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Queensland Competition Authority

Seqwater Operating and Capital Expenditure Review

Assessment of Prudency and Efficiency



Final Report

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REPORT DETAILS

Title:	**Seqwater Operating and Capital Expenditure Review** **Review of Prudency and Efficiency**
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***Synopsis*:**	This report presents the findings of CH2M HILL's review of Seqwater operating and capital expenditure prudency and efficiency. It also presents the approach and results of CH2M HILL's assessment of operating and capital investment planning and procedures against current good practice.

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Executive Summary

The Queensland Competition Authority (QCA) has commissioned CH2M HILL to undertake a review of investment policy and planning procedures, operating expenditure and capital expenditure of the Seqwater bulk water authority. This Review forms part of QCA's broader pricing review, which is the basis of recommendations for future bulk water charges.

CH2M HILL has produced this report based on its review of current Seqwater process documentation, actual capital and operating expenditures for 2013-14 and forecast expenditures over a 13-year period from 1 July 2015 to 30 June 2028.

Introduction and Background

QCA regulates water and wastewater services in Queensland to manage the risk of monopoly pricing, where a business can charge higher prices or provide poorer services compared with those businesses that operate in an open and competitive market. By undertaking economic and pricing regulation of government-owned monopoly water and wastewater services in Queensland, the QCA encourages monopoly businesses to operate responsibly and fairly in the absence of normal competitive market forces.

To inform QCA's recommendations on future water charges and provide assurance that Seqwater is operating responsibly and sustainably, regular reviews of investment prudency and efficiency are carried-out. Recently these have been augmented by reviews of investment decision support instruments, including policy and procedures.

The following sections outline the findings of CH2M HILL's review, with greater detail provided in the body test of the report.

Information Adequacy

Seqwater provided a substantial amount of documentation in support of both its original Review Submission and in response to information requests during the review. The level of responsiveness of Seqwater to CH2M HILL information requests was generally high and the turn-around time for provision of information was rapid.

Not all documentation provided was material to the review and CH2M HILL identified a number of documentation gaps/anomalies that had a material impact on the evidence-base for proposed capital and operational expenditures. Some of these information gaps were a result of new policies and business processes being relatively immature and inconsistently applied. In some instances, an evidence-base could not be established and this resulted in adjustments to proposed expenditures.

Review of operational expenditures was complicated by the late release of new figures that proved to be somewhat flawed. As a result CH2M HILL changed its analytical approach to the review of these figures to ensure robustness of the review outcomes. This involved deeper-level analysis of actual cost information provided from the Seqwater corporate information system and the expenditure forecasts based on these figures.

Policies and Procedure Review

The current Seqwater business is the result of a recent merger of three separate water business and business consolidation is not fully complete. Some energy has been put into the future business framework and CH2M HILL's review of Seqwater Policies and Procedures indicated that Seqwater has a clear vision for its capital and operational planning framework. It is now working towards realising this vision, which in the opinion of CH2M HILL, is capable of achieving good practice outcomes into the future.

It is clear from CH2M HILL's review, that more work is required before a robust and tightly integrated suite of planning/management instruments, enabling processes/systems and a fully aware workforce are in-place. Many of the instruments of the framework are in-development or early roll-out and other legacy processes are being transitioned-out. The result is that there is a lot of inconsistency in how the current instruments are applied in-practice.

Seqwater capital planning processes are underpinned by a robust documentation/approval process and generally require limited staff awareness / guidance to ensure compliance and achieve good practice. The one exception to this is the planning and approvals for capital renewal programs. Minor structural changes to the program investment justification documents and tighter linkage to individual business cases for projects under each program is required to achieve good practice. The two primary factors linking a project to a program should be:

1. Scope (either asset-specific, activity-specific or outcome-specific); and
2. Benefits, linked to currently defined cost drivers.

This approach will eliminate the potential for approval of and draw-down of program budgets by low-value or out-of-scope projects.

Seqwater governance arrangements are well progressed in terms of process and accountabilities. The documents that support the Seqwater governance arrangements and the output documents that demonstrate good governance are however, at an early stage of maturity, impacting the consistency of document content and rigour.

In the current Seqwater policy / procedure environment, it is certain that business efficiencies will be realised as business processes become more mature and therefore, more integrated and streamlined. It is difficult to quantify what these efficiencies may yield in terms of cost-savings, when the recency of the merger impacts the establishment of robust cost baseline.

Operating Expenditure

Seqwater submitted total actual and forecast operating expenditures for the current price path (from 2013-14 to 2017-18) of approximately $1,226.9 million (real 2014 terms). An overview of Seqwater's actual and forecast operating expenditure over this period is outlined in the Table below. It should be noted that the figures presented exclude accounting costs such as depreciation and amortisation and Seqwater's interest expense to Queensland Treasury Corporation (QTC). Contract Services is the largest source of expenditure for the period, accounting for $439.5 million, or approximately 36 percent of total operating expenditure. The second largest cost category is Employee Expenses with $380.8 million over the period, or 31 percent of total operating expenditure.

Seqwater's actual and forecast operating expenditure, 2013-14 to 2017-18 ($M, real 2014)

Cost Category	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Employee Expenses	76.966	75.994	75.880	76.012	76.939	380.791
Contract Labour	4.187	2.805	2.487	2.509	2.509	14.499
Contract Services	79.686	91.788	88.281	90.669	89.063	439.488
Chemicals	12.986	13.845	14.430	14.945	15.495	71.702
Electricity	19.727	19.262	19.602	19.881	20.189	98.661
Other Materials And Services	45.044	44.451	43.266	43.874	45.157	221.792
Total Operating Expenditure	**238.596**	**248.145**	**243.947**	**247.892**	**248.354**	**1,226.934**

Source: Opex model 2014-09-25 Q1 FY15 revised.xlsm as amended by CH2M HILL

CH2M HILL undertook a detailed examination of the prudency and efficiency of a representative sample of operating expenditure categories over the period from 2014-15 to 2027-28. The expenditure categories selected for detailed review are outlined as follows:

- Employee costs including:
  - Employee expenses
  - Contract labour
- Contract Services
  - General Maintenance Services
  - Term Maintenance Contract
  - General Contracting
  - Consultancies
- Materials and services (excluding electricity), including
  - Chemicals expenses
  - Contract services
  - Other materials and services
- Corporate costs related to activities that cannot be reasonably allocated to other cost categories

The above sample of cost categories were identified by the QCA. As a proportion of total actual and forecast operating expenditure, CH2M HILL's review accounted for approximately 91.6 percent of Seqwater's total operating expenditure.

CH2M HILL's review of Seqwater operational expenditure found that forecasted operational expenditures were generally prudent, but that limited evidence was provided to provide confidence that proposed investments were efficient. Operational expenditures in organisations like Seqwater are largely compliance or demand driven. In both instances appropriate investigation will readily identify an appropriate action and therefore, operational investment need. Seqwater is clearly capable of identifying this need and CH2M HILL found no real evidence of spurious cost items in either the actual operational costs presented or the expenditure forecasts.

CH2M HILL did however; identify significant opportunities for efficiency when comparing actual operational expenditures with the proposed forecasts. There were three main factors contributing to the inefficiency from an auditing perspective:

1. A lack of substantiation of large cost movements (generally increases) from actual costs to the forecasts, especially when considering the demand data made available;
2. A lack of transparency in the cost code transition from actual to forecast figures, with the resulting potential for double-counting of costs; and
3. The perpetuation of short-term or one-off expenditures from the 2013/14 year into the annual forecasts.

With regard to the first point, limited justification was provided for cost movements of many of the reviewed operational expenditure items, based on the information provided by Seqwater. To satisfy efficiency review requirements, the proposed investment movements need to be well linked to defined business drivers (both performance and demand) and proven by evidence to be cost-effective. In many cases these requirements were not met.

Cost code movements that could not be effectively explained (as opposed to justified) were generally the result of forecasted cost codes rolling-up a number of actual cost items. Seqwater did clarify which cost codes were rolled-up, but CH2M HILL found that some of these were also carried-through in the forecasts. A number of the cost adjustments recommended by CH2M HILL to eliminate double-counting of expenditures that resulted from this.

Seqwater made a number of high-level corrections to figures provided to address the issue of carrying-through short-term or one-off expenditures from the actual expenditures into the forecast. CH2M HILL found that the adjustments proposed captured some, but not all instances of this carry-through. Where these adjustments were made, limited justification of their quantification or timing was provided.

CH2M HILL's found sufficient evidence in the information provided by Seqwater to satisfy itself that macro budget allocations for operational expenditures were subject to an appropriate level of governance and approval. This did not however, extend to the assessment of or justification for specific expenditures made under these budget heads. CH2M HILL accepts that smaller operational expenditures do not warrant the administrative burden of documentation, but these could be addressed on a program basis. Other operational expenditures are at an equal scale to capital projects that require formal justification and should be dealt with in the same manner as these projects from a project/cost control perspective.

Because the sample of expenditure was such a high proportion of the total operational expenditure, CH2M HILL believes there is no scope for extrapolating review findings to other operational expense items.

A summary of CH2M HILL's prudency and efficiency assessment of each sampled operating expense items is presented in the Table below:

Summary of prudency and efficiency assessment of sample operational expense items ($M, real 2014)

Expense Item (Escalation Category)	Assessment			Forecast Operational Expenditure (million)		
	Prudent	Efficient	Comment	Seqwater Proposed	Adjustment	CH2M HILL Recommended
Employee Costs	Prudent	Inefficient	Salaries and employment benefits have been adjusted to better reflect actual expenditures for these items and the change in FTE numbers from 2013/14 to 2014/15. An adjustment has also been made for the reduction in ICT staff likely as a result of implementing a SaaS delivery model for future corporate information systems.	$1,063.2	-$40.7	$1,022.5
Contract Labour	Prudent	Partially Efficient	The proposed positive adjustment to the forecasts to cover pro-rata disbursement of contract labour costs related to "Comply with QLD Govt and Increase ICT Capability" is not sufficiently substantiated. The adjustment has been reversed.	$35.4	-$0.3	$35.1

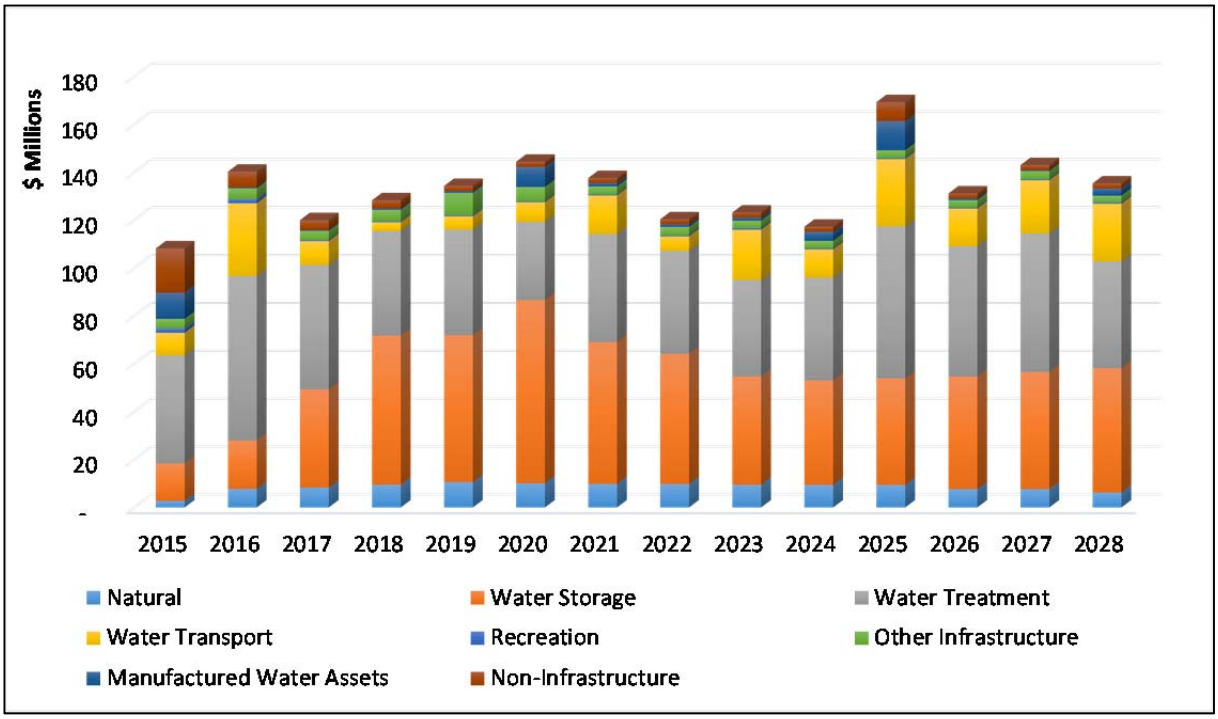
Expense Item (Escalation Category)	Assessment			Forecast Operational Expenditure (million)		
	Prudent	Efficient	Comment	Seqwater Proposed	Adjustment	CH2M HILL Recommended
Contract Services	Prudent	Inefficient	The significant increase from actual to forecast of maintenance delivered under Seqwater panel arrangements has not been substantiated and these have been adjusted to 2012/13 / 2013/14 levels, as appropriate. The significant increase in both general and ICT consultancy expenditures has not been substantiated and these have been adjusted to 2013/14 levels. The significant increase in repair and maintenance projects delivered by Veolia outside the scope of its current maintenance contract has not been substantiated and the forecast has been adjusted to the average of 2012/13 and 2013/14 levels.	$1,229.1	-$171.1	$1,058.0
Chemicals	Prudent	Inefficient	Adjustments have been made to the chemical expenditure forecasts for the AWTP's and Tugun Desalination Plant to better reflect likely expenditures based on plant demand forecasts. Forecasts for "Other Chemicals" cannot be justified based on the information provided by Seqwater and an appropriate adjustment has been made in consideration of likely demands and conditions.	$230.5	-$9.6	$220.8

Expense Item (Escalation Category)	Assessment			Forecast Operational Expenditure (million)		
	Prudent	Efficient	Comment	Seqwater Proposed	Adjustment	CH2M HILL Recommended
Other Materials and Services	Prudent	Inefficient	Adjustments have been made to some legal expenditure items to address the one-off or short-term nature of these expenditures. A three year hire to purchase arrangement has been forecast annually for the provision of PDA/GPS equipment. An adjustment has been made to limit expenditures to three years. The annual forecast for QCA Fees over-estimates these expenditures by one-third and an adjustment has been made.	$619.7	-$68.0	$551.7
Corporate Costs*	Prudent	Inefficient	These costs are already captured in the Expense Items above and have been considered in the adjustments made.			
Total Adjustments				***$3,473.8***	***-$289.8***	***$3,184.1***

Capital Expenditure

Seqwater has submitted a total forecast capital expenditure of approximately $1,853 million (real 2014 terms) over the forecast period of 2014-15 to 2027-28. An overview of Seqwater's forecast capital expenditure, by asset class, is presented in the Figure below. As can be seen, the dominant areas of expenditure relate to water storage (i.e. dams and weirs) and water treatment (i.e. treatment plant) assets.

Seqwater annual forecast capital expenditure by asset class ($M, real 2014)



Source: Seqwater, Capital Program for 2014 Bulk Price Review 2014-09-26 No efficiencies.xlsx

A sample of ten projects were identified and assessed as a representative sample of the capital expenditure program for Seqwater. Details of these projects are presented in the Table below:

Capital projects sampled for detailed prudency and efficiency review ($M, real 2014)

Project	Asset Type	Primary Driver	Planning & Asset Management Stage	Forecast Expenditure (million)[1]
North Pine Dam – Saddle Dam 1 filter buttress, dam parapet wall and bridge raise	Dam	Compliance	System Master Planning & Investment	$102.525
Mount Crosby West Bank WTP – Capacity Upgrade	WTP	Growth	System Master Planning & Investment	$77.381
Somerset Dam – Dam Stabilisation Design	Dam	Compliance	System Master Planning & Investment	$72.000
Lake MacDonald Dam – New Dam	Dam	Compliance	Validation, Planning & Investment Commitment	$63.889
Leslie Harrison Dam – Stage 1 Filter buttress / crest reconstruction	Dam	Compliance	System Master Planning & Investment	$57.756
North Pine WTP Renewals Program	WTP	Renewals	System Master Planning & Investment	$43.802
Mount Crosby to Green Hill Pipeline	Pipeline	Renewals	System Master Planning & Investment	$42.951
Mount Crosby East bank WTP – Filtration Improvements	WTP	Compliance	Validation, Planning & Investment Commitment	$36.540
Mount Crosby West Bank WTP Renewals Program	WTP	Renewals	System Master Planning & Investment	$40.539
Kilcoy WTP Upgrade[2]	WTP	Compliance	Implementation	$17.822
Total Sample (10 Projects)				**$555.205**
Percentage of total forecast capital expenditure				**30%**

Note:
1 Forecast expenditure to be incurred over the regulatory period from 2014-15 to 2027-28
2 Project is programmed to be commissioned in 2014-15, forecast expenditure includes total expenditure incurred to date plus forecast expenditure in 2014-15.

CH2M HILL's assessment of the prudency and efficiency of the sample capital projects highlighted a variable, but generally adequate level of justification of project prudency. That is, most projects reviewed were able to be substantiated on the grounds of the following cost drivers:

- Legal / Regulatory obligation;
- Growth; or
- Infrastructure Replacement.

A range of concerns were raised however, in CH2M HILL's assessment of the efficiency of the capital projects reviewed. These concerns centred on the clarity and transparency of project cost substantiation and in-particular:

- The basis / origin of unit rates applied in project estimates;
- The alignment of project cost estimates and the stated scope / standard of work;
- The alignment of project costs with relevant capital program budgets.

As a result of these concerns, CH2M HILL has assessed a number of the projects reviewed as inefficient and recommended adjustments to the reported capital expenditure accordingly.

CH2M HILL has assessed the prudency and efficiency of approximately 30 percent of Seqwater's proposed capital expenditure over the forecast period from 2014/15 to 2027/28. CH2M HILL has considered the validity of applying further adjustments to un-sampled capital expenditure based on the assessment and findings of sampled capital expenditure. For the purposes of this Review, however, CH2M HILL is of the view that this is not appropriate.

A summary of CH2M HILL's prudency and efficiency assessment of each representative capital project is presented in the Table below:

Summary of prudency and efficiency assessment of sample capital projects ($M, real 2014)

Project Name	Assessment			Forecast Capital Expenditure (million)		
	Prudent	Efficient	Comment	Seqwater Proposed	Adjustment	CH2M HILL Recommended
North Pine Dam – Saddle Dam 1 filter buttress, dam parapet wall and bridge raise	Prudent	Efficient	Primary driver has been demonstrated, and the project is supported by an adequate decision-making process. Proposed scope of works appears reasonable and standard of works are in line with industry good practice. Cost estimate is supported by sufficient evidence and appears reasonable.	$102.525	-	$102.525
Mount Crosby West Bank WTP – Capacity Upgrade	Prudent	Inefficient	The primary driver of compliance has been demonstrated, and the project is supported by an adequate decision-making process to date. However, due to uncertainty in existing cost estimates, the complexity of upgrading the site, and requirement for further detailed investigation, CH2M HILL considers that the lower current cost estimate of $35 million should be included in Seqwater's proposed forecast capital expenditure for the purposes of establishing an appropriate price path.	$77.381	-$ 42.381	$35.000

Project Name	Assessment			Forecast Capital Expenditure (million)		
	Prudent	Efficient	Comment	Seqwater Proposed	Adjustment	CH2M HILL Recommended
Somerset Dam – Dam Stabilisation Design	Prudent	Inefficient	The primary driver has been demonstrated, and the project is supported by a clear, consistent and transparent decision-making process to date. Proposed scope of works appears reasonable and standard of works are in line with industry good practice. However, sufficient evidence with supporting substantiation has been provided to demonstrate that the cost estimate for this project should be reduced from $72 million to $33.815 million.	$72.000	-$ 38.185	$33.815
Lake MacDonald Dam – New Dam	Prudent	Efficient	Primary driver has been demonstrated, and the project is supported by a clear, consistent and transparent decision-making process. Proposed scope of works appears reasonable and standard of works are in line with industry good practice. Cost estimate appears reasonable and is based on a 30 percent detailed design.	$63.889	-	$63.889
Leslie Harrison Dam – Stage 1 Filter buttress / crest reconstruction	Prudent	Efficient	Primary driver has been demonstrated and the project is supported by an adequate decision-making process. Proposed scope of works appears reasonable and standard of works are in line with industry good practice. Cost estimate is supported by sufficient evidence and appears reasonable.	$57.756	-	$57.756

Project Name	Assessment			Forecast Capital Expenditure (million)		
	Prudent	Efficient	Comment	Seqwater Proposed	Adjustment	CH2M HILL Recommended
North Pine WTP Renewals Program	Partial	Partial	Primary drivers have been demonstrated in eight of the nine projects reviewed and the projects are supported by decision-making processes that have some room for improvement. Proposed scopes of work are generally reasonable, but the standards of work are not well articulated. Cost estimates also appear reasonable, but are supported by variable levels of evidence and the level or rigour applied in cost build-up is generally insufficient for larger projects. A significant jump in capital expenditures has been noted beyond the planning horizon of the documents reviewed which cannot be explained.	$43.802	-$0.068	$43.734
Mount Crosby to Green Hill Pipeline	Prudent	Inefficient	The cost drivers for the programs have been demonstrated, and part of the program is supported by an adequate decision-making process. Proposed scope of works for the cathodic protection sub-program appears reasonable and standards of work are in line with industry good practice. However, CH2M HILL notes that insufficient evidence has been provided to support the cost estimate of $42.951 million.	$42.951	-$42.951	-

Project Name	Assessment			Forecast Capital Expenditure (million)		
	Prudent	Efficient	Comment	Seqwater Proposed	Adjustment	CH2M HILL Recommended
Mount Crosby East bank WTP – Filtration Improvements	Prudent	Efficient	Primary driver has been demonstrated, and the project is supported by a clear, consistent and transparent decision-making process. Proposed scope of works appears reasonable and standard of works are in line with industry good practice. Cost estimate is supported by sufficient evidence and appears reasonable.	$36.540	-	$36.540
Mount Crosby West Bank WTP Renewals Program			Primary drivers have been demonstrated for all seven projects reviewed and the projects are supported by decision-making process where there is some room for improvement. Proposed scopes of work are reasonable, but the standards of work could be better articulated. Cost estimates also appear reasonable for the levels of expenditure being sought. A significant jump in capital renewal expenditures was noted beyond the planning horizon of the documents reviewed which cannot be explained.	$40.539	-	$40.539
Kilcoy WTP Upgrade[2]	Prudent	Efficient	Primary driver has been demonstrated, and the project is supported by an adequate decision-making process. Proposed scope of work appears reasonable and standard of works are in line with industry good practice. A change management process was in place and project appears to be delivered within the revised *Post Market Budget Review* cost estimate.	$17.822	-	$17.822

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Glossary

Corporate Costs	Relate to those general corporate expenditure items that are central in nature and cannot be reasonably allocated to other cost types.
Inflation	The increase in prices and fall in the purchasing value of money.
DAFF	Dissolved air filtration floatation, a water treatment process that clarifies wastewater by the removal of suspended matter such as oils and solids.
DLH DLM DNP DSO PMC TEB TKY TNP TWB	Leslie Harrison Dam Lake McDonald Dam North Pine Dam Somerset Dam Mount Crosby Pipeline Mount Crosby East Bank Treatment Plant Kilcoy Water Treatment Plant North Pine Water Treatment Plant Mount Crosby West Bank Water Treatment Plant
Annual Operation Plan	Defines the operational strategies and supporting program of work that Seqwater intends to apply in the following year.
Asset Portfolio Master Plan (APMP)	A long-term (30 year) planning document that defines the future operational approach for the Seqwater system.
PAS55	The British Standard for Asset Management Maturity Assessment and Implementation
ISO 55000	The International Standard for Asset Management Maturity Assessment and Implementation, based on PAS55
D&C	Design and Construct, a method of procurement that bundles the design and delivery project components together.

Abbreviations

ABS	Australian Bureau of Statistics
ACIF	Australian Construction Industry Forum
AFC	Acceptable Flood Capacity
ANCOLD	Australian National Committee of Large Dams
AOP	
APMP	Asset Portfolio Master Plan
AS	Australian Standard
CA	Certified Agreement
CIS	Corporate Information System
CPI	Consumer Price Index p52
DAFF	Dissolved air filtration floatation
DEWS	Department of Energy and Water Supply
DSC	Dam Safety Committee
DWQIP	Drinking Water Quality Improvement Plan
EBA	Enterprise Bargaining Arrangement
EGWWS	Electricity, gas, water and waste services
ELT	Executive Leadership Team
FAMP	Facilities Asset Management Plan
GAWB	Gladstone Area Water Board
HAACP	Hazard Analysis and Critical Control Points
IFHC	Incremental Flood Hazard Category
IIMM	International Infrastructure Management Manual
IPWEA	Institute of Public Works Engineering Australia
IRG	Investment Review Group
KPI	Key Performance Indicator
LOS	Level of Service
MDMM	Mean day maximum month
NAMS	New Zealand Asset Management Support (non-profit organisation)
NPC	Net Present Cost
PLC	Programmable Logic Controller
PMF	Probably Maximum Flood
PRA	Portfolio Risk Assessment
PwC	PricewaterhouseCoopers
QCA	Queensland Competition Authority
QTT	Queensland Treasury and Trade
QWC	Queensland Water Corporation
RBA	Reserve Bank of Australia
RFI	Request for Information
SCADA	Supervisory Control and Data Acquisition
SEQ	South-East Queensland
SKM	Sinclair Knight Merz (now Jacobs)
SOP	System Operating Plan
UV	Ultraviolet
WPI	Wage Price Index
WSP	Water Security Plan
WSAP	Water Supply Asset Plan
WTP	Water Treatment Plant

1 Introduction

1.1 Overview

The Queensland Competition Authority (QCA) has been directed by the Queensland Treasurer and Minister for Trade to investigate the monopoly bulk water supply pricing practices of the South-East Queensland Bulk Water Supply Authority (Seqwater) with the objective of recommending bulk water prices for the period of 1 July 2015 to 30 June 2018.

The QCA has engaged CH2M HILL to undertake a review of Seqwater's operating and capital expenditure (the Review) to assist it to assess actual and forecast operating and capital expenditure of Seqwater that contribute to the total costs to be recovered by bulk water prices. For the purposes of this Review, CH2M HILL has specifically investigated Seqwater's actual capital and operating expenditure from 2013-14, estimated actual expenditure for 2014-15 and forecast expenditure over a 13-year period from 1 July 2015 to 30 June 2028.

1.2 Background

The objectives of QCA's investigation of the pricing practices of Seqwater: the government-owned monopoly bulk water supplier for South-East Queensland; is to recommend bulk water prices for the period from the 1st July 2015 through to the 30th June 2018. In doing so, the QCA seeks to protect users from the potential adverse financial consequences of monopoly provider while enabling bulk water suppliers to recover the efficient costs of their large capital investments.

In recommending prices for the three remaining years of the 10-year bulk water price path, the QCA is also required to consider the need for sufficient revenue for Seqwater to recover prudent and efficient costs incurred from providing bulk water supply services over the period from the 1st July 2015 to the 30th June 2028.

1.2.1 The role of QCA

The QCA is an independent Statutory Authority established by the *Queensland Competition Authority Act 1997* and is given the task of regulating prices, access and other matters relating to regulated industries in Queensland.

The QCA regulates water and wastewater services in Queensland to manage the risk of monopoly pricing, where a business can charge higher prices or provide poorer services compared with those businesses that operate in an open and competitive market. By undertaking economic and pricing regulation of government-owned monopoly water and wastewater services in Queensland, the QCA encourages monopoly businesses to operate responsibly and fairly in the absence of normal competitive market forces.

1.2.2 Role of Seqwater

Seqwater is responsible for ensuring a safe, secure and reliable bulk drinking water supply for South-East Queensland (SEQ), as well as providing essential flood mitigation services. Seqwater is also responsible for providing irrigation services to approximately 1,200 rural customers in five water supply schemes.

Seqwater owns and operates 26 dams, 47 weirs and 14 bores and aquifers which combined, supply as much as 90% of SEQ's drinking water. Seqwater is also responsible for a range of supply assets, including 46 water treatment plants, a 600 kilometre bulk supply pipeline

network, the Gold Coast Desalination Plant and the Western Corridor Recycled Water Scheme.

Seqwater was formed on 1 January 2013 through a merger of three State-owned water businesses, the SEQ Water Grid Manager, LinkWater and the former Seqwater in accordance with the *South East Queensland Water (Restructuring) Act 2007* as amended by the *South East Queensland Water (Restructuring) and Other Legislation Amendment Regulation (No.1) 2012*. Seqwater is now also responsible for the long term planning of the region's future water needs, a function that was formerly undertaken by the Queensland Water Commission.

Seqwater supplies bulk water to eleven councils either directly or through two multi-council owned water retailers (Queensland Urban Utilities and Unitywater). It is the bulk water charges to these entities and the capital and operational costs that contribute to these charges that are the subject of this Review.

1.3 Objectives and scope of this Review

The objective of this Review is to assist the QCA to assess the prudency and efficiency of Seqwater's actual and forecast operating and capital expenditure that contribute to the total costs to be recovered by bulk water charging. As part of this Review, CH2M HILL has been directed to consider:

- Seqwater's actual capital and operating expenditure from 2013-14
- Seqwater's estimated actual capital and operating expenditure for 2014-15
- Forecast capital and operating expenditure over a 13-year period from the 1st July 2015 to the 30th June 2028.

CH2M HILL's Review consists of three distinct components to assist the QCA's investigation of Seqwater's pricing practices:

- **Component 1 – Policies and planning review:** Assess whether Seqwater's capital and operating policies and procedures are consistent with good industry practice, taking into account Seqwater's approach to:
  - Asset management, and whether Seqwater can demonstrate a high-performing asset management program that incorporates, among other aspects, detailed asset inventories, operation and maintenance tasks, and long-range financial planning to build system capacity at the lowest life-cycle cost
  - Capital expenditure planning and delivery, including governance, gateway and approval arrangements, linkages between asset management and planning and expenditure prioritisation, risk analysis, options analysis, and engagement with customers
  - Procurement practices and procedures
  - Legal Compliance

  In undertaking Component 1, CH2M HILL is required to consider the implications for operating and capital expenditure and identify opportunities for improvement.

- **Component 2 – Prudency and efficiency of operating costs:** Assess whether Seqwater's operating expenditure (specifically employee costs, materials and services, and corporate costs) from 1 July 2013 to 30 June 2028 is prudent and efficient, including:
  - Describing the drivers of significant increases in 2014-15 operating expenditure relative to 2013-14 and 2012-13
  - Assessing whether the unit rates and indexes used to escalate operating costs from 2014-15 to 2027-28 are consistent with prevailing market conditions and historical trends
  - Assessing whether each of the sampled cost items are required to meet Seqwater's requirements relating to its legal and regulatory obligations or its contracts with external agencies (i.e. prudent) and expenditure is undertaken in a least-cost manner over the life of the relevant assets and is consistent with relevant benchmarks (i.e. efficient)
  - Identifying the value of any expenditure considered not to be prudent or efficient
  - Identifying whether any causes of imprudent or inefficient expenditure can be extrapolated to other, un-sampled operating expenditure
  - Identify any efficiency gains or economies of scale sought or achieved by Seqwater, and identify a prudent and efficient level of future gains with reference to appropriate benchmarks

  In undertaking Component 2 of the Review, CH2M HILL was required to have regard to the strategic and operational plan approved by the responsible Ministers under the South East Queensland Water (Restructuring) Act 2007.

  CH2M HILL must accept Seqwater's demand forecasts, provided that they include a long term residential demand of 184 lpd (litres per person per day) and a non-residential demand of 91 lpd (not including demand from power stations and Toowoomba Regional Council).

- **Component 3 – Prudency and efficiency of capital expenditure:** Assess whether Seqwater's capital expenditure from 1 July 2013 to 30 June 2028 is prudent and efficient, including:
  - Assess whether sampled capital expenditure projects is required as a result of a legal obligation, new growth, renewal of existing infrastructure, or it achieves an increase in the reliability or the quality of supply that is explicitly endorsed or desired by customers, external agencies or participating councils (i.e. prudent)
  - Assess whether the scope of the works is the best means of achieving the desired outcomes having regard to the options available; the standard of the works conforms with relevant technical, design and construction requirements; and the cost of the defined scope and standard of works are consistent with conditions prevailing in the markets for engineering, equipment supply and constructions (i.e. efficient)
  - Identify the value of any expenditure considered not to be prudent or efficient

- Identify whether any causes of imprudent or inefficient expenditure can be extrapolated to other, un-sampled capital expenditure
- Assess whether the unit rates and indexes used to escalate capital expenditure costs from 2014-15 to 2027-28 are consistent with prevailing market conditions and historical trends
- Identify any efficiency gains or economies of scale sought or achieved by Seqwater, and identify a prudent and efficient level of future gains with reference to appropriate benchmarks

In undertaking Component 3 of the Review, CH2M HILL was required to have regard to the strategic and operational plans approved by the responsible Ministers under the South East Queensland Water (Restructuring) Act 2007.

CH2M HILL was also required to accept Seqwater's demand forecasts, provided that they include a long term residential demand of 184 litres per person per day (L/p/d) and a non-residential demand of 91 L/p/d (not including demand from power stations and Toowoomba Regional Council).

A copy of the full Terms of Reference for CH2M HILL's Review is included in **Appendix A**.

1.4 Report structure

This report discusses and presents CH2M HILL's key findings and recommendations arising from the assessment of Seqwater's planning and policy procedures and forecast operating and capital expenditure to be incurred by Seqwater over the period from 1 July 2015 to 30 June 2028. Specifically:

- **Section 1** provides background on the scope and objectives of this Review
- **Section 2** presents the methodology adopted by CH2M HILL in reviewing the prudency and efficiency of Seqwater's forecast operating and capital expenditure
- **Section 3** provides a commentary on the adequacy of information received as part of this Review
- **Section 4** presents the findings of CH2M HILL's review of Seqwater's policies and planning procedures, including its approach to asset management, capital planning and delivery, procurement and legislative compliance
- **Section 5** presents the findings of CH2M HILL's prudency and efficiency assessment of the sample operating expenditure incurred and forecast by Seqwater
- **Section 6** presents the findings of CH2M HILL's prudency and efficiency assessment of the sample capital expenditure incurred and forecast by Seqwater

2 Review Methodology

2.1 Overview

CH2M HILL's Review of Seqwater's operating and capital expenditure comprised the following main activities:

- A desktop review of information provided by Seqwater in its initial Price Monitoring Submission
- Preparation of an initial Request for Information that identified key supporting information required to effectively undertake the Review. This was submitted to Seqwater on the 20th August 2014
- The development of a *Capital and Operating Expenditure: Good Industry Practice* paper that defined accepted good industry practice with respect to capital and operating policies and procedures. This was submitted to QCA on the 20th of August 2014
- A Polices and Planning Workshop held at Seqwater's Ipswich office on the 27th of August 2014. This workshop to provided Seqwater representatives an opportunity to present their capital and operating policy and planning procedures and provide more detail on their context than could be gained from a desktop review
- The review and assessment of Seqwater's capital and operating policies and procedures against accepted good industry practice, taking into account the documents received in response to the initial RFI and knowledge gained in the August 27 workshop
- A desktop review of information provided by Seqwater in support of its Submission, both during and subsequent to the meetings with its representatives
- Interviews held at Seqwater's Ipswich office on the 24th and 25th of September to clarify details of the specific capital projects and expenditure categories under review.
- The detailed review of key elements of sampled operating expenditure to assess the efficiency of such expenditure
- The detailed review of key elements of sampled capital expenditure to assess the prudence and efficiency of such expenditure
- Synthesis of data obtained from the above evaluation to draw conclusions in respect of the prudency and efficiency of actual and forecast operating and capital expenditure
- Preparation of this report to document the findings of the Review.

CH2M HILL also referenced the findings presented in previous price investigation reviews of Seqwater to assess whether issues raised in these reviews had been closed-out where applicable.

The following sections outline the basis upon which the prudence and efficiency of expenditure has been assessed.

2.2 Assessment of policies and planning procedures

The first component of CH2M HILL's Review was the investigation and assessment of policies and planning procedures implemented by Seqwater to support the planning, approval and delivery of capital and operational investments. In particular, CH2M HILL assessed whether Seqwater procedures, policies processes were consistent with good industry practice.

CH2M HILL developed a *Capital and Operating Expenditure: Good Practice Paper* that outlined current regional industry norms in capital and operational expenditure and provided a baseline for transparent assessment of Seqwater's current practices. CH2M HILL's *Capital and Operating Expenditure: Good Practice Paper* is presented in **Appendix B**.

Effective and robust planning frameworks provide the context and strategic direction for capital and operational planning, and enable an organisation to demonstrate that its investment decisions have been prudent and appropriately targeted. The Paper outlined a high-level checklist of considerations or success factors in key areas of business function related to capital and operational expenditure. These areas include:

- Corporate Planning
- Service Levels
- Capital Investment Planning
- Asset Management
- Procurement
- Governance
- Investment Decision-support Systems.

The Paper identified the primary considerations for good practice in each of the above functional areas. CH2M HILL's review of Seqwater's policies and planning procedures involved:

- Assessing whether the primary considerations and success factors for each functional area where in place and could be readily identified
- Testing the rigour of Seqwater's policies and planning procedures by assessing whether there was demonstrable evidence that those policies and planning procedures were being applied consistently and appropriately throughout the organisation.

The detailed reviews of operating and capital expenditure were the primary mechanism of capturing evidence of process compliance.

2.3 Assessment of prudency and efficiency

For the purposes of this Review, QCA has adopted the following definitions with respect to prudency and efficiency:[1]

- **Operating expenditure** is **prudent** if it is required to meet Seqwater's requirements relating to its legal and regulatory obligations or its contracts with external agencies

[1] Queensland Competition Authority, 2014. *Terms of Reference – Seqwater Opex and Capex Review,* pp.2-4.

- **Operating expenditure** is **efficient** if it is undertaken in a least-cost manner over the life of the relevant assets and is consistent with relevant benchmarks
- **Capital expenditure** is **prudent** if it is required as a result of a legal obligation, new growth, renewal of existing infrastructure, or it achieves an increase in the reliability or the quality of supply that is explicitly endorsed or desired by customers, external agencies or participating councils
- **Capital expenditure** is **efficient** if:
    i. The scope of the works (which reflects the general characteristics of the capital item) is the best means of achieving the desired outcomes after having regards to the options available, including more cost-effective regional solutions, the substitution possibilities between capital and operational expenditure and non-network alternatives, such as demand management
    ii. The standard of the works conforms to technical, design and construction requirements in legislation, industry and other standards, codes and manuals. Compatibility with existing and adjacent infrastructure is relevant as is consideration of modern engineering equivalents and technologies. Compliance with regulatory obligations is likely to be highly relevant
    iii. The cost of the defined scope and standard of works is consistent with conditions prevailing in the markets for engineering, equipment supply and constructions. The consultant must substantiate its view with reference to relevant interstate and international benchmarks and information sources. For example, the source of comparable unit costs and indexes must be given and the efficiency of costs justified. The consultant should identify the reasons for any costs higher than normal commercial levels.

In assessing the prudency of capital and operating expenditure, CH2M HILL considered the following:

- The basis (driver) for the investment
- The outputs (and benefits) associated with each project or expenditure program
- The methods by which projects and initiatives were identified and developed, including the application of any risk based processes used to prioritise projects or initiatives
- The planning and design processes used to develop projects, and evidence of options considered and design development

In undertaking the assessment of expenditure efficiency, CH2M HILL undertook an assessment of the following:

- Project needs analysis, options studies and business cases to ascertain whether the preferred investment will achieve both the service level required and the lowest sustainable, whole-of-life cost.
- The current stage of the design development (as this provides an indication of the likely accuracy of any cost estimates)

- The processes used to develop cost estimates, including a review of key cost components, unit rates and escalation factors
- Assumptions made for overheads, contingencies, taking into account the stage of design development and typical allowances made within the industry
- The proposed method of procurement, taking into account the stage of design development

3 Overview of Information Adequacy

3.1 Summary of information provided

The information support of the review was provided exclusively in digital format and comprised: Adobe PDF documents; Microsoft Word documents; Microsoft Excel spreadsheets and saved Microsoft Outlook message files. Seqwater provided spreadsheet files providing details of the context and content of many of the files provided to assist in the review.

The data was provided in the following broad categories:

- The Initial Submission documents
- Documents supporting the Policy and Planning Review
- Documents supporting review of Operating Expenditure
- Documents supporting review of Capital Expenditure

CH2M HILL also sourced documentation of previous Seqwater reviews and Seqwater corporate documentation on the public domain from the QCA and Seqwater websites, respectively to support our review.

Details of these documents are provided in the following sections:

3.2 Initial Submission and Previous Review Documentation

The following documents were either provided by QCA at the Review Kick-off Meeting on the 11th of August 2014 or sourced from the QCA website. These include the original Seqwater Submission documents as well as the Prudency and Efficiency documents produced for the 2012-13 Review. The specific documents gathered were:

Current Review

- *Referral-Notice-for-Bulk-Water-Review.pdf*: Treasurer and Minister for Trade Referral Notice for Review of Seqwater Bulk Water Prices 2015-2018, dated 05/05/2014
- *Seqwater Submission.pdf*: Seqwater Bulk Water Prices 2015 to 2018 Submission to the Queensland Competition Authority, Final Issue, dated 31/07/2014
- *Appendix A.pdf*: Seqwater Bulk Water Supply System Interim Operating Strategy 2014-2029, Original Issue, dated 03/07/2014
- *Appendix B.pdf*: Seqwater Annual Operations Plan – May 2014, Final Issue, dated 30/05/2014
- *Appendix C.pdf*: Jacobs Independent Review of Cost forecasts for the Gold Coast Desalination Project Ref: QE06934R001 | 2, dated 30/06/2014
- *Appendix D.pdf*: Jacobs Independent Review of Cost forecasts for the Western Corridor Recycled Water Scheme Ref: QE06934R002 | 4, dated 01/07/2014

Seqwater supplied two additional Appendices to the Seqwater submission document on the 21st of August 2014, as detailed below:

- *App E- Cost escalation PWC (Final Report).pdf*: PwC Report Cost Escalation forecasts: Supporting documentation for Seqwater's QCA submission, , dated May 2014

- *APP F- Dams and Weirs Capital Works Program - Final for QCA submission.pdf*: URS Report Dams and Weirs Capital Works Program, dated 27/05/2014

Previous Review

- *Seqwater-2012-13-Submission.pdf*: Seqwater 2012-13 Grid Service Charges Submission to the Queensland Competition Authority, dated February 2012
- *SEQ-Water-Grid.pdf*: Water Grid Manager 2012-13 Grid Service Charges Submission to the Queensland Competition Authority, undated
- *SEQ-Grid-Service-Charges-2012-13.pdf*: QCA Report: SEQ Grid Service Charges 2012-13, Final Report, dated July 2012
- *Grid-Service-Providers-Costs-of-Debt.pdf*: QTC Response to QCA RFI on Forecast Costs of Debt, dated 30/03/2012
- *Seqwater-submission-re-Draft-Report-Cover-Letter.pdf*: Seqwater Cover Letter to 2012-13 Grid Service Charges: Response to Draft Report of the Queensland Competition Authority, dated 28/05/2012
- *Seqwater-submission-re-Draft-Report.pdf*: Seqwater 2012-13 Grid Service Charges: Response to Draft Report of the Queensland Competition Authority, dated May 2012
- *SKM-Assessment-of-Capital-and-Operating-Expend-Linkwater.pdf*: SKM Report: Grid Service Charges 2012-2013: Phase 2 – Assessment of Capital and Operating Expenditure: Grid Service Provider: Linkwater, dated June 2012
- *SKM-Assessment-of-Capital-and-Operating-Expend-Seqwater.pdf*: SKM Report Grid Service Charges 2012-2013: Phase 2 – Assessment of Capital and operating Expenditure: Grid Service Provider: Seqwater, dated June 2012

3.3 Policies and planning

Policy and planning documentation was supplied by Seqwater in response to CH2M HILL requests for information or to provide substantiation in support of enquiries made during the course of the Review targeted interviews. This documentation generally fell into the following broad categories:

- Policies
- Strategies and Plans
- Procedures
- Guidelines and Manuals
- Templates
- General

Specific details of the files provided in each of these categories are presented below. Details of these documents have only been provided where the document name is not self-evident.

Policies

- *POL-00013 Corporate – Risk Management Policy Statement.pdf,* dated 18/06/2014
- *POL-00025 Corporate – Non-Current Asset Accounting Policy.docx,* Rev 3, dated 25/03/2013
- *Procurement Policy – POL0045_D14-48800.pdf,* Rev 2, dated 14/04/2014
- *POL-00052 Corporate – Asset Management Policy Statement.pdf,* dated 18/06/2014

- *Item 45 POL-00053 Corporate - Audit and Risk Committee Charter.pdf,* dated 04/03/2014
- *POL-00065 Corporate – Financial Sustainability Policy Statement.pdf,* dated 18/06/2014
- *POL-00073 Corporate – Capital Investment Governance Charter.docx,* First Draft, dated 28/11/2014
- *POL-00076 Corporate – Compliance Policy.pdf*: Covering Regulatory and Corporate compliance, Original Version, dated 08/04/2014.

Strategies and Plans

- *20130605 A4 Strategic Plan at a glance_final.pdf, Seqwater Strategic Plan 2013-2018 Outline, undated*
- *Asset Management Planning Strategy (Draft).pdf,* dated 2014
- *PLN-00059 Corporate – Strategic Asset Management Plan.pdf,* Original Version, dated 18/05/2009
- *PLN-00112 Corporate Asset Delivery –Asset Management Framework.docx,* Rev 2, dated 18/03/2013
- *PLN-00191 Corporate Procurement – Strategic Procurement Plan.docx,* Rev 1, dated 23/07/2013
- *TEB 1 - Bulk Water Supply System Interim Operating Strategy 2014-2029 FINAL.pdf,* dated 03/07/2014
- *Brand and Integrated Marketing Strategy - Overview October QCA 2.1.pdf,* dated May 2014

Processes and Procedures

- *03.6 A - Water Security Program Process Map.pdf,* Seqwater-developed map of WSP process, undated
- *Scheduled Maintenance Process V0 5 2.pdf,* Seqwater-developed map of scheduled maintenance process, undated
- *PRO-01336 Corporate Procurement – Decision Matrix Procedure.xlsx,* undated
- *Procurement Procedure – PRO01514_D14-48711.pdf,* Rev 2, dated 16/04/2014
- *PRO-01583 Corporate – PRO-01583 Controlled Documents Management Procedure.pdf,* Rev 1, dated 04/09/2013
- *PRO-01786 Corporate Finance – Operating Projects procedure (4).docx,* Final Version, dated 19/08/2013
- *D13 31258 Project Change Request Process - Change Management Procedure - Procedure,* Original Version, undated
- *Criticality Assessment Methodology.docx*, Seqwater guidance on asset criticality assessment procedure, undated

Guideline Documents and Manuals

- *Budget Guidelines 14-15.docx,* Original Version, undated
- *Capital V Operating Costs.docx,* Draft Accounting Direction, undated
- *GDE-00041 Corporate Asset Delivery - Cost Estimation Guidelines.pdf,* Final Version, dated 15/05/2012
- *MAN-00046 - Corporate - Procurement Handbook V3.docx,* Rev 3, dated 06/08/2014

- *DNP20 - Guidelines on Acceptable Flood Capacity for Dams - Queensland Government - 2013.pdf, Original Version, Department of Energy and Water Supply document, dated January 2013*
- *DNP21 - Queensland Dam Safety Management Guidelines - Queensland Government - 2002.pdf, Original Version, Department Natural Resources and Mines document, dated February 2002*
- *MAN-00076 Corporate - Delegations and Authorisations Manual.docx,* Rev 9, dated 18/06/2014
- *Capital V Operating Costs.docx, Accounting Direction – Capital Works: Capital vs Operating (Guideline), undated*
- *02.11 A - Contract Delegations to Investment and Procurement Committee - Board Meeting June 2014 – PRINTED.docx,* Investment Procurement Committee Charter, undated

Template Documents

- *TEM-00058 Corporate - Business Case (Major Project) Template.docx,* dated 24/07/2012
- *TEM-00059 Corporate - Business Case (Medium Project) Template.docx,* dated 24/07/2012
- *TEM-00060 Corporate - Business Case (Minor Project) Template.docx,* dated 24/07/2012
- *TEM-00061 Corporate - Needs Analysis (Asset) (Major Project) Template.docx,* dated 24/07/2012
- *TEM-00062 Corporate - Needs and Options Analysis (Medium Project) Template.docx,* dated 24/07/2012
- *TEM-00064 Corporate - Business Case (Asset) (Minor Project) Template.docx,* dated 24/07/2012
- *TEM-00065 Corporate - Needs Analysis (Major Project) Template.docx,* dated 24/07/2012
- *TEM-00066 Corporate - Options Analysis (Major Project) Template.docx,* dated 24/07/2012
- *TEM-00067 Corporate - Needs and Options Analysis (Asset) (Medium Projects) Template.docx,* dated 24/07/2012
- *TEMPLATE - WTPs Long Term Planning Report_LTPR_July_2014.pdf,* dated 03/06/2014

Supporting Documents

- *Capital and Minor Works Procurement Framework.pdf,* Internal Briefing Note, dated 04/03/2014
- *ELT Presentation - Portfolio Management FINAL.pdf,* Internal Presentation, undated
- *07July14_ReportJuneData.pdf,* Asset Maintenance Report for June 2014, dated July 2014
- *Cranes TMP.docx,* Example Tactical Maintenance Plan for Cranes and Winches, undated
- *Cranes Job Plan.docx,* Example Job Plan for Cranes and Winches, undated

3.4 Operating expenditure

Operating expenditure documentation was supplied by Seqwater in response to CH2M HILL requests for information or to provide an evidence base for the specific operational expenditure categories reviewed. The information provided by Seqwater could be categorised in terms of the CH2M HILL RFI headings, as follows:

- Benchmarking
- Employee Expenses
- Expenditure Reconciliations and Drivers
- Operating Cost Breakdown
- Operational Expenditure Initiatives
- Service Standards

Details of the files provided under each of these groupings are provided below:

Benchmarking

- *SEQWATER14 ICT Expenditure Review DRAFT Report 310714.pdf,* KPMG Draft Report on Seqwater ICT Strategy and Expenditure Regulatory Readyness Assessment, dated July 2014
- *SWP benchmarking paper cathcments (sic) 28072014.pdf,* Synergies Economic Consulting Report on Benchmarking of Source Water Protection Expenditure, dated April 2014

Employee Expenses

- *J000782 Our Seqwater EBA doc4[1].pdf,* Seqwater Certified EBA Agreement 2013-2016, undated
- *Jan - Jun 14 Savings tracker.xlsx,* Seqwater spreadsheet showing employee-identified savings initiatives for the January – June 2014 period enabled by the EBA efficiency arrangements
- *Approved savings for contingent increase 1 January 2014.xlsx,* Actual savings realised through the EBA efficiency arrangements, dated 04/12/2013
- *Overtime by Location as at 20 June 2014 FINAL.pdf,* Seqwater breakdown of staff overtime from general ledger, dated 20th June 2014
- *Overtime by Region as at 20 June 2014 FINAL.pdf,* Seqwater breakdown of staff overtime from general ledger, dated 20th June 2014
- *Overtime by Team as at 20 June 2014 FINAL.pdf,* Seqwater breakdown of staff overtime from general ledger, dated 20th June 2014
- *Superannuation.docx,* Seqwater summary of superannuation payments for FY15Q1, undated
- *Employer Expenses by Natural Acct – 1314 Actuals vs Q1F15.xlsx,* Reconciles budget/forecast cost account codes to actual expenditure account codes, undated
- Seqwater Employee Expense Methodology.docx – Provides detail on how employees expense forecasts are developed
- ICT response – FTE reduction.docx – SPT/ICT Business Group providing detail on ICT staff demand
- Redundancies.docx – Seqwater clarification on determination of redundancy expenditure forecasts

Expenditure Reconciliations and Drivers

- *07.4 - Final 2014-15 Budget - Board Meeting March 2014.docx,* Seqwater Final Budget Board Submission, dated 19/03/2014
- *07.4 A - Analysis of Fixed Operating Expenses - Board Meeting March 2014.docx,* Seqwater Supporting Paper to Final Budget Board Submission, dated 19/03/2014
- *07.4 B - Statement of Comprehensive Income 2014-15 - Board Meeting March 2014.docx,* Seqwater Supporting Paper to Final Budget Board Submission, dated 19/03/2014
- *2014-15 Budget Parameters - Opex Justification - WTP.docx,* 2014/15 budget parameters for operational expenditure justification – WTP Team, Northern Region, undated, unsigned
- *2014-15 Budget Submission (OPEX costs) - Water Supply Planning team.docx,* 2014/15 budget parameters for operational expenditure justification – Water Supply Planning Team, undated, unsigned
- *2014-15 Budget Submission (OPEX costs) by Asset Capability & Sustainability Team.docx,* 2014/15 budget parameters for operational expenditure justification – Asset Capability and Sustainability Team, undated, unsigned
- *CEO Report - SCI March 14.xlsx,* Spreadsheet containing the data underpinning the March 2014 Statement of Comprehensive Income Paper, dated 31/03/2014
- *CEO Report June 13.xlsx,* Spreadsheet containing the data underpinning the June 2013 Statement of Comprehensive Income Paper, dated 30/06/2013
- *Initiative Assessment Submission - Health Based Targets Assessment.docx,* Example of a business initiative expenditure justification – Health-based target assessment, undated, unsigned
- *Initiative Assessment Submission - Resourcing Plan 2014-15.docx,* Example of a business initiative expenditure justification – Reduction of contingent Project Management resources, undated, unsigned

Operating Cost Breakdown

- *Aggregate OPEX data 2014-08-22 Q3 2014.xlsx,* Spreadsheet containing operational budget data for 2014-15 and actual operational expenditure for 2012/13, dated 22/08/2014 – **Subsequently superseded**
- *Seqwater opex data 26-9-14 consolidated.xlsx,* Spreadsheet containing consolidated actual operational expenditure for 2012/13, 2013/14 and 2014/15, dated 26/09/2014
- *OPEX model 2014-09-25 Q1 FY15 revised.xlsx,* Spreadsheet containing revised operational budget data for 2014-15 and actual operational expenditure for 2012/13
- *Q1 narratives.xlsx,* Spreadsheet detailing the variance of operational expenditures between 2014/15 forecasts and 2013/14 actuals
- *20120831CR_Review MWA operations_Final report_FINAL_with attachments.pdf, Seqwater* Review of operating arrangements for the Western Corridor Recycled Water Scheme and Gold Coast Desalination Plant, dated 31st August 2012
- *20140327 Letter to Ben Bowen re GCDP 2028 Budget Assumptions v3.pdf, Seqwater* to Veolia requesting a detailed cost forecast for the Gold Coast Desalination Plant, dated 27th March 2014
- *20140327 Letter to Ben Bowen re WCRW 2028 Budget Assumptions v3.pdf, Seqwater* to Veolia requesting a detailed cost forecast for the Western Corridor Recycled Water Scheme, dated 27th March 2014

- *WCRWS Q1 opex forecast Veolia.xlsx,* Veolia Spreadsheet containing 2014-2028 operational expenditure forecasts for Western Corridor Recycled Water Scheme
- *220140929_ OCRW QCA - Contractor Services overview.docx, Seqwater* overview of Contractor Services expenditures, undated
- *ALL CONTRACT PRICES - as at 01-09-14.xlsx,* Spreadsheet presenting current chemical supply contract prices, dated 01/09/2014
- *Q1 Chemical budgets.xlsx,* Spreadsheet presenting current chemical budgets for 2014/15 Q1, undated
- *Copy of MtCrosbyEBWBEnergyReportRev1.xlsx,* Spreadsheet presenting energy usage for Mt Crosby in 2009/10, undated
- *Q1 Scheduled-Reactive-Planned Maintenance budgets.xlsx,* Spreadsheet presenting current budgets for 2014/15 Q1 Reactive and Planned Maintenance, undated
- *Seqwater Play It Safe campaign 2014 - October QCA 2.4.pdf, Seqwater presentation* presenting details of the Play it Safe Campaign, dated September 2014

Operational Expenditure Initiatives

- *Our strategic focus areas - Getting ahead of the game.pdf,* Seqwater staff communique outlining strategies to achieve operational efficiencies, dated 23/06/2014
- *Opex efficiencies support.docx,* Paper outlining how Seqwater is targeting/achieving operational cost efficiencies, undated

Service Standards

- *Performance reporting list.xlsx,* Spreadsheet developed in response to the RFI detailing all performance reporting in Seqwater, supplied on 28/08/2014
- *REF-00268 Statement of Obligations - QBWSA.pdf,* Statement of Obligations issued to Seqwater for 2013 by the Treasurer and Minister for Trade and Minister for Energy and water Supply, undated
- *bulk-water-supply-code.pdf,* A Department of Energy and Water Supply (DEWS) document supported by Legislation that regulates the supply of bulk water, dated 01/01/2013
- *seq-system-operating-plan5.pdf,* Defines the operational response to achieving the level of service objectives set for the South-East Queensland Region, Rev 5, dated 18/12/2012 (superseded)
- *Levels of Service.pdf,* Water Amendment Regulation (No. 1) 2014 Subordinate Legislation 2014 No. 151, A key driver of bulk water level of service obligations related to demand and storage for Seqwater, undated
- *Seqwater WQ Annual Report 12-13 Report.xlsx,* Seqwater Annual Report to the Regulator on drinking water quality for 2012-13, dated 17/12/2013
- *2012-13 DWQMP Annual Report.pdf,* A Department of Energy and Water Supply (DEWS) document supported by Legislation that regulates the supply of bulk water, dated 01/01/2013
- *D14 74617 Seqwater Quarterly Performance Report Period Ending June 2014 - Final for DEWS Treasury.pdf,* Business Performance Report against the Seqwater Operational Plan for Q4 2014, undated
- *D14 91452 03.1 B Business Performance Report - August 2014 Board Meeting.pdf,* Monthly Performance Report to the Board for the month of July 2014 on the status of business KPIs, undated

- *D14 91455 03.1 C Operations Dashboard - August 2014 Board Meeting.pdf,* Graphical summary of rolling annual operational KPIs for the Board, undated
- *03.1 B Business Performance Report - Board Meeting September 2014 (Aug….pdf,* Monthly Performance Report to the Board for the month of September 2014 on the status of business KPIs, undated
- *03.1 C Operations Dashboard - Board Meeting September 2014.pdf,* Graphical summary of rolling annual operational KPIs for the Board, undated
- *Customer confidence report Zone 1, June 2014.pdf,* Summary of Zone 1 water health and aesthetic performance measures for the month of July 2014, undated
- *Customer confidence report Zone 2, June 2014.pdf,* Summary of Zone 2 water health and aesthetic performance measures for the month of July 2014, undated
- *Customer confidence report Zone 3, June 2014.pdf,* Summary of Zone 3 water health and aesthetic performance measures for the month of July 2014, undated
- *Customer confidence report Zone 4, June 2014.pdf,* Summary of Zone 4 water health and aesthetic performance measures for the month of July 2014, undated
- *Various email messages demonstrating how water quality monitoring results outside of the service level envelope are automatically flagged and communicated.*

3.5 Capital expenditure

Capital expenditure documentation was supplied by Seqwater in response to CH2M HILL requests for information and provided support for investment in the Projects identified for review. The information was provided to CH2M HILL in the following groupings, which are largely project-based:

- General Background Information
- DLH Leslie Harrison Dam - Project Delivery - Stage 1 Filter Buttress Crest Reconstruction
- DLM Lake McDonald Dam- Project Delivery - New Dam
- DNP North Pine - Project Delivery - Saddle Dam 1 Filter
- DSO Somerset Dam - Project Delivery Dam Stabilisation Design
- PMC PI Mt Crosby to Green Hill-Renewals
- TEB Capacity Upgrade to 350MLD
- TEB Filtration Improvements (resilience)
- TKY Kilcoy WTP Upgrade (Under Construction)
- TNP North Pine WTP – Renewals
- TWB Mount Crosby West Bank WTP – Renewals

Details of the files provided under each of these groupings are provided below:

General Background Information

- *Preliminary Planning Criteria Paper - FINAL.docx,* Paper documenting Seqwater Preliminary Service Specifications and Planning Criteria for the Bulk Water System, dated 08/04/2014
- *Project Documentation Master.xlsx,* Spreadsheet presenting detailed background information on the Projects identified for review, undated
- *TEB 5 - Asset Portfolio Master Plan 2014.pdf,* Original Version, undated
- *Asset Portfolio Development and Delivery 2014 15 Infrastructure Investment Program.pdf,* Original Version, dated 15/02/2014
- *Seqwater Dams PRA - First Strategy Report_20131211.pdf,* URS Report on the Seqwater Dams Portfolio Risk Assessment and Risk Management Strategy, dated 22/11/2013
- *DNP17 - PRA Work Program - Business Case - Dam Safety Upgrades - 2013-2014 and 2014-2015.pdf,* URS Business Case for Dam Safety Upgrades, dated 24/07/2012
- *DNP18 - Dams PRA - Dam Safety Risk Management Strategy Report - Final ~ URS Australia Pty Ltd 2013.pdf,* URS Report on the Seqwater Dams Portfolio Risk Assessment and Risk Management Strategy, dated 22/11/2013 (from North Pine Filter directory)
- *DNP19 - 42627348 - Seqwater Dams Capital Works Program.pdf,* URS Report on the Seqwater Dams and Weirs Capital Works Program, dated 27/05/2014 (from North Pine Filter Directory)
- *DNP20 - Guidelines on Acceptable Flood Capacity for Dams - Queensland Government – 2013.pdf,* Department of Energy and Water Supply document, dated January 2013 (from North Pine Filter directory)
- *DNP21 - Queensland Dam Safety Management Guidelines - Queensland Government – 2002.pdf,* Department of Natural Resources and Mines Document, dated February 2002 (from North Pine Filter directory)
- *DNP22 - Referable Dams Portfolio Risk Assessment - Business Case - December 2011.pdf,* Seqwater Business Case for undertaking the Referable Dams Portfolio Risk Assessment, dated 04/08/2011 (from North Pine Filter directory)
- *Seqwater Valuations Report - 24 06 2013 (2).pdf,* Cardno Report on the valuation of Seqwater Infrastructure Assets, dated June 2013 (from Mt Crosby / Green Hill, North Pine Renewals and Mount Crosby Renewals Directories)
- *Attachment 1a -Capital and Operating Investment Methodology.pdf,* Cardno Report on the Reservoir Management Program investment approach, dated January 2012

DLH Leslie Harrison Dam - Project Delivery - Stage 1 Filter Buttress Crest Reconstruction

- *DLH1 - Leslie Harrison Dam - Safety Conditions - 2009.pdf,* Dam Safety Condition Schedule for Leslie Harrison Dam, dated February 2009
- *DLH5 - Leslie Harrison Dam - Acceptable Flood Capacity (AFC) Study - GHD -2011.pdf,* dated October 2011
- *DLH6-LeslieHarrisonDam_Dams Portfolio Risk Assessment_2013_URS_SuppFirstStrategy.pdf,* URS Report on Seqwater Dams Portfolio Risk Assessment: Leslie Harrison Dam, dated November 2013

DLM Lake McDonald Dam- Project Delivery - New Dam

- *DLM5_Lake Macdonald_Six Mile Creek Dam_Lake Macdonald Dam Safety Upgrade_Concept and Options_URS Aus.pdf,* URS Option Selection and Concept Design Summary Report, dated 14/02/2014
- *DLM6_Lake Macdonald Dam_Six Mile Creek Dam_Safety Upgrade Option Selection and Concept Design Project_URS_2014.pdf,* URS URS Option Selection Report, dated 14/02/2014
- *DLM8_Lake Macdonald Dam_Six Mile Creek Dam_Dam Safety Upgrade_Detailed Concept Design_BC_2014.pdf,* URS Detailed Concept Design Report (Business Case), dated 20/12/2010
- *DLM9-Lake Macdonald_Dam Safety Upgrade Implementation_Corporate_Business Case_Six Mile Creek Dam_Project ID 00141.pdf,* dated 18/06/2014
- *DLM10-Lake Macdonald Dam_Six Mile Creek Dam_Safety Upgrade Option Selection and Concept Design_Options Review_URS_2014.pdf,* dated 14/02/2014
- *02.03 - Lake MacDonald Upgrade Business Case - Board Meeting June 2014 – PRINTED.docx,* Seqwater Cover Letter to Business Case, dated June 2014
- *02.4 A - Business Case Lake MacDonald Dam Safety Upgrade - IPC Meeting June 2014.pdf,* Seqwater Business Case, dated 04/06/2014
- *Lake MacDonald - Capital Program for QCA - Memo.pdf,* Seqwater description of capital program development process for Lake MacDonald Dam project, dated 25/09/2014

DNP North Pine - Project Delivery - Saddle Dam 1 Filter

- *DNP1 - North Pine Dam -AFC Assessment - 2012 - URS.pdf,* URS Acceptable Flood Capacity Report, dated 09/02/2012
- *DNP12 - Appendix K_Conceptual Upgrade Option Sketches.pdf,* Appendix K to the URS Acceptable Flood Capacity Report: Upgrade Option Sketches, assumed to be dated 09/02/2012
- *DNP16 - North Pine Dam - Safety Conditions - 2009.pdf,* Dam Safety Condition Schedule for North Pine Dam, dated February 2009

DSO Somerset Dam - Project Delivery Dam Stabilisation Design

- *DSO1 - Somerset Dam - Safety Conditions - 2009.pdf,* Dam Safety Condition Schedule for Somerset Dam, dated May 2009
- *DSO2 - Somerset Dam - Acceptable Flood Capacity (AFC) and Concept Design Report - 2011 - Entura.pdf,* Entura Acceptable Flood Capacity Report, Rev 0, dated 16/12/2011
- *DSO4 - Somerset Dam - 20 year Safety Review Report - 2014 – URS.pdf,* URS document, dated 17/03/2014
- *DSO8 - Somerset Dam - Flood Upgrade Options Feasibility Study - Scope of Works - June 2014.pdf,* Seqwater Upgrade Options Feasibility Study Brief, dated 25/06/2014
- *Lake Somerset - Risk Information – Memo.pdf,* Seqwater Memo detailing release of new information on Somerset Dam capital expenditure for Review, dated 25/09/2014

PMC PI Mt Crosby to Green Hill-Renewals

- *00 Main Document - QCA Response Mt Crosby Green Hill.xlsx,* Seqwater spreadsheet presenting the approach taken to planning of capital expenditures for the Mt Crosby to Green Hills Pipeline renewal, undated
- *Mt Crosby-Green Hill-Renewals V 1.2 submitted.xlsx,* Spreadsheet presenting specific information on the Green Hill Renewals Project, based on the RFI, Ver 1.2, undated

- *Pipeline Network Detailed Desktop Study - Tyco June 2011.pdf,* Tyco Report for Linkwater on the Desktop Study of the Condition of the Pipeline Network, dated 30/06/2011
- *Pipeline Condition Management Scope Planning Report - Final.pdf,* GHD Report for Linkwater on Pipeline Condition Management Scope Planning, dated March 2012
- *Pipeline 30 Year Program and Implementation Plan - Final.pdf,* GHD Report for Linkwater on the Pipeline Management 30-Year Program of Works, dated January 2013
- *PJR-13-46 Trunk Mains - Cathodic Protection Program.pdf,* Seqwater Project Justification Report for review of eight schemes under the Cathodic Protection Program, undated
- *Attachment 2a - PJR 31.docx,* Linkwater (GHD) Project Justification Report for eight schemes under the Cathodic Protection Program, dated 16/11/2011
- *Attachment 4- Scheme 16 and 24 - Savcor Investigation.pdf,* Savcor Project Investigation Report for the Mt Crosby to Green Hill and Sparkes Hill to Green Hill Cathodic Protection Projects, dated 18/05/2012
- *Attachment 5 - Scope Cost.pdf,* Theiss Services letter detailing project scope and cost, dated 25th January 2013
- *Attachment 6a Theiss LinkWater Turnkey Project.xlsx,* Theiss Services breakdown of project costs, undated (but assumed to be an attachment of the letter above)
- *Attachment 6-Cathodic Protection Upgrade Program.pdf,* Theiss Services Savcor detailed investigation report for project

TEB Capacity Upgrade to 350MLD

- *TEB 2 - Mt Crosby Needs Analysis Investment Planning 2014.pdf,* Seqwater Major Project Needs Analysis for future asset improvements at Mt Crosby, dated 25/08/2014
- *TEB 2 - UPDATED Mt Crosby - Needs Analysis (Major Project) Future Asset Improvement Investments.pdf,* Seqwater Major Project Needs Analysis for future asset improvements at Mt Crosby, dated 25/08/2014 (signed and supersedes original)
- *TEB 3 - Mt Cosby WTPs Options Analysis (Major Project)-Future Asset Improvement Investments.pdf,* Seqwater Major Project Options Analysis for future asset improvements at Mt Crosby, dated 25/08/2014
- *TEB 3 - UPDATED - Mt Crosby - Options Analysis (Major Projects) Future Asset Improvement Investments.pdf,* Seqwater Major Project Options Analysis for future asset improvements at Mt Crosby, dated 26/08/2014 (signed and supersedes original)

TEB Filtration Improvements (resilience)

- *TEB 10 Mt Crosby WTP Options Development - Options and Concept Design Report - SKM.pdf,* SKM Report: Covers whole of plant process improvements, dated January 2012
- *TEB 11 D14 84450 Needs Analysis (Asset) (Major Project) Mt Crosby Critical Process Improvements.pdf,* SKM Report: Short-term Critical Process Improvements, dated 12/09/2012
- *TEB 4 Mt Crosby WTPs- Long Term Planning Executive Summary Report.pdf,* Seqwater Report, dated 27/08/2014
- *TEB 6 Options Analysis Report_WP 3 and 4_Rev0 chemical storage handling dosing mixing and filter refurbishment.pdf,* SKM Report: Mt Crosby Water Treatment Plants: Critical Process Improvements – Feasibility and Preliminary Design: Options Analysis Report, dated July 2014
- *TEB 7 D14 62112 Mt Crosby Long term planning Options 2014 NPV.pdf,* Spreadsheet NPV calculations: source unknown, undated

- *TEB 8 Memo Process Risk matrix and asset planning criteria.pdf,* Seqwater Memo describing the methodology employed in developing the sedimentation and filtration flow rate risk matrix, dated 8/05/2014
- *TEB 9 East Bank WTP Filter Refurbishment Preliminary Design Report.pdf,* SKM Report: Preliminary Design of the East Bank Filter Refurbishment, dated February 2014
- *TEB 12 Mt Crosby Eastbank GÇô Pathogen assessment for planning.pdf,* Seqwater Internal Report, dated May 2014
- *TEB 13 D14 6470 Appendix 12.1 Improvement Plan WIPv6 TEB.pdf,* List of process improvements and some project risk details, cannot ascertain which document this is an Appendix to, undated
- *TEB 14 D14 99195 Cost Estimation - Filter Refurbishment air grid options design costs.pdf,* Source unknown but assumed to be Seqwater, dated 16/12/2013

TKY Kilcoy WTP Upgrade (Under Construction)

- *KWTP 1 Project Budget & Cost Allocation.pdf,* Source unknown but assumed to be Seqwater, undated
- *KWTP 5 Kilcoy WTP Board Paper Rev 8.pdf,* Seqwater Board Record of Project Details and Approval, unsigned, undated
- *KWTP 6 Kilcoy WTP Post Market Budget Review - QCA issue 13 July.pdf,* Seqwater review of Project budget subsequent to Board approval and development of the Business Case, unsigned, dated 23/05/2011
- *KWTP 3a Scope Change Register.pdf,* Seqwater Register, undated
- *KWTP 3b SCR 079 - APPROVED - HACCP SCADA.pdf,* Seqwater Form – Scope Change Request, dated 29/03/2013
- *KWTP 3c SCR 055 - REJECTED - Chemical Tank Roller Door.pdf,* Seqwater Form – Scope Change Request, dated 29/1/2012
- *KWTP 3d SCR090 APPROVED - Safety Review Items.pdf,* Seqwater Form – Scope Change Request, undated
- *KWTP 4 Site General Arrangement.pdf,* Seqwater Drawing – Project General Arrangement, unsigned, undated
- *KWTP 2 Monthly Report.pdf,* Seqwater Summary Report of Project for the month of July 2014, undated

TNP North Pine WTP - Renewals

- *FAMP - North Pine WTP Final (88017).pdf,* Seqwater Facility Asset Management Plan for North Pine WTP, dated 20/07/2011
- *NORTH PINE WTP - RENEWALS V1.4 - Submitted.xlsx,* Spreadsheet presenting specific information on the North Pine WTP Renewals Program, Response to initial RFI, Ver 1.4, undated
- *D14 45473 PID01661 Business Case North Pine WTP - Modify Sedimentation Basins 1 & 2 Traveling Bridge.pdf,* Seqwater Business Case, dated 14/04/2014
- *D14 46786 PID01654 TNP - Business Case - North Pine WTP - Repair to Flocculation and Mixing Chambers.pdf,* Seqwater Business Case, dated 28/04/2014
- *D14 46796 BC North Pine WTP - Sludge Thickening Tank Concrete Repair.pdf,* Seqwater Business Case, dated 28/04/2014

- *D14 49724 Business Case - North Pine WTP - Replace the Generator - D14 49724(2).pdf,* Seqwater Business Case, dated 05/05/2014
- *D14 62169 Business Case - North Pine WTP - install fall arrest systems on building roofs (approved 13-14).pdf,* Seqwater Business Case, dated 06/05/2014
- *D14 55346 PID01659 TNP - Business Case - North Pine WTP - Sump Pump Upgrade.pdf,* Seqwater Business Case, dated 20/05/2014
- *D14 59250 PID01183 Business Case - North Pine WTP - Replacement of Fluoride Hopper.pdf,* Seqwater Business Case, dated 03/06/2014
- *D14 59252 North Pine WTP - Replace Roof Sheets at Administration Building.pdf,* Seqwater Business Case, dated 03/06/2014
- *D14 61768 Business Case - North Pine WTP - Replace PLC 101 and 102.pdf,* Seqwater Business Case, dated 10/06/2014
- *North Pine Renewals Example Documentation.pdf,* Seqwater Business Case, dated 10/06/2014

TWB Mount Crosby West Bank WTP - Renewals

- *FAMP - Mt Crosby WB WTP June 2011 Final (88089).pdf,* Seqwater Facility Asset Management Plan for Mt Crosby West Bank WTP, dated 28/04/2014
- *TWB Budget Analysis V 1.1 submitted.xlsx,* Spreadsheet presenting specific information on the Mt Crosby West Bank WTP Renewals Program, Response to initial RFI, Ver 1.1, undated
- *D14 43852 BC Mt. Crosby West Bank WTP - Replace Alum Dosing System Pipework.pdf,* Seqwater Business Case, dated 28/04/2014
- *D14 55023 Business Case - Mt Crosby West Bank Water Treatment Plant GÇô Overhaul Centrifuge.pdf,* Seqwater Business Case, dated 05/05/2014
- *D14 59793 Business Case - Mt Crosby West Bank WTP GÇô Overhaul No 5 Raw Water Pump and Motor.pdf,* Seqwater Business Case, dated 04/06/2014
- *D14 61763 Business Case Mt Crosby West Bank WTP GÇô Refurbish No 7 DAFF Recycle Pump.pdf,* Seqwater Business Case, dated 03/06/2014
- *D14 63787 20140602 345 PID01392 - TWB Mt Crosby West Bank WTYP – Replace Sump Pump in Raw Water Well 2.pdf,* Seqwater Change Request Form, dated 02/06/2014
- *D14 65545 Business Case - Mt Crosby West Bank WTP GÇô Replace Waste Water Pumps and Motors.pdf,* Seqwater Business Case, dated 10/06/2014

3.6 Obstacles and limitations

The primary obstacle presented to this review by the documentation provided by Seqwater is the lack of a consistent documentation framework to assess against. This obstacle it the result of a number of factors including:

- The recent amalgamation of Seqwater, Linkwater and Water Grid Manager and the fact that many legacy planning/justification documents for each of these entities remain current;
- The relative immaturity of the proposed integrated planning / documentation framework planned for Seqwater, which results in:
    - Changes in document content as they are developed / improved; and

- Inconsistent application of document intent, largely driven by a developing awareness of documentation context
- Some overlap of document decision-support (ie. More than one document may be used to justify an element of expenditure)

This situation required the reviewer to consider each document in the context of the planning framework in-place at the time of document creation. Even when this is done however, CH2M HILL found many instances in our review where the expenditure audit trail was not well established. In-particular, it was difficult to track in documentation provided, the factors influencing budget changes and their subsequent approval.

Seqwater's Submission document was well structured and developed, but the documentation underpinning the submission required additional documentation to provide the necessary evidence-base for the review. The evidence-base needed to support both the justification for planned expenditures and an end-to-end planning process, where the end point in one stage of the planning cycle could be identified at the start of the next stage. Provision of review documentation in full appreciation of this requirement would have significantly expedited the review.

CH2M HILL encountered difficulty in reconciling the figures provided in the Seqwater submission with those provided in the original expenditure spreadsheets. The majority of the reconciliation discrepancies were the result of shortcomings in referential transparency and were resolved by referencing other supporting documents.

Analysis of expenditures was further impacted by the release of updated operational and capital figures late in the review program. CH2M HILL understands that the figures were updated to reflect the 2014 Q3 Actual figures, which showed a material saving over budget forecasts. The result of the re-cast figures is that the Seqwater submission no longer provided the level of support to the figures provided than was previously the case.

The new spreadsheet provided for operational expenditures in-particular employed different cost codes for actual expenditure years and forecast years. In addition, this spreadsheet included computational errors in the formulae applied, which impacted forecasts for cost items that were demand-driven. This required additional time to diagnose and significantly impacted cost transparency.

3.7 Conclusions

Seqwater staff members have been generous of their time to meet with CH2M HILL and forthcoming with information or clarifications when these have been requested. As the review progressed, CH2M HILL found a number of documentation gaps/anomalies that have a material impact on the evidence-base for proposed capital and operational expenditures and in some instances this evidence-base could not be established.

Some of the information gaps in the documentation provided for capital expenditures are considered by CH2M HILL to be a function of macro business processes being in early development and staff still coming up-to-speed with them. This in-development phase remains somewhat convoluted as legacy planning documents transition-out and new ones phase in.

Other information gaps related to capital expenditures are considered to be a result of inconsistent application of policy, often with a logical rationale that did not find its way into

the documentation. This makes retrospective assessment of prudency and/or efficiency by someone outside the business difficult.

Review of operational expenditures was complicated by the late release of new figures that proved to be somewhat flawed. As a result CH2M HILL changed its analytical approach to the review of operational expenditure figures to ensure robustness of the review outcomes. This involved deeper-level analysis of actual cost information provided from the Seqwater corporate information system and the expenditure forecasts based on these figures.

Limited information could be provided by Seqwater to support cost movements identified from actual costs to the proposed forecasts. This is primarily because no institutionalised tracking of these expenditures occurs beyond budget justification/allocation.

4 Policy and Planning Procedures Review

4.1 Introduction

Policies provide clear guidance on business objectives and strategy to enable consistent and aligned decision-making across all aspects of a business. Effective policies and their uniform adoption therefore, drive business efficiency, through improved resource utilisation and also facilitate good governance, through clear articulation of business direction.

Planning is the practice of looking ahead to determine the optimal actions and resources required to achieve stated policy objectives into the future. In the water business context, this includes the identification of future actions to address forecast water demands and network/business influences, opportunities and risks. Planning is typically implemented as a number of processes within a business framework underpinned by procedures, both of which should be well documented.

In terms of capital and operational investment, effective policies and planning frameworks allow an organisation to demonstrate that its investment decisions are prudent, appropriately targeted and therefore, efficient. They achieve this by presenting a transparent process workflow, supported by policy, which recognises the requirement for appropriate consideration of needs, risk identification and approvals.

This section provides an overview of CH2M HILL's assessment of Seqwater's policies and planning procedures that underpin operating and capital planning and investment against good industry practice. As outlined in Section 2, CH2M HILL has developed a *Capital and Operating Expenditure: Good Practice Paper* to provide a baseline for transparent assessment of Seqwater's current practices. CH2M HILL's *Capital and Operating Expenditure: Good Practice Paper* is presented in **Appendix B**.

Where inconsistencies against good industry practice have been identified, CH2M HILL has sought to consider implications for operating and capital expenditure where appropriate and to identify potential opportunities for improvement.

4.2 Seqwater Business Context

Seqwater was formed on 1 January 2013 through a merger of three State-owned water businesses: the South East Queensland Water Grid Manager; LinkWater; and the former Seqwater. The merger was enabled by the *South East Queensland Water (Restructuring) Act 2007,* as amended by the *South East Queensland Water (Restructuring) and Other Legislation Amendment Regulation (No.1) 2012*.[2] As part of the structural reform of the South East Queensland water industry at the time of the merger, Seqwater also assumed responsibility for long-term water resource planning which was previously undertaken by the Queensland Water Commission.[3]

Key drivers for Seqwater policy and planning are:

- The *Statement of Obligations*: a document enabled under the South East Queensland Water (Restructuring) Act 2007 that sets the expectations of the Responsible Ministers for Seqwater;

[2] Seqwater, 2013. *Annual Report 2012-2013,* p.5.
[3] The Queensland Water Commission ceased operations on 1, January 2013.

- Legislative requirements, including desired levels of service objectives;
- The environmental and health requirements of relevant Regulators;
- The current Australian Drinking Water Guidelines, which drives water quality requirements and the achievement thereof; and
- Customer and Stakeholder requirements/needs.

Since the recent merger, Seqwater has consolidated the policies and planning procedures of the three pre-merger entities into a single suite of policies and a comprehensive planning framework. With limited time since the merger, the planning framework is complete, but many of the instruments that support it are either legacy documents yet to be superseded, interim documents or newly developed.

While it is recognised that Seqwater is in the process of developing new business-wide systems and planning initiatives supporting capital and operational expenditure, CH2M HILL must review the effectiveness of Seqwater's current existing and interim policies and planning procedures in delivering prudent and efficient operating and capital investment.

4.3 Corporate Planning

Corporate Planning is the mechanism employed by organisations to assure delivery of business objectives through the alignment of all business activities with these objectives. This is achieved through the development of appropriate business strategies, the identification of investments and actions to deliver these strategies and the implementation of a suite of performance measures to drive and track whether the strategies are or have been effective.

There is no uniform standard for the suite documentation required to meet Corporate Planning requirements. In the Australian water industry, many of these documents and their structure are often mandated by external parties, but they generally do not meet all corporate planning requirements. The result is that water agencies tend to have to fill-in the gaps with other documentation or augment the content of mandated documents to achieve good corporate planning outcomes.

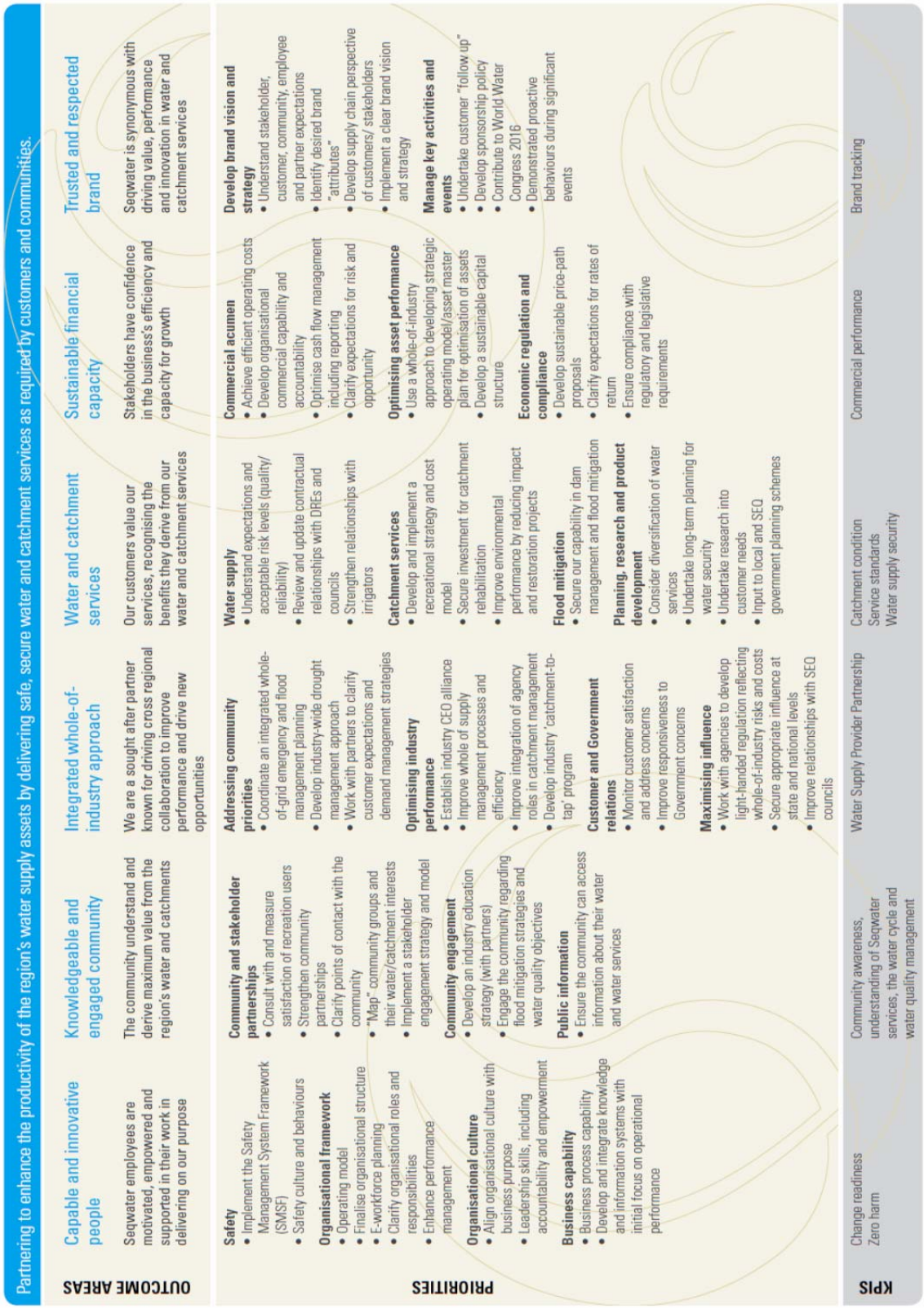
The *Statement of Obligations* is the primary driver for Corporate Planning in Seqwater. This document requires Seqwater to regularly develop Strategic and Operational Plans. It also requires Seqwater to report achievement against the defined Guiding Principles (objectives) quarterly and in the Annual Report.

4.3.1 Strategic Plan

The Seqwater Strategic Plan comprises two pages and in this respect, appears to serve as an output document for an underlying planning process. It is a mid-term planning document, covering a five-year time horizon. The first page of the Seqwater Strategic Plan outlines the business vision, purpose/role in the water sector and the likely future issues that will impact the business over the defined planning horizon.

The second page outlines how Seqwater will achieve its business objectives in the current environment through the definition of outcome areas and priorities that focus business resources on activities of greatest benefit. An excerpt of the current Strategic Plan (2013-2018) is presented in Figure 4-1 overleaf:

Figure 4-1: Strategic Plan Outcomes, Priorities and KPIs



There is good alignment of the outcome areas with the Statement of Obligation and reasonable linkage between the outcome areas and priorities. It is noted that the primary focus of priorities defined in the current Seqwater Strategic Plan is on development and implementation of corporate capability in support of the Outcome Areas. This demonstrates that the post-amalgamated Seqwater organisation is still in the process of finalising business consolidation.

Linkage of defined KPIs to the priorities defined is very tenuous and this highlights the risks of such an abridged approach to strategic planning. In addition, the KPIs defined are too general in nature and insufficiently described to drive achievement or performance improvement without further substantiation.

The Seqwater Strategic Plan sets high-level context for capital and operational expenditure which is captured in more detailed Seqwater Planning documents and therefore, has limited direct influence on investment prudency and efficiency.

4.3.2 Operational Plans

Seqwater operational planning is currently driven by the *System Operating Plan (SOP)*. This 2012 document was developed by the Queensland Water Commission, many of the functions of which have now been transferred to Seqwater. It is understood that the *SOP* will be superseded in the near future by the *Water Security Program* which will be developed by Seqwater.

The *SOP* sets the desired levels of service for the bulk water system as well as the risk criteria that will apply when combined storage reduces to levels that might require mitigation measures, including demand management. The *SOP* also details the Operating Rules that will apply for any plan related to water resources.

The *SOP* mandates the development and regular update of a number of Plans related to water operations, supply and security, with specific detail on the parameters to be monitored and reported. This includes the development of the *Annual Operations Plan*, where the document content and method of development are prescriptively detailed.

Seqwater provided its *Annual Operations Plan*, dated May 2014 for this Review. This document has been developed in consultation with key Seqwater clients and fulfils all of the requirements detailed in the *SOP*. It presents current issues and opportunities in the water system on a regional basis and outlines the strategies put in-place to address them, with due regard for:

- The Levels of Service set-out in the Water Regulation*;*
- All other Regulatory compliance requirements;
- The outcome areas and priorities in the Strategic Plan;
- Key transfer and supply arrangements and approaches;
- The opportunities and constraints inherent in the water system assets; and
- The outcomes of storage / transport modelling that can consider a number of future demand scenarios.

A fundamental tenet of this Annual Operations Plan is to optimise the balance of water security and cost. This document ultimately informs the operational approach that will be applied over the next five-years and the likely funding requirements of this approach. It is expected that the content of the Annual Operations Plan will be captured in the future *Water*

Security Program (WSP), which is a newly legislated requirement under the *Water Act 2000*. The first Seqwater WSP is scheduled for completion in June 2015.[4] By the end of 2015, the WSP will also incorporate the planning detail currently provided in the Water Supply Asset Plan.

The Seqwater *Year 2013 Water Supply Asset Plan* (WSAP) is the current supporting document to the *Annual Operations Plan*. It provides greater detail on both the methodology applied in developing the demand scenarios and the system changes necessary to meet each scenario investigated. It also considers collaborative approaches Seqwater seeks to employ with water supply-chain partners to address future demands in the most cost-effective manner. The WSAP presents high-level capital budget forecasts by asset class, based on the "Most Likely" demand scenario modelled.

It is recognised by Seqwater that the current WSAP focusses primarily on demonstrating compliance with LOS objectives and does not provide a robust 'whole of system' integrated approach to planning. This planning obligation is currently being progressed through the development of the WSP. As part of the WSP, Seqwater is seeking to develop a comprehensive 30-Year Integrated Master Plan to assist with providing an integrated, whole-of-system and whole-of-life cost optimised approach to planning.

4.3.3 Annual Report

CH2M HILL originally reviewed the 2013 Seqwater Annual Report and was subsequently provided the 2014 Annual Report when it was completed in late September. Both reports are structured very similarly to Annual Reports produced by other bulk water authorities in the Queensland regulatory environment. Both reports also effectively link Seqwater Outcome Areas to Government objectives.

Of most significance to this Review are the Key Performance Indicators reported in the Annual Report and the Operational Performance in-particular. In this respect, it was beneficial to review both 2013 and 2014 Annual reports as it highlighted significant improvements in KPI reporting, but also showed a reduction in the KPIs reported in the area of investment optimisation.

The 2013 Report presented KPIs as key statistics, with no information on the context and limited detail on the target for these figures. In contrast, the 2014 Report generally presented indicators that were both relevant and measurable. It is noted that many of the KPIs in the 2014 Report have an "improvement against baseline" target. This may be appropriate, given Seqwater is likely to still be in the process of establishing robust targets. Continuation with this KPI target strategy for too long may however, may impact sustainability or lead to over-investment in certain business areas. CH2M HILL also recommends that performance trends are graphed in the future to demonstrate business improvement and/or to highlight emerging issues.

With regard to KPI coverage: we note between the 2013 and 2014 reports, a shift away from reporting compliance at an asset class level and operational program delivery achievement. This shift is one of a number of indicators that Seqwater may have made a conscious decision to separate corporate and operational planning processes. It follows that the 2014 Annual Report provides less support to the review of operational and capital expenditure prudency and efficiency than the 2013 Report.

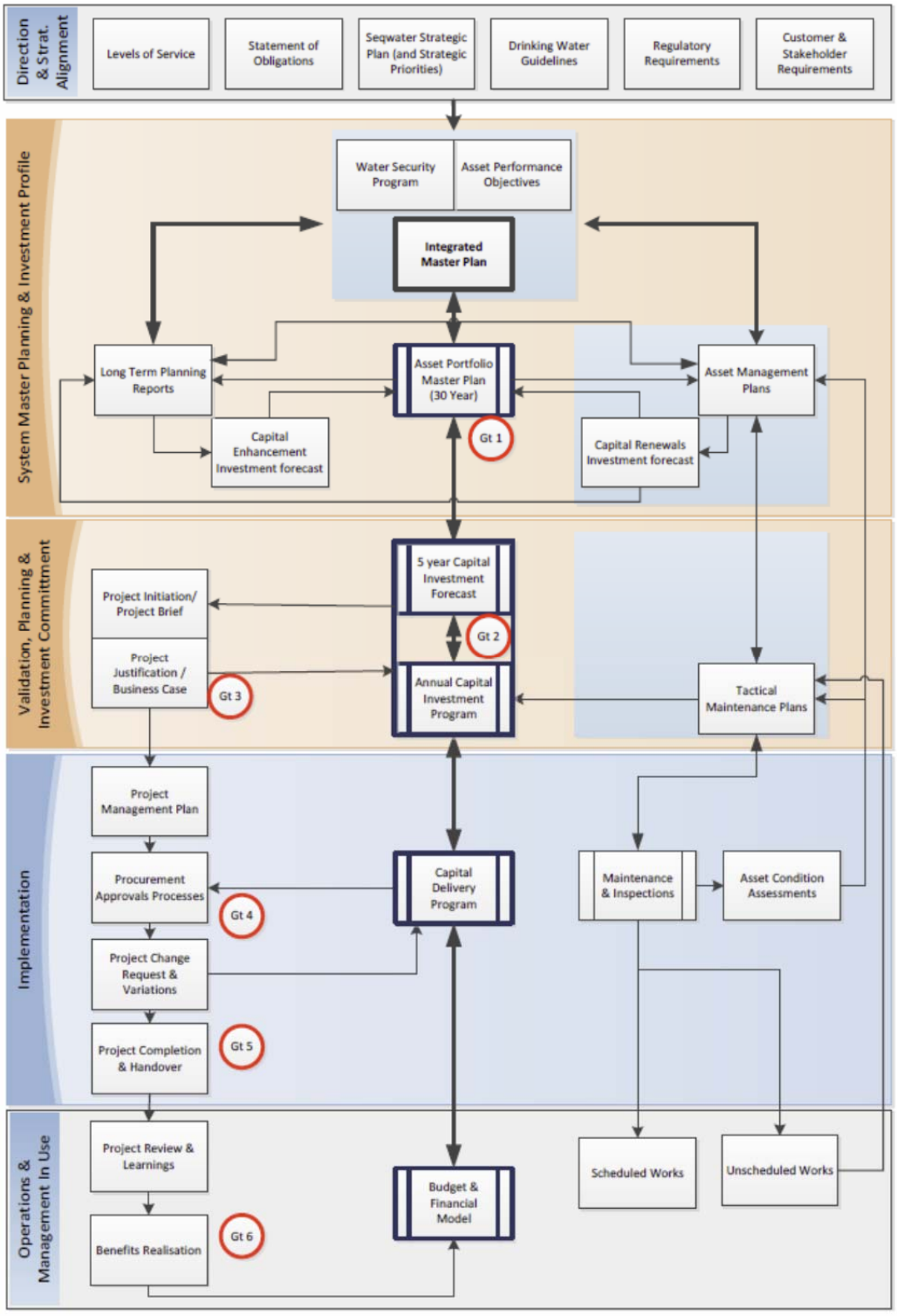
[4] Seqwater, 2014. *Bulk Water Supply Interim Operating Strategy 2014-2029*, p.10.

CH2M HILL notes however, that in addition to annual corporate reporting, Seqwater provides regular reporting of operational performance to the regulator (DEWS). This reporting will drive an appropriate level of focus on operational performance, but it is the view of CH2M HILL that a 'rolled-up' compliance KPI in the Annual Report would be beneficial in terms of providing a holistic view of performance achievement for such an operationally-focused business.

4.4 Planning and Asset Management Framework

Seqwater prepared a planning and asset management overview diagram for its Review Submission, which elegantly identifies all its asset investment planning instruments and their interactions. This diagram is presented in Figure 4-2 below:

Figure 4-2: Seqwater Planning and Asset Management Framework



Source: Seqwater 2015 to 2018 Price Review Submission

The diagram above shows the major planning inputs on the top row, capital planning processes on the left and asset management processes on the right. Planning instruments identified up the middle of the diagram consolidate and optimise the inputs from both capital planning and asset management processes. The horizontal blue or brown boxes in the

diagram define specific steps in the asset planning and approval life-cycle – from direction-setting at the top, through to management in-use at the bottom.

CH2M HILL notes that the diagram above departs in some ways from the Asset Management Framework diagram presented on Page 68 of the Seqwater Submission. The departures are generally around where specific processes/instruments sit in the life-cycle and in particular, between the 'System Master Planning and Investment Profile' and 'Validation, Planning and Investment Commitment' phases. This is not surprising, given the level of overlap and iteration between these phases.

Details of the CH2M HILL review of capital planning and asset management processes and instruments related to this framework are provided in the following sections:

4.4.1 Capital expenditure planning and delivery

Capital expenditure planning and delivery relates to the broad range of processes, procedures, activities and approvals that seek to establish a common, consistent and transparent approach to the management, planning, design and implementation of capital expenditure projects to ensure maximum value for money.

CH2M HILL has reviewed Seqwater's policies and planning procedures as they relate to the planning and delivery of capital expenditure, and assessed these against industry good practice. For the purposes of this review, this has included a review of coordination activities with customers, cost estimation, expenditure prioritisation and timing, project documentation including options analysis and business case development, project implementation and gateway review processes. CH2M HILL has reviewed Seqwater's capital planning and delivery policies and planning procedures against the following elements and characteristics common to good practice:

- Alignment with relevant capital planning guidelines, such as the Queensland Government Capital Works Management Framework and supporting instruments
- Capital projects are informed by corporate and strategic objectives and policies and defined service levels
- Capital improvements or enhancements and their timings are substantiated by robust demand forecasts
- Downstream operational and maintenance implications over the expected economic life of future capital projects are considered in the options analysis process
- An appropriately detailed, long-term forecast of future capital expenditure requirements has been developed, and the basis for its development is clearly documented
- A program of specific future capital projects is documented well ahead of delivery (preferably a multi-annual rolling program)
- The substantiation of capital projects on-program is well documented and supported by appropriately detailed and robust:
    - Options analyses (including benefit / risk / cost assessments)
    - Project prioritisation
    - Business Cases

- Analytical rigour increases with project scale and also as projects move through successive planning "gates"
- Allocation of costs to capital projects is in accordance with Asset Accounting Standards and Queensland Government Guidelines.

CH2M HILL's review and assessment of Seqwater's approach to capital expenditure planning and delivery is outlined in the following sub-sections:

Overview of Seqwater's approach to capital planning and delivery

Seqwater's approach to capital planning and delivery is formalised in its Planning and Asset Management Framework. The capital "planning" function is captured by the 'System Master Planning and Investment Profile' and 'Validation, Planning and Investment Commitment' phases of the planning and approval life-cycle, while capital "delivery" is managed through the 'Implementation' phase of the life-cycle. Key supporting documentation, inputs and plans for each of these respective phases are outlined below:

- System Master Planning and Investment Profile:
    - Integrated Master Plan
    - Water Security Program
    - 30-Year Asset Portfolio Master Plan
    - Long-term Planning Reports (by Asset Class or Facility)
    - Capital Enhancement Investment Forecasts
    - Capital Renewals Investment Forecasts
- Validation, Planning and Investment Commitment:
    - 5-Year Capital Investment Forecast
    - Annual Capital Investment Program
    - Project Initiation Reports / Project Brief Documents
    - Project Justification Reports / Business Cases
- Implementation:
    - Capital Delivery Program
    - Project Management Plan
    - Procurement Approvals Processes (supported by strategy)
    - Program Delivery Plan
    - Project Change Request and Variations
    - Project Completion and Handover

A critical component of the Validation, Planning and Investment Commitment phase is the annual *Asset Portfolio Master Plan* (APMP). The APMP is a long-term (30 Year) planning document that defines the future operational approach for the Seqwater system. It delivers the objectives and operational strategies defined in the *Integrated Master Plan* through the optimisation of outputs from both the capital planning and asset management processes.

The APMP also defines and to some extent smooths, the long-term investment demand for both capital and operational expenditure for budgeting and resource-planning purposes.

At a portfolio level, capital investment need in the APMP is informed by a number of Long-Term Planning reports. These reports are developed either on an asset class basis or for larger Seqwater facilities, like Treatment Plants. There is some variation in the level of detail and focus of current long-term planning reports driven by their pre-merger origins, but they all provide an adequate level of justification for future capital expenditure. The Dam Portfolio Risk Assessment documents for example, are quite robust, taking a risk/criticality approach to the determination of both investment need and priority.

At the project level, Business Cases (and supporting documentation) are critical in establishing and demonstrating prudent and efficient capital expenditure. Seqwater Business Cases are developed to a number of common, annotated templates, which apply to capital works in varying expenditure categories. The templates cover as a minimum: project definition; options considered; risk assessment/allowance; whole-of-life cost consideration; implementation/procurement approach and change management. The development of Business Cases is informed by Seqwater Policy, with guidance provided on the number and nature of options to be considered and the approach to risk assessment.

For larger projects, a dedicated Needs Analysis document is required, whereas for smaller projects, a combined Needs Analysis / Business Case are sufficient. As with Business Cases, development of a dedicated Needs Analysis document is supported by an annotated template to drive completeness and consistency. This template covers: project driver(s); service need; outcomes sought; potential options; risks associated with the base case (do nothing) and change management.

The content of the Business Case templates and the Needs Analysis template are in-line with industry standards in terms of content coverage.

Implementation

The suite of documentation employed by Seqwater for Project Implementation is very standard and in-line with industry good practice. Standard templates are available for:

- Project scoping and management
- Definition and approval of the Project procurement approach
- Project change control
- Project completion and handover

Of most interest to the CH2M HILL Review is the processes and documentation supporting Project change control. Assuming that upstream planning documentation has demonstrated prudency and efficiency, the change control process ensures an audit trail of change and approval through delivery.

The documentation provided for the Kilcoy Water Treatment Plant upgrade demonstrated the application and effectiveness of Project change control in-use at Seqwater. These documents included:

- The original Project Business Case
- A Post-market Budget Review document, highlighting rationale for the change in project budget
- A Board Paper requesting the budget change

- A standardised Project scope change register
- The Board Resolution approving the project budget change
- General monthly project reporting documentation outlining current and latent project issues in delivery
- A standardised and documented approach to change requests and approvals

Additional documentation was provided to support expenditures on this project and while useful for audit trail purposes, were less standardised and therefore less indicative of common corporate approach. This fact notwithstanding, it is clear that from a Policy and procedure perspective, project change control processes in-place at Seqwater are in-line with industry good practice.

Risk

Seqwater has a clearly defined risk management Policy and CH2M HILL has sighted specific planning documentation during the course of the review that promotes and demonstrates a corporate approach to risk. This includes a number of portfolio risk assessment planning documents, which consider both criticality and risk in the identification of asset investment need/prioritisation. Risk is also a consideration in project planning documentation, with risk and opportunity registers developed for all major programs and projects ahead of their commencement.

Prioritisation

Prioritisation is approached to varying levels of detail across the Seqwater asset-base. The primary mechanism of prioritisation seems to be the facility and asset class-based planning reports and their supporting assessment documents. Some of these documents have common content/structure defined by Seqwater, but many of them have been developed by consultants. Most of these documents apply asset condition, criticality and risk to the determination of investment priority, based largely on visual assessments and the analysis thereof.

There is no evidence in currently available documentation of a mechanism to consolidate and integrate prioritisation across the asset portfolio in consideration of: the prioritisation already done at the asset class level; the current strategic direction of the business; and current/forecast budgets. The obvious planning instrument to achieve this, based on the information provided by Seqwater, is the *Integrated Master Plan* currently under development.

Engagement with customers

Seqwater's primary customers for regulated activities are either Water Retailers or Local Governments whose principal considerations are meeting both future water demands and regulatory requirements. Seqwater consults with these customers regularly in the development of key capital planning documentation and for a number of larger, portfolio-based documents request direct input on draft documents prior to finalisation.

Formal engagement occurs at the Management level, through minuted monthly meetings with Local Government or Retail customers on a Regional basis. Seqwater has supplied sample minutes of these meetings for the review. The two focus areas of these meeting are Strategy and Planning and Operational issues. It is not uncommon for papers to be initiated through these meeting to investigate specific issues that are identified.

At a more informal level, Seqwater technical staff members maintain regular contact with their retailer or Local Government counterparts on more tactical operational issues on an as-needed basis. Mutually agreed operating protocols have been established between Seqwater and its customers, which clarify and enable this engagement.

Seqwater also interfaces directly with the community to raise awareness of the water cycle and to establish appropriate service levels for recreational assets/facilities provided within its owned catchment areas. Details of this and more general community engagement are provided in the Seqwater *Brand and Integrated Marketing Strategy* and similar documents.

Capital Planning and delivery findings

As the Capital Planning and delivery mechanisms of the three pre-merger entities were not too dissimilar, Seqwater Capital and Planning policies and procedures are further progressed in their post-merger development than other business processes. Policies are in-place, procedures are relatively well-developed and guidelines/templates exist to support the entire capital planning life-cycle. A possible area for improvement (as it is for most water agencies) is the capture of post-delivery cost information. CH2M HILL has not seen any evidence of the capture and analysis of either tendered or as-delivered costs for capital operational activities. This information would be invaluable for both tender assessment and estimating purposes.

The merger and mandated transition to the *Water Security Program* approach has influenced Seqwater capital planning and delivery capability however, in the area of longer-term planning. Both the lack of a consolidated view of the asset portfolio status in terms of common (business-wide) performance parameters and the need to focus resources on the short-term capital program (to ensure delivery) has impacted development of a robust, longer-term capital program. It is anticipated that the focus of Seqwater planning resources will shift to long-term planning once the short-to-near term programs are well embedded and a suitable lead-time to delivery is established.

The Seqwater capital planning and delivery templates provided are in-line with good industry practice. Combined with a good knowledge of Seqwater policies and guidelines, they provide sufficient opportunity to document capital investment drivers, options, opportunities and risks, assuring investment prudency. CH2M HILL's detailed expenditure reviews noted however, inconsistencies in the level of detail provided in these documents. These inconsistencies may be symptomatic of a lack of awareness of current policies or a lack of understanding of the need for a robust investment substantiation/approval audit trail.

CH2M HILL also noted a disconnect between the documents employed to justify budgets for larger programs of work and the individual projects that may be delivered under these budgets. Whilst the documents in-isolation are relatively robust (ie. The rationale for both program and project is sound), there is a risk that individual projects that are out of scope for a given program get funded with program budget. The primary factors contributing to the disconnect identified by CH2M HILL are:

- Limited alignment of benefits identified in individual project Business Cases with specific program objectives; and
- Unclear definition of scope within program planning documentation in terms that can readily be linked to project scopes.

CH2M HILL recommends that each project approved for draw-down of program budgets has a strong scope and benefits linkage to the funding program.

4.4.2 Asset Management

Asset Management is the process of minimising the whole-of-life cost of delivering mandated or desired service levels where those service levels are largely provided by infrastructure assets. Whole of life costs are minimised by:

- Specifying new or replacement assets to effectively and efficiently meet future demands and service level requirements;
- Planning and delivering renewals and maintenance in a manner that optimises use of available resources and maximises the economic life of the asset;

While Asset Management is by definition asset focused, the most cost-optimal asset management response may not always be an asset investment. An investment in addressing a non-asset factor or driver that reduces demand for or consumption of existing assets can also be a valid investment option.

CH2M HILL has reviewed Seqwater's asset management policies and planning procedures against the following elements and characteristics common to good practice:

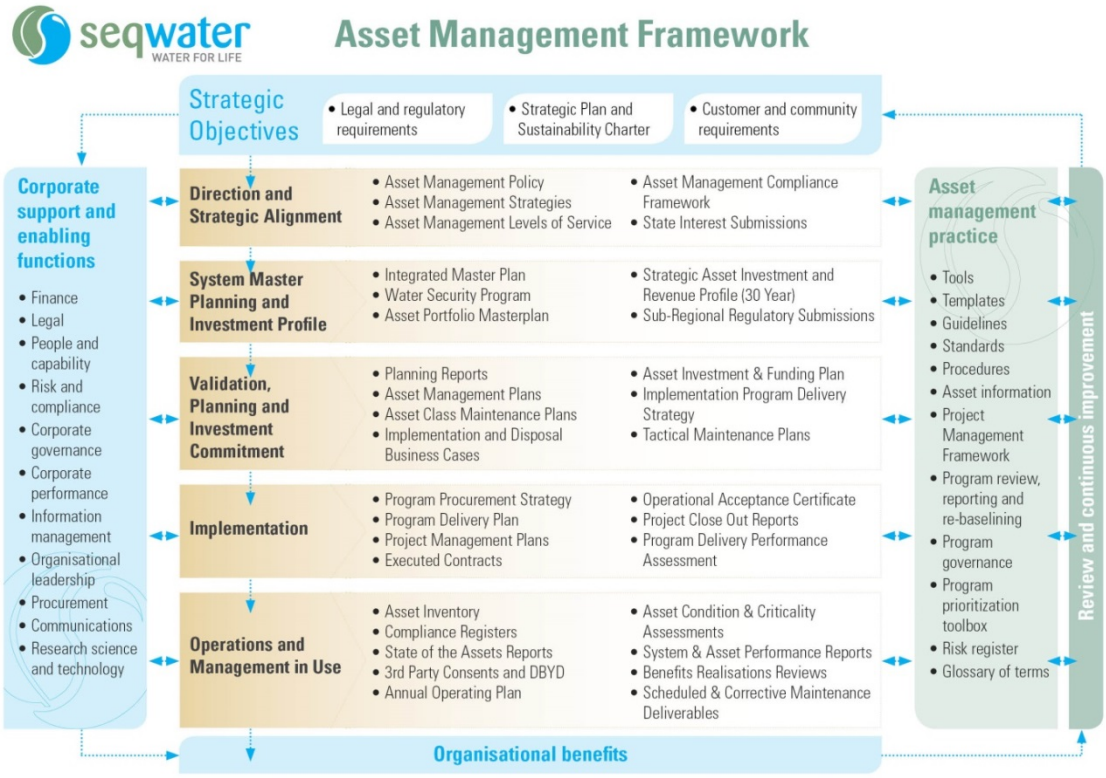
- General alignment with relevant external maintenance management guidelines:
    - Queensland Government Maintenance Management Framework and supporting instruments
- An exhaustive asset register is readily available at a level of componentisation that enables appropriate asset accounting and optimal whole-of-life cost decisions
- Asset management processes generally comply with relevant standards and guidelines:
    - PAS55 / ISO 55000
    - International Infrastructure Management Manual
    - Relevant Australian Asset Accounting Standards (AASB 1049/116)
    - The Queensland Government Non-current Asset Policies for the Queensland Public Sector, as applicable
- The criticality of each asset or asset component to service level delivery/achievement is well understood and documented
- Asset deterioration / service level degradation is robustly and regularly assessed on an annual or multi-annual basis
- The scope of all minor capital, operation and maintenance tasks related to the current asset portfolio is well documented and consistently understood across the business
- The intervention criteria that "trigger" minor capital, operations and maintenance tasks are well documented (or captured in decision-support system configurations) and consistently understood
- Historical records are kept of all delivered minor capital, operation and maintenance activities, as well as the criteria that initiated them, to build / improve corporate operational knowledge

- Asset equipment standardisation is employed wherever possible, to optimise both operations & maintenance procedures and resource allocation
- Capital, maintenance and non-infrastructure options are considered for all service level shortfalls identified and the best option is selected on the basis of least whole-of-life cost and optimal risk management
- The maintenance planning approach employed seeks to reduce unplanned maintenance and focus on appropriately programmed or preventative maintenance

Overview of Seqwater's approach asset management

Seqwater has implemented an Asset Management Policy which underpins the business' commitment to asset management principles. The corporate planning document *PLN-00112 Corporate Asset Delivery – Asset Management Framework* as presented in Figure 4-3 below shows the context and components of the Seqwater Asset Management Framework.

Figure 4-3: Seqwater Asset Management Framework



Source: Seqwater Draft Asset Management Planning Strategy

The Seqwater draft *Asset Portfolio Master Plan* (APMP) describes Seqwater's future investment plans for ensuring safe, secure, resilient and reliable water for its customers. It summarises the asset planning processes employed by Seqwater and consolidates the results of subordinate asset planning processes into a single program of future investment out to 2028. Figure 4-4 and Figure 4-5 below have been taken from the APMP and show both the quantum of investment required by asset category and the level of influence of specific drivers on this investment:

Figure 4-4: Future Annual Investment Demand, by Asset Class

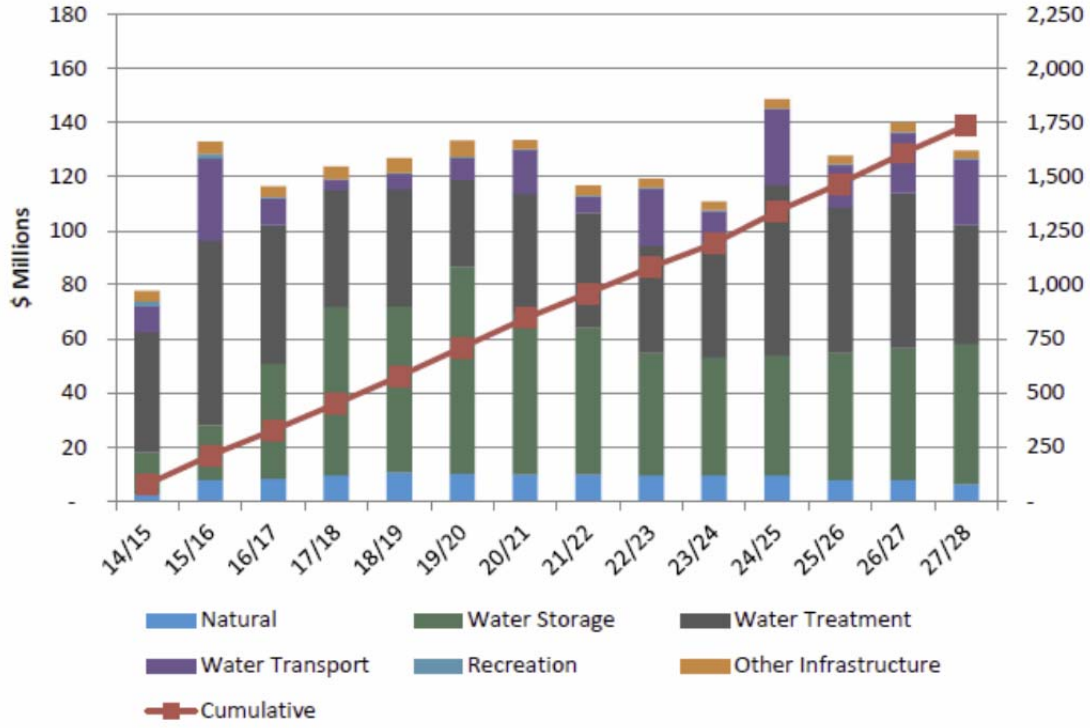
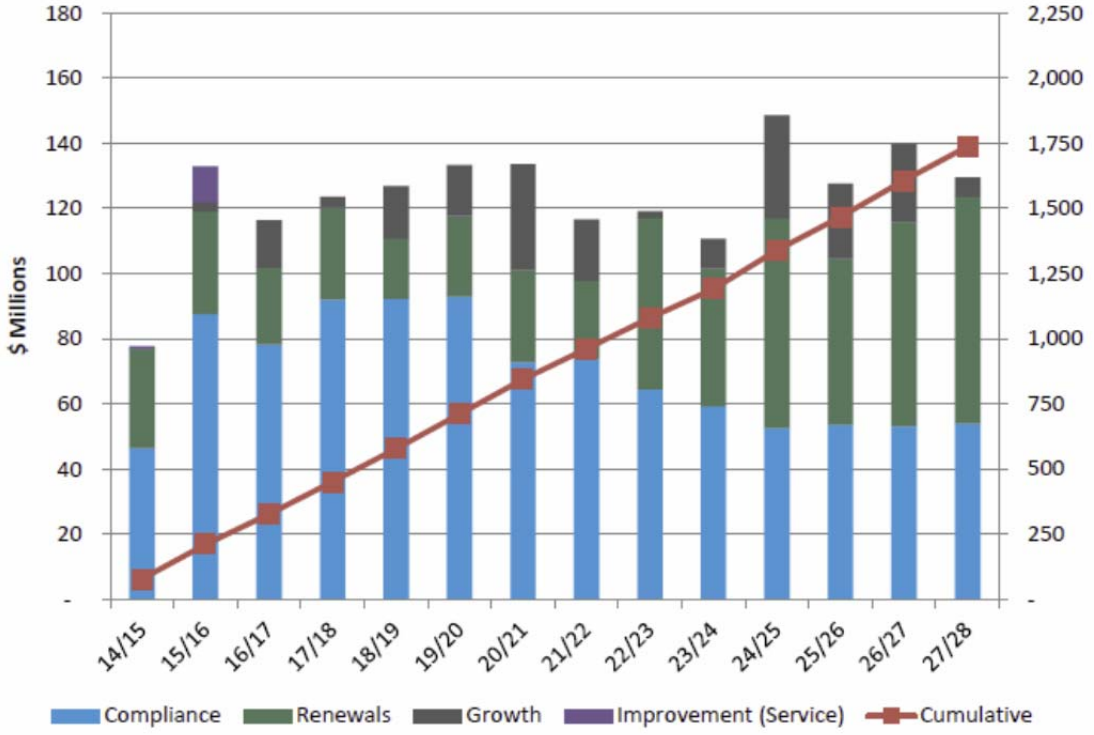


Figure 4-5: Future Annual Investment Demand, by Investment Driver



It is clear that the process of developing this document has been highly beneficial in enabling Seqwater to take a more strategic view on water system investment. In the near term, it has highlighted key portfolio gaps that represent significant business risks and also identified

opportunities to maximise returns, both on current system infrastructure service/capacity and on the investment in asset planning to-date.

A draft *Asset Management Planning Strategy* that details the business' approach to tactical asset management has been developed. This document covers the planning and delivering of maintenance activities; asset monitoring; and asset renewals. These programs are the key planning outputs from the asset management process that feed into the *Capital Investment Programs* and *Asset Portfolio Master Plan*, which represent the documentary interface with capital planning processes.

The *Asset Management Planning Strategy* provides the rationale for and description of key documents under the Asset Management Framework. These include:

Water Security Plan

This document is yet to be developed, but will become the main document that drivers integrated delivery of the Seqwater's Asset Management Strategy. In this context it will articulate the operational strategies that will be put in-place to ensure future water demands, regulatory compliance requirements and stakeholder needs are met. It is anticipated that this document will consolidate and harmonise a lot of the information and strategies already documented in the Water Supply Asset Plans developed by the three, pre-merger entities.

Asset Management Plans

These individual documents are facility or area-based plans that present current asset capability (ie. asset's ability to achieve desired or required service levels) and define an integrated and whole-of-life cost optimised approach to meeting any capability shortfall. The *Asset Management Plans* incorporate strategies identified in the *Asset Class Plans*, where appropriate.

The Facility Asset Management Plans reviewed by CH2M HILL included a 10-Year Renewal and Refurbishment Program as an Appendix. This Program provides clarity on the Seqwater operational response to the defined facility maintenance strategy and quantifies its future funding demand for maintenance.

CH2M HILL notes that the *Facility Asset Management Plans* researched in the detailed expenditure review focus entirely on the demand for asset renewals and refurbishment. There is an opportunity to expand the scope of these documents to include forecasted demand for maintenance – particularly the maintenance demand identified in the Asset Investment Funding Plan described below. The benefit of this approach would be that the interrelationship between a given maintenance regime and renewal cycles would be more clear. Improved understanding of this interrelationship enables better whole-of-life cost optimised investment decision-making.

Asset Class Plans

Asset Class Plans define strategies for managing groups of similar assets to optimise service life and efficiency. These plans apply to assets that are not readily attributed to a region or facility, like pipelines. The approach Seqwater applies to *Asset Class Plans* is similar to that for *Asset Management Plans*.

Tactical Maintenance Plans

Tactical Maintenance Plans inform the monitoring, maintenance and renewal activities that apply to specific assets. These plans include activity-level guidance in the form of specific standard procedures at a level of detail suitable for use in a work order management system. *Tactical Maintenance Plans* collectively feed into the *Asset Investment Funding Plan* which informs post-commissioning maintenance cost information for capital business planning purposes.

All of these plans are supported by a regime of regular asset inspections as well as condition and risk assessments, which may either initiate an immediate works (maintenance/repair) response or modify the already planned response for a given asset. In the case of an immediate response being required (unplanned or "reactive" works) the cause of the failure is analysed to improve the strategies defined in relevant *Asset Class Plans* and the inspection/maintenance regimes defined in the *Tactical Maintenance Plans*.

Seqwater is in the process of developing process maps that clearly define asset management workflows and examples of Work Order workflows have been provided as an example. The development of such documents promote a common understanding across the business of asset management processes and ensure staff with asset management responsibilities understand the context, tasks and deliverables attached to their roles.

The asset condition assessment methodology defined in the Seqwater *Asset Management Planning Strategy* is consistent with the requirements of the *International Infrastructure Management Manual* (IIMM): a document published jointly by the Institute of Public Works Engineering Australia (IPWEA) and New Zealand Asset Management Support non-profit organisation (NAMS). The IIMM is generally regarded as the benchmark reference for public infrastructure asset management.

Outside of the defined Asset Management Framework, Seqwater has developed Policy and Guidelines on asset accounting to ensure that assets and asset investment in the portfolio are appropriately capitalised. These guidelines also ensure that all non-current assets are regularly re-valued in accordance with Queensland Government Guidelines to ensure accuracy of the net book value of the asset portfolio and therefore, the asset depreciation presented in the financial statements for the organisation.

The key policy document is the Corporate Finance Policy – Non-Current Asset Accounting Policy, which complies with the Queensland State Government Policies and references current Australian Asset Accounting Standards. The guideline documents reviewed align with, and generally expand on the details provided in the Policy, with a focus on capitalisation.

Asset management findings

Seqwater is clearly in the process of developing its corporate asset management capability, but the currently developed Asset Management Framework provides a sound basis to achieve good practice.

Strengths of the Seqwater asset management approach include:

- Enabling Policy in-place and strategies developing
- A robust and integrated Framework that is in alignment with PAS55/ISO55000
- A transparent and robust approach to asset condition, risk and criticality assessment

- Reasonable 'cascading' of asset planning documentation from strategy through to operational response
- Downstream maintenance liabilities are considered in the scoping and planning of capital projects
- Tactical Maintenance Plans are comprehensive for the assets covered
- Some evidence of asset reliability assessment and the application of Reliability Centred Maintenance principles

Weaknesses of the Seqwater asset management approach include:

- Inconsistencies in the roles of specific planning instruments within the proposed Asset Management Framework, driven by legacy documents that remain current and transitional documents filling current Framework gaps
- An inconsistent and somewhat incomplete asset register, impacted by consolidation of asset information from disparate information systems post-merger
- No consolidated view (in a single document) of the performance objectives for the Seqwater asset portfolio
- Limited 'cascading' of asset performance indicators from strategic objectives down to operational investment 'triggers'.
- Asset portfolio operational performance objectives are largely treated separately from corporate performance objectives and also reported separately
- An immature but developing approach to integration of capital and asset management planning outputs
- A level of 'siloing' in the development of the asset management approach for certain facilities or asset classes
- Limited documentation on either maintenance intervention criteria (outside of timing) or asset deterioration profiles under various operating scenarios

4.5 Procurement

The approach employed to procuring goods and services can have a significant influence on the financial outcomes of the transaction. Significant economic efficiencies can be gained through the appropriate alignment of project scale/complexity with procurement rigour and careful consideration of contract 'packaging' and incentivisation.

CH2M HILL has reviewed Seqwater's Policy and procedures approach to procurement, based on the following indicators of good practice:

- A procurement policy and supporting documentary guidelines have been developed, are readily available to relevant users, are clearly understood and followed
- These policies / guidelines are in alignment with regulatory requirements and other external stakeholder requirements:
    - Queensland Government Procurement Policy (2013) and its underlying principles

- The procurement approach leverages market competition wherever possible to maximise value for money
- The term "Value for Money" is:
    - Clearly defined in corporate documentation;
    - Linked to service levels and risk mitigation; and
    - Consistently understood across the business
- The form of procurement method of contracting is informed by an assessment of the risk factors inherent in the services/deliverable being procured
- The capability and capacity of potential service providers is assessed and categorised on a regular basis (pre-qualification, etc)

Details of the Seqwater procurement approach are provided in the following sections:

4.5.1 Strategic Procurement Plan

The *Strategic Procurement Plan* is the 'roadmap' for Seqwater post-merger procurement capability development. It outlines Seqwater's intended direction with respect to procurement over the two year period from 2013-15 and as such, documents what has been done in a largely completed program.

The plan identifies key initiatives and strategies to advance procurement within Seqwater, covering not just policy, process and procedure, but also awareness, business alignment and system support.

4.5.2 Procurement Policy

Seqwater's Procurement Policy is underpinned by the following principles:

- Value for money
- Open and effective competition
- Sustainability
- Probity and ethical behaviour
- Risk management
- Responsible spend management

These principles are in alignment with those of current Queensland State Government Procurement Policy as defined by the Department of Housing and Public Works.

The policy is supported by: a defined corporate Procurement Procedure (PRO-001514) which provides more detail on the application of Seqwater procurement principles; and a *Procurement Decision Matrix* which assists Seqwater staff to identify the appropriate procurement mechanism/approach to employ under specific circumstances.

4.5.3 Procurement Handbook

Seqwater has developed a *Procurement Handbook* that defines the methodology and principles of procurement which include:[5]

[5] Seqwater, 2014. *Procurement Handbook (MAN-00046),* Rev 3, p.5.

- Planning & Sourcing
- Tendering
- Purchasing
- Contract Management
- Logistics.

The *Procurement Handbook* is designed to support and strengthen Seqwater's Procurement Policy, Process Maps and Quick Guides by providing Seqwater staff direction and guidance on specific issues of Procurement. It also provides clarity on the boundaries around roles and responsibilities that interface to Procurement.

4.5.4 Procurement Findings

CH2M HILL identified no significant issues in its review of the Seqwater procurement approach. Policies, guidelines and templates supporting procurement were in–line with State Government policy requirements and principles as well as being consistent in their message. Compliance with the approach advocated by Seqwater procurement policies and procedures (which is also mandated by Policy) should achieve optimal outcomes, providing the specifications for the goods and services procured are aligned with business requirements.

We noted some departures from the approach presented in the policy/guideline documents provided in our review of specific projects and expenditure items. Some of these departures are considered to be due to the fact that documents reviewed pre-date current guidance. In other cases, the departures may be attributed to a developing awareness of the current arrangements among staff tasked with production of documents supporting the procurement process.

4.6 Governance

Effective corporate governance is achieved when appropriate rigour and transparency is applied to risk management, business approvals and business performance. A critical success factor for good governance is the clear (and preferably documented) definition of the accountabilities, roles and responsibilities of staff and/or committees involved in decision-making.

At Seqwater, good governance is supported at the policy level through the implementation of the following policies:

- Corporate Risk Management Policy
- Corporate Compliance Policy (Regulatory and Corporate)
- Capital Investment Governance Charter

These Policies and the management instruments that relate to them are discussed in the following sections:

Corporate Risk Management

Seqwater's risk management Policy seeks to embed a culture of risk identification and management into all business practices and decision-making, in support of strategic and operational objectives. It provides direct linkage to the current Strategic Plan and holds the Board and Executive accountable for setting risk tolerances and ensuring risks are reported.

It also recognises the need for training and tools to ensure an appropriate level of risk management capability within the business.

The risk approach employed by Seqwater is documented in the corporate procedure document *PRO-00801 Corporate – Risk Management Procedure*, which seems to be a SEQ Water Grid legacy document. Guidance provided by this document covers Environment, Drinking Water Quality, Water Quantity, Public Safety and Workplace Health & Safety risk categories. It is generally in-line with the likelihood and consequence assessment approach defined in *AS/NZS ISO 31000:2009 Risk Management*.

Seqwater also keeps current a corporate Risk Register which is structured in accordance with the Corporate Risk Management Procedure and is utilised as a resource in regular Board meetings.

Corporate Compliance Policy

This Policy confirms Seqwater's commitment to compliance with: all relevant: legislation; government policies and directives; licences; approvals; permits; contract terms and conditions; and certification standards. It also states that Seqwater will employ the Australian / New Zealand Standard Compliance Framework AS/NZS 3806:2006 to monitor compliance.

Internal compliance controls employed by Seqwater include policies, procedures, systems and processes, which are internally / externally audited and continually improved. Staff compliance is managed through a documented Code of Conduct, which raises staff awareness of compliance issues and improves staff compliance accountability. The details of the Corporate Compliance Framework are documented in the Corporate Manual MAN-00255 Compliance Framework, which covers:

- Compliance Registers
- A compliance software solution
- An assurance checking and corrective action procedure
- A notification procedure
- A legislative change procedure; and
- A compliance reporting regime.

Capital Investment Governance Charter

The Corporate Capital Investment Charter has been implemented in Policy and details the framework that will apply for all capital investments and all non-infrastructure investments that exceed GM financial approval levels. The Policy:

- Formalises a structured review of investment
- Provides rigour in the oversight of Business Case development
- Ensures alignment of investments with policy as well as strategic asset and whole-of-business plans
- Provides comfort to the Board and Executive that investments are aligned with priorities, that risks and efficiency opportunities have been considered and that all regulatory requirements have been met

The policy details the scope and role of the Investment Review Group (IRG) in approving investments on behalf of the Investment and Procurement Committee and/or the Board.

Individual GMs have the discretion to utilise the IRG to peer review investments that are not normally in-scope, but that have an elevated risk profile for any reason.

The IRG is a subgroup of the Executive Leadership Team and currently comprises:

- GM Water Supply, Strategy and Policy (as Chair)
- GM Asset Portfolio Development and Delivery
- And the Chief Financial Officer

The IRG meets approximately six times a year and has carriage of in-scope investment approvals / endorsement for:

- The overall (budget) capital program
- New Approvals of Individual Projects;
- Existing Project Approvals where defined contingencies have been exceeded
- Large capital expenditure items / programs
- Emergent or emergency works (including on an out-of-session basis, where necessary)

The IRG can also recommend and/or endorse reallocation of unspent capital funds.

The Minutes of each IRG Meeting are recorded and stored in the corporate document management system (with appropriate access rights).

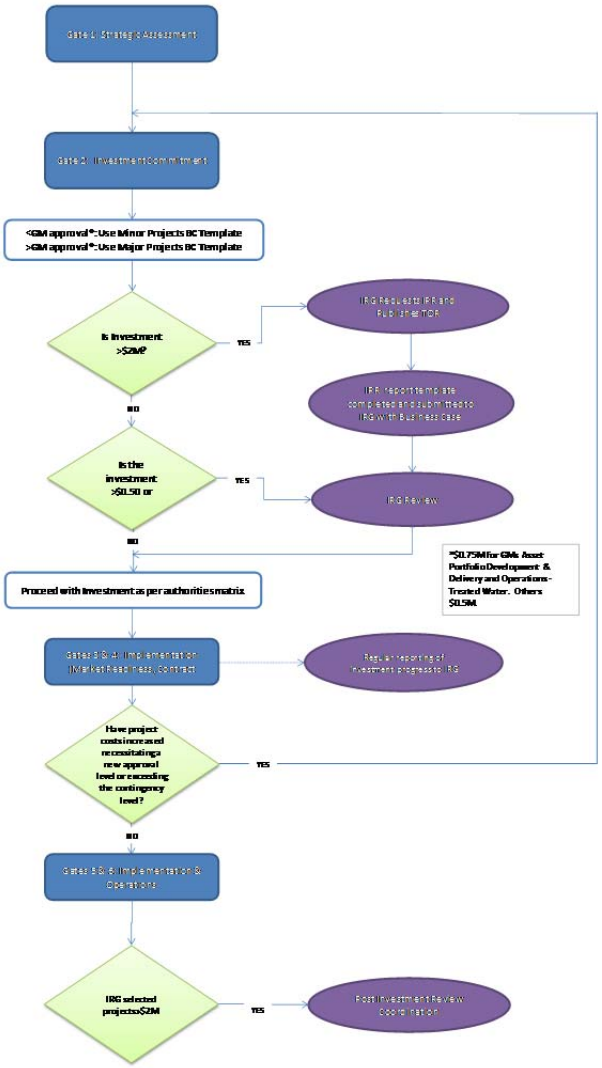
The IRG also reviews key metrics for all active studies and projects to gain an understanding of status and risk, as well as carrying out post implementation reviews on selected investments to track investment performance.

For investments requiring Board approval (>$2M) the IRG initiates an independent, fit-for-purpose peer review by a small team comprising four or more members with experience directly relevant to the investment proposal, but not conflicted by advocating the investment (the IPR team). At least one member of each team will be a member of the Regulatory and Investment Governance team and one member will be from the relevant operational unit.

The IPR team is guided by Terms of Reference drafted by the IRG. The structure of IRP Reports for each investment reviewed is informed by standardised templates and these reports are the only document other than the original Business Case required for IRG approval. The same IPR mechanism can be employed for post investment reviews.

The generic Seqwater investment approval process is presented in Figure 4-6 below:

Figure 4-6: Seqwater Investment Approval Process



The figure above shows the standard gating arrangements for investment approval, as presented in the *Capital Investment Governance Charter*. The Seqwater Authorities Matrix referenced in this Figure can be found in the *Corporate Manual of Delegations and Authorisations*. The matrix covers both financial and broader decision-making authorities within Seqwater, including execution of contracts, signing of correspondence and appointment/oversight of personnel.

4.6.1 Governance Findings

Seqwater governance arrangements are at an early level of maturity, with good practice processes now largely in-place. Execution of these processes is expected to be refined as they are used in-practice. At this stage there is evidence that the mechanisms of governance are progressing, but that the specific instruments of approval and their content could be improved and/or more universally understood to improve governance outcomes. This will require time and may be expedited by either: an awareness campaign; training; or some broadly distributed standardised guidelines.

4.7 Findings

It is clear from CH2M HILL's review of Seqwater Policies and Procedures that Seqwater has a clear vision for its capital and operational planning framework and is working towards realising this vision. This vision, as presented to CH2M HILL and if delivered, is capable of achieving good practice outcomes into the future.

It is also clear that there is more development required before a robust and tightly integrated suite of planning/management instruments, enabling processes/systems and a fully aware workforce are in-place. Many of the instruments of the framework are in-development or early roll-out and others are being transitioned-out. The result is that there is a lot of inconsistency in how the current instruments are applied in-practice. There remains also, a level of uncertainty around what the eventual scope of influence of the Asset Management will be on investment planning (ie. Covering only renewals and maintenance or the entire asset life-cycle).

Seqwater capital planning processes are underpinned by a robust business framework and generally require limited staff awareness / guidance to ensure compliance with the framework to achieve good practice. The one exception to this is the planning and approvals for capital renewal programs. Minor structural changes to the program investment justification documents and tighter linkage to individual business cases for projects under each program is required to achieve good practice. The two primary factors linking a project to a program should be:

1. Scope (either asset-specific, activity-specific or outcome-specific); and
2. Benefits, linked to currently defined cost drivers.

This approach will eliminate the potential for approval of and draw-down of program budgets by low-value or out-of-scope projects.

Seqwater governance arrangements are well progressed in terms of process and accountabilities. The documents that support the Seqwater governance arrangements and the output documents that demonstrate good governance are however, at an early stage of maturity. Our review found evidence of inconsistent application of documentation feeding the governance process that could be improved through awareness raising and/or training.

In a developing business environment like the one currently at Seqwater, it is certain that business efficiencies will be realised as business processes become more mature and therefore, more integrated and streamlined. It is difficult to quantify what these efficiencies may yield in terms of cost-savings, when the recency of the three-party merger impacts the establishment of an established and robust cost baseline. It is CH2M HILL's opinion that from a systemic process perspective, no cost savings can be determined.

CH2M HILL notes however, that there may be scope to quantify savings as a result of systemic non-compliance with the processes described in this component of the review. These savings will be identified in the capital or operational sections of this report, where the detailed reviews have provided an evidence-base for their quantification.

5 Operating Expenditure

5.1 Overview of operating expenditure

Seqwater has submitted total actual and forecast operating expenditures for the current price path (from 2013-14 to 2017-18) of approximately $1,226.9 million (real 2014 terms). An overview of Seqwater's actual and forecast operating expenditure over this period is outlined in Table 5-1 below. It should be noted that the figures presented exclude accounting costs such as depreciation and amortisation and Seqwater's interest expense to Queensland Treasury Corporation (QTC). Contract Services is the largest source of expenditure for the period, accounting for $439.5 million, or approximately 36 percent of total operating expenditure. The second largest cost category is Employee Expenses with $380.8 million over the period, or 31 percent of total operating expenditure.

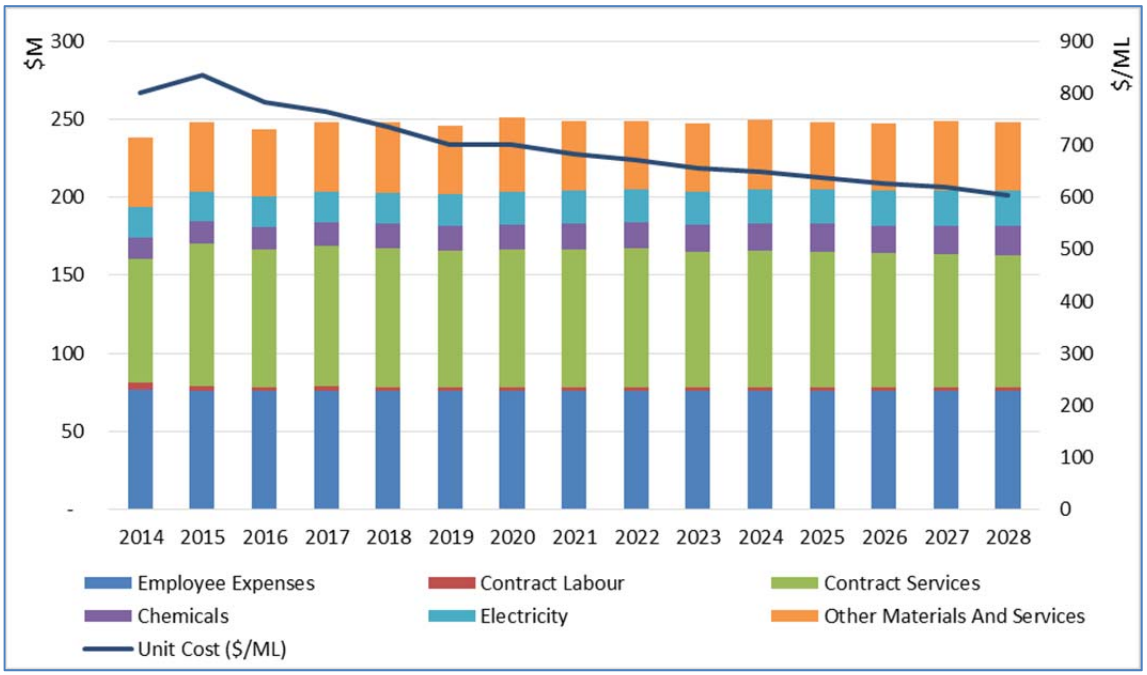
Table 5-1: Seqwater's actual and forecast operating expenditure, 2013-14 to 2017-18 ($M, real 2014)

Cost Category	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Employee Expenses	76.966	75.994	75.880	76.012	76.939	380.791
Contract Labour	4.187	2.805	2.487	2.509	2.509	14.499
Contract Services	79.686	91.788	88.281	90.669	89.063	439.488
Chemicals	12.986	13.845	14.430	14.945	15.495	71.702
Electricity	19.727	19.262	19.602	19.881	20.189	98.661
Other Materials And Services	45.044	44.451	43.266	43.874	45.157	221.792
Total Operating Expenditure	**238.596**	**248.145**	**243.947**	**247.892**	**248.354**	**1,226.934**

Source: Opex model 2014-09-25 Q1 FY15 revised.xlsm as amended by CH2M HILL

For the entire forecast period of 2013-14 to 2027-28, Seqwater has reported forecast operating expenditure of approximately $3,474 million (real 2014 terms). An overview of Seqwater's forecast operating expenditure, by cost escalation category, is presented in Figure 5-1. As can be seen, the dominant areas of expenditure for the entire period relate to Contract Services and Employee Expenses.

Figure 5-1: Seqwater annual forecast operating expenditure by cost category ($M, real 2014)

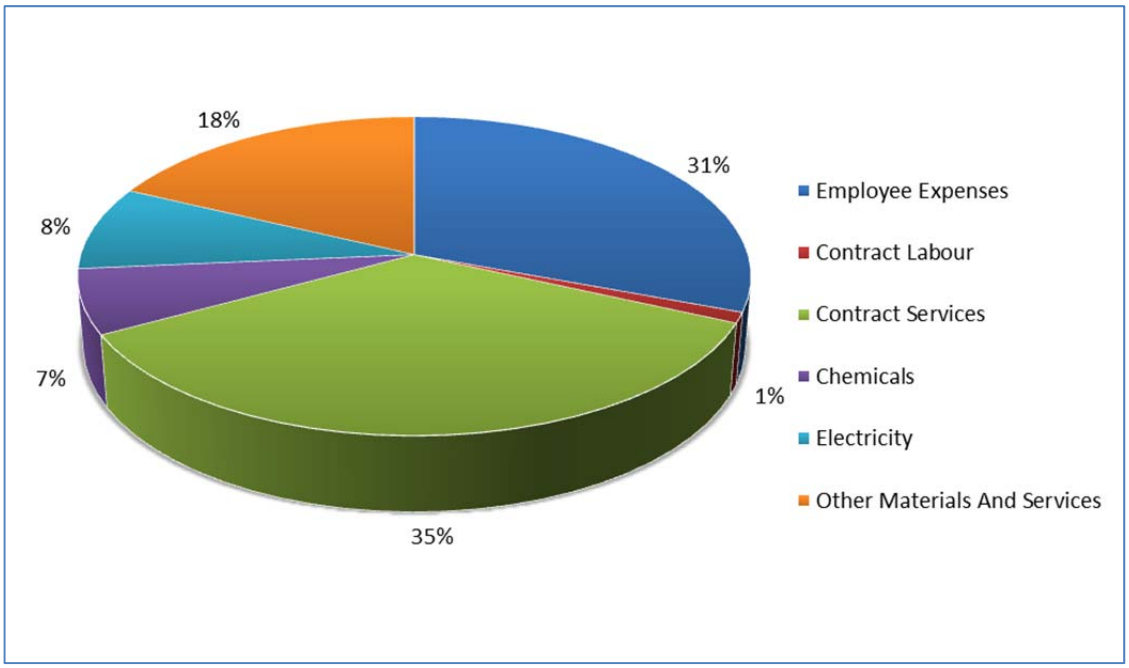


Source: CH2M HILL analysis based on Opex model 2014-09-25 Q1 FY15 revised.xlsm

Figure 5-1 also presents the unit cost of Seqwater delivering a megalitre (ML) of bulk water. Seqwater's unit cost of bulk water is forecast to increase from $801/ML in 2013-14 to $834/ML in 2014-15, before steadily decreasing over time to $605ML in 2027-28.

Overall, Seqwater's forecast operating expenditure is expected to remain relatively constant, in real terms, over the forecast period. A breakdown of Seqwater's total forecast operating expenditure by cost category, over the period from 2013-14 to 2027-28, is provided in Figure 5-2. It can be seen that Employee Expenses and Contract Services related expenditure accounts for approximately 66 percent Seqwater's total actual and forecast operating expenditure over the period.

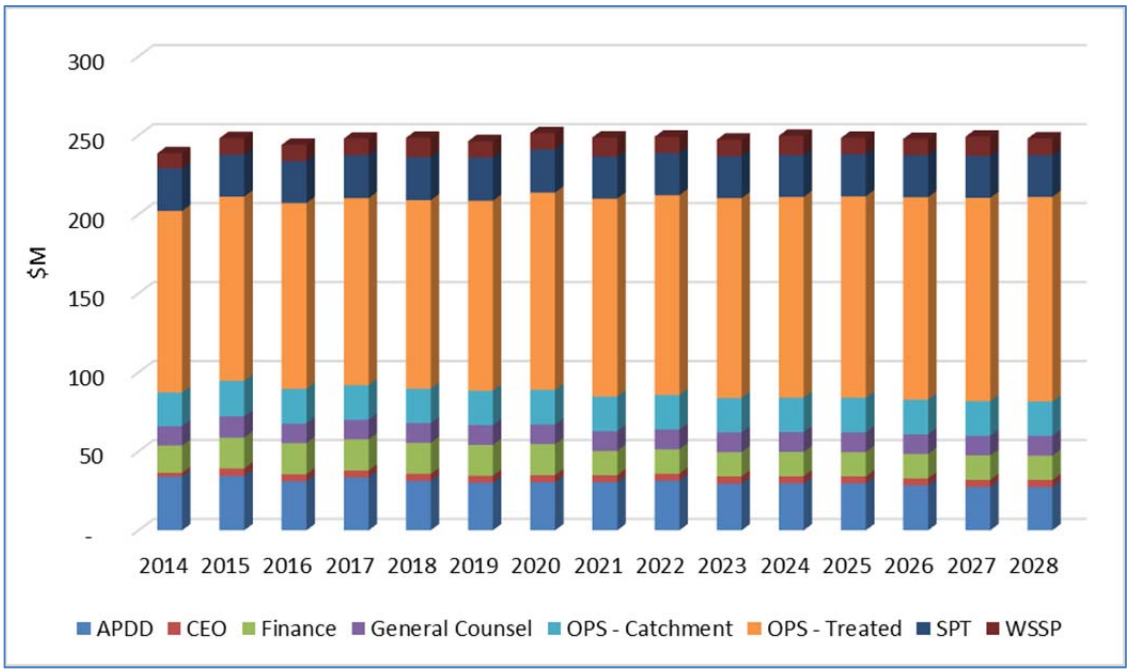
Figure 5-2: Total actual and forecast operating expenditure by cost category ($M, real 2014)



Source: CH2M HILL analysis based on Opex model 2014-09-25 Q1 FY15 revised.xlsm

A breakdown of Seqwater's actual and forecast operating expenditure by General Manager Business Group is provided in Figure 5-3 and Figure 5-4. The Operations – Treated Water business group is by far the largest source of operating expenditure over the forecast period, accounting for approximately $1,851 million, or 50 percent of total operating expenditure. The Asset Portfolio Development and Delivery and Service, People and Technology business groups are the next largest contributors to operating expenditure, accounting for approximately $458.242 million and $402.310 million respectively.

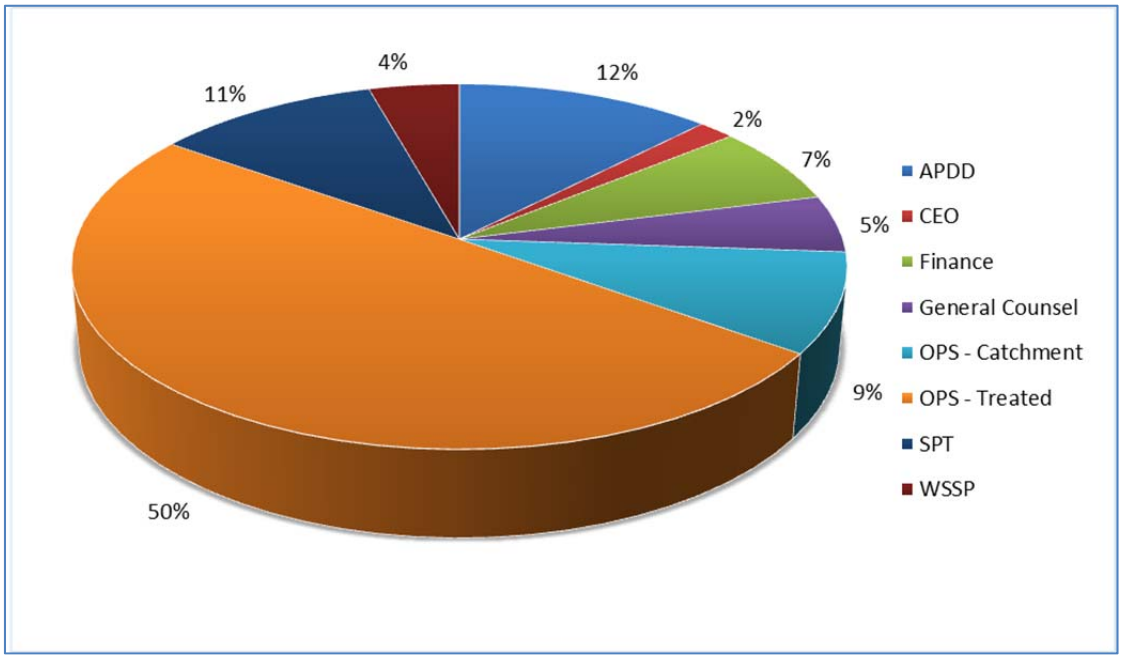
Figure 5-3: Seqwater annual forecast operating expenditure by business group ($M, real 2014)



Source: CH2M HILL analysis based on Opex model 2014-09-25 Q1 FY15 revised.xlsm

A breakdown of the proportion of Seqwater's total forecast operating expenditure by General Manager Business Group, over the period from 2013-14 to 2027-28, is provided in Figure 5-4.

Figure 5-4: Proportion of total actual and forecast operating expenditure by business group (%, real 2014)



Source: CH2M HILL analysis based on Opex model 2014-09-25 Q1 FY15 revised.xlsm

5.1.1 Sample operating expenditure categories

To enable the assessment of Seqwater's actual and forecast operating expenditure that contribute to the total costs to be recovered by bulk water prices, CH2M HILL undertook a detailed examination of the prudency and efficiency of a representative sample of operating expenditure categories over the period from 2014-15 to 2027-28. The expenditure categories selected for detailed review are outlined as follows:

- Employee costs including:
  - Employee expenses
  - Contract labour
- Contract Services
  - General Maintenance Services
  - Term Maintenance Contract
  - General Contracting
  - Consultancies
- Materials and services (excluding electricity), including
  - Chemicals expenses
  - Other materials and services
- Corporate costs related to activities that cannot be reasonably allocated to other cost categories

The above sample of cost categories were identified by the QCA. As a proportion of total actual and forecast operating expenditure, CH2M HILL has reviewed approximately 91.6 percent of Seqwater's total operating expenditure.

5.2 Overview of Prudency and Efficiency Assessment

5.2.1 Seqwater operational expense forecasting approach

Seqwater based its future operating expense forecasts on the 2013/14 actual operating expense figures. Appropriate adjustments were made by Seqwater to account for one-off expenditures in the 2013/14 year and to capture known future expenditures in the forecast years.

Actual operational expense figures were sourced from the Seqwater financial system (CIS) at the General Ledger account code level, with each account code allocated to an escalation category to enable appropriate indexation of the figures into the future (which will assist price path calculations by QCA). Adjustments to the forecasts were made by Seqwater at the Business Unit and escalation category level. The base figures and adjustments were provided in the form of a spreadsheet model, which forms the basis of CH2M HILL's analysis.

Two complications arose during the course of the CH2M HILL review of Seqwater operational expenditure:

1. A revised operational expenditure model was provided by Seqwater that to some extent, impacted reconciliation of specific cost items with references in the Seqwater Submission;
2. During the course of review, it became apparent that account codes were inconsistent between actual and forecast figures in the model. Specifically: some forecasted codes "rolled-up" (totalled) one or many actual expenditure codes and the method of roll-up was not communicated to CH2M HILL until late in the review.

With regard to the latter complication, it is understood that the rolling-up of forecast accounts aligns with the current Seqwater budgeting approach. CH2M HILL recommends that Seqwater consider rolling-up actual costs in the same manner for future reviews to improve transparency and understanding of operational expenditure movements.

5.2.2 Sample operating expenditure findings

CH2M HILL's review of Seqwater operational expenditure found that forecasted operational expenditures were generally prudent, but that limited evidence was provided to provide confidence that proposed investments were efficient. Operational expenditures in organisations like Seqwater are largely compliance or demand driven. In both instances appropriate investigation will readily identify an appropriate action and therefore, operational investment need. Seqwater is clearly capable of identifying this need and CH2M HILL found no real evidence of spurious cost items in either the actual operational costs presented or the forecasts.

CH2M HILL did however; identify significant opportunities for efficiency when comparing actual operational expenditures with the proposed forecasts. There were three main factors contributing to the inefficiency from an auditing perspective:

4. A lack of substantiation of large cost movements (generally increases) from actual costs to the forecasts, especially when considering the demand data made available;
5. A lack of transparency in the cost code transition from actual to forecast figures, with the resulting potential for double-counting of costs; and
6. The perpetuation of short-term or one-off expenditures from the 2013/14 year into the annual forecasts.

With regard to the first point, limited justification was provided for cost movements of many of the reviewed operational expenditure items, based on the information provided by Seqwater. To satisfy efficiency review requirements, the proposed investment movements need to be well linked to defined business drivers (both performance and demand) and proven by evidence to be cost-effective. In many cases these requirements were not met.

Cost code movements that could not be effectively explained (as opposed to justified) were generally the result of forecasted cost codes rolling-up a number of actual cost items. Seqwater did clarify which cost codes were rolled-up, but CH2M HILL found that some of these were also carried-through in the forecasts. A number of the cost adjustments recommended by CH2M HILL to eliminate double-counting of expenditures that resulted from this.

Seqwater made a number of high-level corrections to figures provided to address the issue of carrying-through short-term or one-off expenditures from the actual expenditures into the forecast. CH2M HILL found that the adjustments proposed captured some, but not all

instances of this carry-through. Where these adjustments were made, limited justification of their quantification or timing was provided.

CH2M HILL's found sufficient evidence in the information provided by Seqwater to satisfy itself that macro budget allocations for operational expenditures were subject to an appropriate level of governance and approval. This did not however, extend to the assessment of or justification for specific expenditures made under these budget heads. CH2M HILL accepts that smaller operational expenditures do not warrant the administrative burden of documentation, but these could be addressed on a program basis. Other operational expenditures are at an equal scale to larger capital projects and should be dealt with in the same manner as these projects from a project/cost control perspective.

Recommendations

In the course of reviewing Seqwater operational expenditures, CH2M HILL has identified a number of recommendations which may improve future assessments of prudency and efficiency as follows:

Justification of Expenditures

Seqwater provided a compelling argument for many of the operational expenditures reviewed and to a lesser extent, their movements from actual to forecast. Limited information was provided to support the drivers for and derivation of the expenditures from an audit trail perspective. CH2M HILL suggests that may operational expenditure budget heads could be dealt with on a program basis – similar to capital programs – which would provide an appropriate level of governance without undue administrative overhead.

Cost Code Transparency

If Seqwater is to continue with the current model format for future Reviews, CH2M HILL suggests that the operational expenditure figures provided be rolled-up in the same manner as the forecast figures. This will significantly improve the transparency of cost reporting and reduce the likelihood of double counting expenditures in the forecasts.

A summary of CH2M HILL's prudency and efficiency assessment of each sampled operating expense items is provided in Table 5-2.

Table 5-2: Summary of prudency and efficiency assessment of sample operational expense items ($M, real 2014)

Expense Item (Escalation Category)	Assessment			Forecast Operational Expenditure (million)		
	Prudent	Efficient	Comment	Seqwater Proposed	Adjustment	CH2M HILL Recommended
Employee Costs	Prudent	Inefficient	Salaries and employment benefits have been adjusted to better reflect actual expenditures for these items and the change in FTE numbers from 2013/14 to 2014/15. An adjustment has also been made for the reduction in ICT staff likely as a result of implementing a SaaS delivery model for future corporate information systems.	$1,063.2	-$40.7	$1,022.5
Contract Labour	Prudent	Partially Efficient	The proposed positive adjustment to the forecasts to cover pro-rata disbursement of contract labour costs related to "Comply with QLD Govt and Increase ICT Capability" is not sufficiently substantiated. The adjustment has been reversed.	$35.4	-$0.3	$35.1

Expense Item (Escalation Category)	Assessment			Forecast Operational Expenditure (million)		
	Prudent	Efficient	Comment	Seqwater Proposed	Adjustment	CH2M HILL Recommended
Contract Services	Prudent	Inefficient	The significant increase from actual to forecast of maintenance delivered under Seqwater panel arrangements has not been substantiated and these have been adjusted to 2012/13 / 2013/14 levels, as appropriate. The significant increase in both general and ICT consultancy expenditures has not been substantiated and these have been adjusted to 2013/14 levels. The significant increase in repair and maintenance projects delivered by Veolia outside the scope of its current maintenance contract has not been substantiated and the forecast has been adjusted to the average of 2012/13 and 2013/14 levels.	$1,229.1	-$171.1	$1,058.0
Chemicals	Prudent	Inefficient	Adjustments have been made to the chemical expenditure forecasts for the AWTP's and Tugun Desalination Plant to better reflect likely expenditures based on plant demand forecasts. Forecasts for "Other Chemicals" cannot be justified based on the information provided by Seqwater and an appropriate adjustment has been made in consideration of likely demands and conditions.	$230.5	-$9.6	$220.8

Expense Item (Escalation Category)	Assessment			Forecast Operational Expenditure (million)		
	Prudent	Efficient	Comment	Seqwater Proposed	Adjustment	CH2M HILL Recommended
Other Materials and Services	Prudent	Inefficient	Adjustments have been made to some legal expenditure items to address the one-off or short-term nature of these expenditures. A three year hire to purchase arrangement has been forecast annually for the provision of PDA/GPS equipment. An adjustment has been made to limit expenditures to three years. The annual forecast for QCA Fees over-estimates these expenditures by one-third and an adjustment has been made.	$619.7	-$68.0	$551.7
Corporate Costs*	Prudent	Inefficient	These costs are already captured in the Expense Items above and have been considered in the adjustments made.			
Total Adjustments				***$3,473.8***	***-$289.8***	***$3,184.1***

5.2.3 Implications for Seqwater's proposed operating expenditure

As CH2M HILL's review of Seqwater operating expenditure covered all material cost items and 91.6 percent of total operating expenditure, there is limited scope for extrapolation of review findings to other cost items.

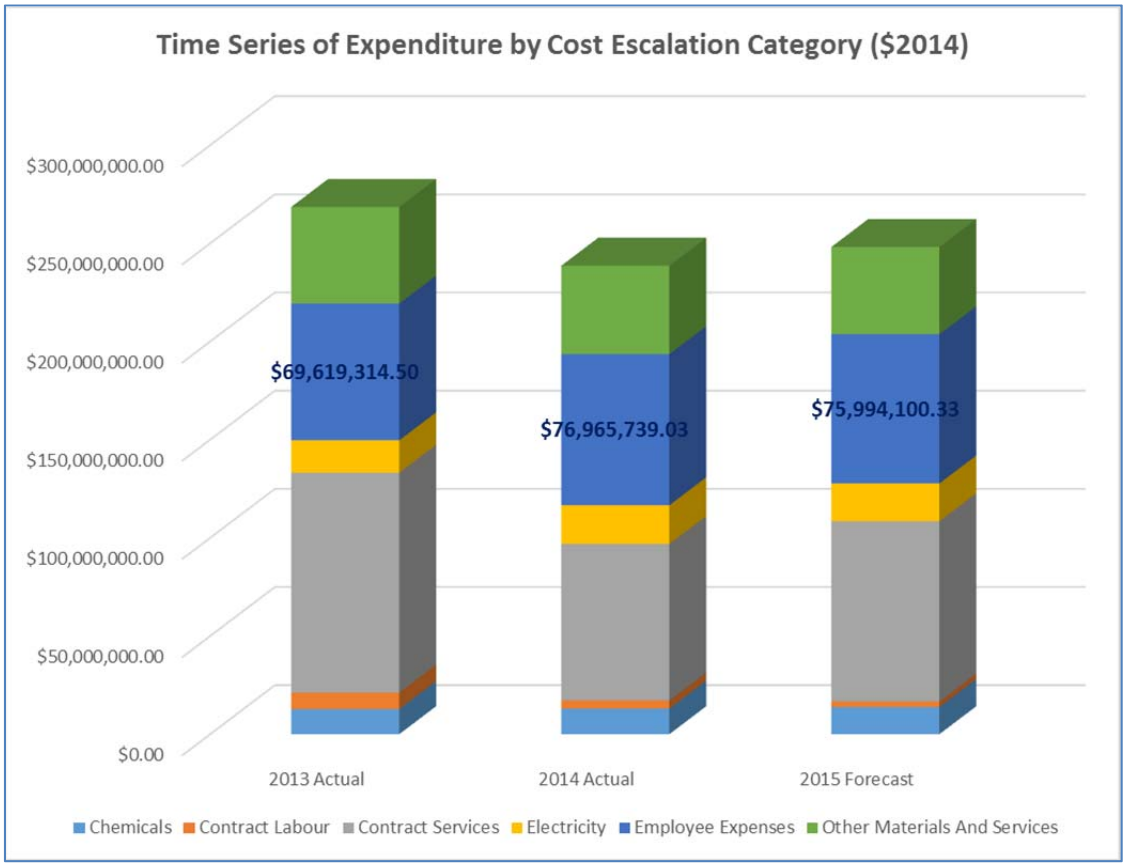
Review recommendations result in a significant reduction in operating expenditure forecasts, largely as a result of limited substantiation of both cost forecasts and cost movements for specific cost items. Where these costs and movements are justified but not well substantiated in evidence, Seqwater will be left with a budget shortfall until the next price review.

5.3 Employee costs

5.3.1 Overview of expenditure

Employee costs represent Seqwater's second largest operational expense category and is only exceeded by the Contract Services category. In the 2013/14 financial year, employment costs accounted for 32.3% of all operational expenditures. These expenditures relate to the direct and indirect costs incurred in employing staff, including remuneration costs, staff allowances/benefits. A comparison of historic and forecast employee expenses against other operational cost categories is presented in Figure 5-5 below:

Figure 5-5: Historical and forecast relationship between Seqwater operational cost categories



Source: Analysis of Seqwater Operational Expense Spreadsheets

CH2M HILL has not presented employment expenses beyond 2014/15, as the Seqwater forecasts are based on constant expenditure in real terms beyond the 2014/15 year with only minor yearly adjustments.

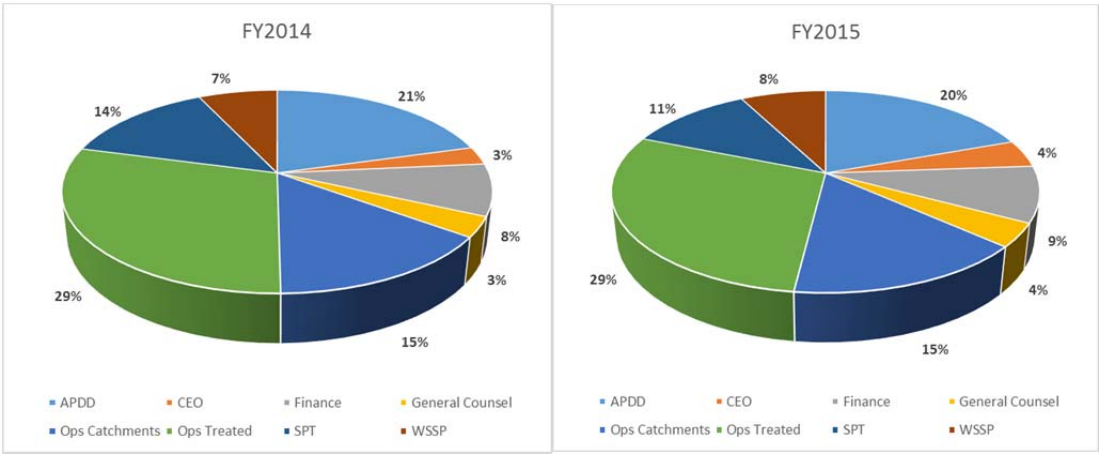
The individual cost components that make up the Employment Expense cost category are as follows:

511001 - Salaries and Wages - Awards
511002 - Overtime Expenses
511003 - Penalty Rate Expenses
511101 - Travel Allowance
511102 - Higher Duties Allowance
511103 - Meal Allowance
511104 - On-Call Allowance
511105 - Trade Allowance
511106 - Hot Skill Allowance
511108 - Other Allowances
511201 - Bonuses
511301 - Employment Termination / Redundancy Payments
511401 - Director's Fees
512001 - Annual Leave
512002 - Annual Leave Loading
512003 - Long Service Leave
512004 - Personal Leave
512005 - Study / Exam Leave
512006 - Maternity / Parental Leave
512007 - Other Leave
512008 - Time Off In Lieu
513001 - Employer Contribution - Accumulation Schemes
513002 - Employer Contribution - Sal Sac - Accumulation Schemes
513011 - Employer Contribution - Defined Benefit Schemes
513013 - Employer Contribution - Sal Sac - Defined Benefit Schemes
514001 - Payroll Tax
514002 - Fringe Benefit Tax Expense
515101 - Workers' Compensation Expenses
515102 - Insurance - Workers Comp Premium

The six-figure prefix for these cost components is a General Ledger account code from the Seqwater Corporate Information System (CIS). The account codes in blue above are only utilised for capture of actual employment expenses. Only the codes in black are utilised for budgeting/forecasting purposes. Seqwater provided guidance on how the forecast budget codes relate to the actual expenditure codes to enable actual / forecast comparisons.

The percentage of employment expenditure for the 2014 and 2015 Financial Years is presented in Figure 5-6 below:

Figure 5-6: Employment expenditure by Business Unit for FY 2014 and 2015



Source: CH2M HILL Analysis of Seqwater Operational Expenditure figures

It can be noted from the Figure above that there is minimal change in the apportionment of employment expenses between the two years.

5.3.2 Documentation provided

The following documentation has been provided:

- Seqwater Submission to QCA (Chapter 8)
- Opex model 2014-09-25 Q1 FY15 revised (as corrected by CH2M HILL)
- Seqwater Employee Expense Methodology.docx – Provides detail on how employees expense forecasts are developed
- Employer Expenses by Natural Acct – 1314 Actuals vs Q1F15.xlsx – reconciles actual expenditure accounts to forecast/budget accounts
- ICT response – FTE reduction.docx – SPT/ICT Business Group providing detail on ICT staff demand
- KPMGSEQWATER14 ICT Expenditure Review Report 310714.pdf – KPMC Report on ICT transition and staff demand
- Redundancies.docx – Seqwater clarification on redundancy figures
- Seqwater opex data 26-9-14 consolidated spreadsheet – used only for analysis of 2012/13 opex data
- Q1 narratives spreadsheet – detailing departures from previously submitted opex cost model
- The Seqwater Staff Enterprise Bargaining Agreement
- Microsoft Word document summarising Seqwater Superannuation arrangements and cost coding
- Three Adobe Acrobat Files detailing Overtime expenditures by:
  - Location
  - Region
  - Team

5.3.3 Drivers

The two primary drivers of employment expenditure are:

1. The number of equivalent full time employees (FTEs) employed by the business; and
2. The employment arrangements under which the employees are engaged.

Seqwater provided a breakdown of staff numbers by Business Unit in their submission document and this is reproduced in Table 5-3 below:

Table 5-3: Breakdown of FY2014 and FY2015 staff numbers by Business Unit

Seqwater Q3 FY14 and FY15 forecast Resourcing	Q3 FY14 FTE Positions	FY14 to 15 change	FY15 FTE Positions	Q3 FY14 Temp Positions	FY14 to 15 change	FY15 Temp Positions	Q3 FY14 Total Positions	FY14 to 15 change	FY15 Total Positions
Operations - Treated Water	**192.5**	**1.0**	**193.5**	**12.0**	**-**	**12.0**	**204.5**	**1.0**	**205.5**
GM Office	2.0	-	2.0	-	-	-	2.0	-	2.0
Business Systems and Support	7.0	-	7.0	-	-	-	7.0	-	7.0
Supply Treated Water - North	41.0	-	41.0	2.0	-	2.0	43.0	-	43.0
Supply Treated Water - South	31.0	-	31.0	3.0	-	3.0	34.0	-	34.0
Supply Treated Water - Central	39.0	-	39.0	2.0	-	2.0	41.0	-	41.0
Operational and Contractural Performance	18.5	-	18.5	2.0	-	2.0	20.5	-	20.5
Asset Maintenance	54.0	1.0	55.0	3.0	-	3.0	57.0	1.0	58.0
Asset Portfolio Development & Delivery	**121.2**	**-**	**121.2**	**13.7**	**(1.8)**	**11.9**	**134.9**	**(1.8)**	**133.1**
GM Office	2.0	-	2.0	-	-	-	2.0	-	2.0
Water Quality and Enviroment	43.0	-	43.0	2.0	0.5	2.5	45.0	0.5	45.5
Asset Capability and Sustainability	20.2	(0.5)	19.7	-	2.4	2.4	20.2	1.9	22.1
Asset Planning	13.0	0.5	13.5	2.0	-	2.0	15.0	0.5	15.5
Engineering and Technical Support	21.0	-	21.0	6.0	(2.0)	4.0	27.0	(2.0)	25.0
Program Delivery	22.0	-	22.0	3.7	(2.7)	1.0	25.7	(2.7)	23.0
Service, People and Technology	**82.2**	**2.8**	**85.0**	**9.0**	**(4.9)**	**4.1**	**91.2**	**(2.1)**	**89.1**
GM Office	2.0	-	2.0	-	-	-	2.0	-	2.0
Strategy and Brand	11.0	2.8	13.8	1.0	-	1.0	12.0	2.8	14.8
WH&S	11.0	1.0	12.0	2.0	(0.4)	1.6	13.0	0.6	13.6
People and Culture	15.2	(2.0)	13.2	4.0	(2.5)	1.5	19.2	(4.5)	14.7
ICT	43.0	1.0	44.0	2.0	(2.0)	-	45.0	(1.0)	44.0
Corporate Finance	**56.0**	**-**	**56.0**	**-**	**-**	**-**	**56.0**	**-**	**56.0**
ChiefFinancial Office	3.0	-	3.0	-	-	-	3.0	-	3.0
Finance	25.0	-	25.0	-	-	-	25.0	-	25.0
Procurement	9.0	-	9.0	-	-	-	9.0	-	9.0
Property and Facilities	19.0	-	19.0	-	-	-	19.0	-	19.0
General Counsel	**18.0**	**-**	**18.0**	**1.0**	**-**	**1.0**	**19.0**	**-**	**19.0**
General Counsel	2.0	-	2.0	-	-	-	2.0	-	2.0
Legal	9.0	-	9.0	-	-	-	9.0	-	9.0
Governance	7.0	-	7.0	1.0	-	1.0	8.0	-	8.0
Operations - Catchment and Raw Water	**99.3**	**1.2**	**100.5**	**5.0**	**7.3**	**12.3**	**104.3**	**8.5**	**112.8**
GM Office (including Project Office)	4.4	0.2	4.6	-	-	-	4.4	0.2	4.6
Source Operations and Management	47.9	1.0	48.9	4.0	-	4.0	51.9	1.0	52.9
Recreation & Catchment Services	47.0	-	47.0	1.0	7.3	8.3	48.0	7.3	55.3
Water Supply, Strategy and Policy	**41.0**	**(1.0)**	**40.0**	**2.0**	**-**	**2.0**	**43.0**	**(1.0)**	**42.0**
GM Office	2.0	-	2.0	-	-	-	2.0	-	2.0
Regulatory and Investment Governance	6.0	(1.0)	5.0	-	-	-	6.0	(1.0)	5.0
Water Supply Planning	15.0	(0.1)	14.9	1.0	-	1.0	16.0	(0.1)	15.9
Water Policy, Strategy, Reseach and Innovation	18.0	0.1	18.1	1.0	-	1.0	19.0	0.1	19.1
Office of the CEO	**7.0**	**1.0**	**8.0**	**1.0**	**(1.0)**	**-**	**8.0**	**-**	**8.0**
Office of the CEO	2.0	-	2.0	-	-	-	2.0	-	2.0
External Relations	5.0	1.0	6.0	1.0	(1.0)	-	6.0	-	6.0
Total	**617.2**	**5.0**	**622.2**	**43.7**	**(0.4)**	**43.3**	**660.9**	**4.6**	**665.5**

Source: Seqwater Submission

CH2M HILL has adopted the staff numbers provided in the table above as the FTE baseline for its analysis.

With regard to employment arrangements, the majority of Seqwater staff members are employed under an Enterprise Bargaining Arrangement (EBA), the current version of which has been supplied by Seqwater.

CH2M HILL has reviewed this EBA and found it to be in-line with Industry Good Practice. In-fact, Seqwater is to be commended for the efficiency initiative within this arrangement that offers a bonus staff salary increment for achieving or exceeding a defined operational efficiency dividend. Seqwater financial reports on this initiative demonstrate that the

operational efficiencies gained to-date have more than offset the salary increment. More detail is provided on the Seqwater EBA in Section 5.3.5 of this report.

CH2M HILL understands that a small minority of Seqwater staff are not employed under the EBA arrangements, but that in these cases the EBA terms define the upper limits for alternative employment contract terms.

5.3.4 Unit rates

With the EBA arrangement providing a level of consistency in employment expenditure, staff numbers and in particular, FTEs become the primary influence of employment expenditures. This parameter has therefore, been adopted as the denominator for employment expense unit rates in CH2M HILL's analyses.

Total employment costs per FTE have been calculated at $116,455.95 for the 2013/14 financial year and $114,190.98 for the 2014/15 financial year, in 2014 dollars. This represents a real decrease in annual employment costs of 1.94%, based on the FTE figures provided by Seqwater. CH2M HILL notes however, that the $3,064,337.47 payment made in the 2013/14 financial year for one-off (day 2) redundancy payouts is unlikely to be duplicated in the 2014/15 year. It is understood that this figure is covered in the *511108 – Other Allowances* code and if this figure is deleted, a net unit rate increase of 2.83% from 2013/14 to 2014/15 results, which is above the net increase in headcount over these years.

A breakdown of employment expenses by Seqwater Business Unit is presented in Table 5-4 below:

Table 5-4: Breakdown of FY2014 and FY2015 employment unit rates by Business Unit

Buisiness Unit	2013/14		2014/15	
	FTE	Cost/FTE	FTE	Cost/FTE
APDD	134.9	$117,713.05	133.1	$111,229.87
CEO	8	$276,124.28	8	$415,951.77
Finance	56	$113,254.92	56	$121,068.18
General Counsel	19	$130,233.64	19	$150,877.33
Operations Catchments	104.3	$109,409.71	112.8	$103,849.20
Operations Treated	204.5	$110,483.16	205.5	$107,785.52
SPT	91.2	$116,401.51	89.1	$95,580.33
WSSP	43	$126,499.58	42	$138,928.13

Source: CH2M HILL analysis of Seqwater Operational Cost figures.

Whilst the rolled-up employment expense scales reasonably well with FTE numbers year-on-year, CH2M HILL notes that the unit rates for some Business Units do not. The major outlier is the CEO Business Unit, where a 25% increase in employment costs is noted.

The Salaries and Wages – Awards account (account code 511001) makes up approximately 75% of 2014/15 expenditure, which indicates that the average salary of Seqwater staff is $84,215.66. CH2M HILL assesses this median Base Salary/Wage to be within the envelope of salaries/wages for similarly skilled employees in the water industry and representative of an organisation whose workforce is dominated by Engineers and Qualified Technicians.

Seqwater's calculated employment costs per ML supplied for FY2013/14 is $258.27 based on actual flows, compared to $255.54 based on forecast flows, representing a net decrease of 1.06%. CH2M HILL has not considered this benchmark as a suitable industry comparator for

employment costs, as Seqwater is unique amongst its organisational peers in the Australasian Region in terms of Regulatory environment, asset holding and level of catchment control.

5.3.5 Escalation factors

In developing its expenditure forecasts for Employee Expenses, Seqwater has applied the escalation factors outlined in Table 5-5.

Table 5-5: Proposed Employee Expenses escalation factors

Year	2013-14	2014-15	2015-16	2016-17	2017-18 to 2027-28
Rate (nominal)	2.50%	2.50%	2.50%	3.50%	3.50%
Rate (real)*	-0.49%	-0.49%	-	0.98%	0.98%

Source: Seqwater Bulk Water Prices 2015 to 2018 - Submission to QCA, p. 118.
* Real refers to 2013-14 dollars

Seqwater engaged PricewaterhouseCoopers (PwC) to analyse historical price movements and other relevant information (including Government and industry forecasts) and recommend escalation forecasts to be applied against the relevant broad operating expenditure categories for the purposes of its 2015-2018 Submission. Seqwater has adopted PwC's recommended escalation factors for Employee Expenses as follows:

- Wage increases as agreed under the Seqwater Certified Agreement from 2013-14 to 2015-16
- Queensland Treasury and Trade (QTT) wage price index (WPI) forecast of 3.5% per annum to 2016-17, extrapolated over the forecast period to 2027-28.

A review of the appropriateness of the Employee Expenses escalation factors adopted by Seqwater in its 2015-18 Submission is outlined below.

Seqwater Certified Agreement

The current Seqwater Certified Agreement (CA) covers the three year period from July 2013 to June 2016. The CA includes both guaranteed and contingent increases, which are based on cash savings being realised that are sufficient to fund the wage increase. The contingent component of the salary increase is based on an assessment by Seqwater every 6 months of the achievement of cash savings matching and sufficient to fund the percentage increase. Table 5-6 outlines the timing of the guaranteed and contingent increases contained in the current agreement.

Table 5-6: Guaranteed and contingent increases agreed in Seqwater's Certified Agreement

Effective Date	Guaranteed wage increase	Contingent wage increase	Total increase
July 2013	2.00%	-	**2.0%**
January 2014	-	0.50%	**0.50%**
July 2014	1.50%	0.50%	**2.00%**
January 2015	-	0.50%	**0.50%**
July 2015	1.00%	1.00%	**2.00%**
January 2016	-	0.50%	**0.50%**

Source: Seqwater Certified Agreement, p.8.

Including contingency increases, and the fact that wage increases are awarded every six months, the total annual increase set out in the CA equates to annual wage rises of slightly more than 2.51% over the term of the agreement. For simplicity, Seqwater has rounded down the wage increase and adopted an annual 2.5% escalation factor.

CH2M HILL notes that in recent price monitoring reviews for south east Queensland retail water businesses, the QCA's preferred approach has been to escalate employee costs in line with current CAs. This was particularly evident in the recent retail water price review of Gold Coast Water where the QCA rejected a proposed escalation factor that was over and above the accepted CA that covered the entire regulatory period.[6] As such, CH2M HILL considers that Seqwater's adoption of an annual Employee Expenses escalation factor of 2.5% over the period from 2013-14 to 2015-16 is appropriate.

Queensland Treasury and Trade WPI Forecast

From 2016-17 onwards, Seqwater has adopted PwC's recommended annual escalation factor of 3.5%. This is based on WPI forecasts published by QTT as part of the *2013-14 Budget Strategy and Outlook* covering the period from 2013-14 to 2016-17, extrapolated over the forecast period to 2027-28. In recommending the application of an escalation factor of 3.5% from 2016-17 to the remainder of the regulatory period (2027-28), PwC stated:[7]

> *For the remainder of the regulatory and forecast periods (to 2027/28) we recommend the current QTT forecasts for growth in the Queensland WPI be applied. Although QTT provides forecasts to 2016/17, we believe the WPI forecast provides a reasonable reflection of broader labour market tends over the medium term. This estimate aligns closely with historical growth in the Queensland WPI, which has averaged 3.6 per cent annually over the past 15 years (nominal), and is conservative compared with historical growth in the national EGWWS sector WPI, which has averaged 4.1 per cent growth over the same period.*

In support of the above recommendation, PwC noted the view expressed by QTT that it expected state-wide employment to grow over the medium term, in response to increased household spending, stronger income growth and faster population growth to overcome the

[6] QCA, 2014. *SEQ Price Monitoring for 2013-15, Part B - Gold Coast Water*, p.52.
[7] PricewaterhouseCoopers, 2014. *Cost escalation forecasts (Appendix E)*, p.15.

negative effects of current household caution and the high Australian dollar on Queensland employment.

CH2M HILL has reviewed the forecasts presented by PwC against updated forecasts published in the recent *2014-15 Budget Strategy and Outlook* by QTT. A comparison of the respective forecasts for annual percentage change in WPI is presented in Table 5-7 below.

Table 5-7: Wage price index forecasts, Queensland

Source	2013-14	2014-15	2015-16	2016-17	2017-18
2013-14 Forecast[a]	3.50%	3.50%	3.50%	3.50%	Not stated
2014-15 Forecast[b]	2.75%	3.00%	3.25%	3.50%	3.50%

Sources:
a. QTT, 2013. *2013-14 Budget Strategy and Outlook,* p.31
b. QTT, 2014. *2014-15 Budget Strategy and Outlook,* p.31

It can be seen that there has been some deviation from the forecasts reviewed by PwC and the revised forecasts developed by QTT as part of the *2014-15 Budget Strategy and Outlook*. Critically however, CH2M HILL notes that the forecast Queensland WPI for 2016-17 (the year informing Seqwater's proposed escalation factor over the period from 2016-17 to 2027-28) remains consistent at 3.5%, and that this is projected to hold at 3.5% in 2017-18.

Based on a review of historical wage levels in the electricity, gas, water and waste services (EGWWS) sector, historical movements in the Queensland WPI, updated forecasts in the Queensland WPI for 2016-17 and 2017-18, and taking into consideration the inherent uncertainty in such projections, CH2M HILL considers that Seqwater's adoption of an annual Employee Expenses escalation factor of 3.5% over the period from 2016-17 to 2027-28 is appropriate.

Summary findings on escalation factors

Based on the above analysis, CH2M HILL considers the Employee Expenses escalation factors proposed by Seqwater for the period from 2013-14 to 2027-28 (see Table 5-5) to be consistent with prevailing market conditions and historical trends, and therefore reasonable and appropriate. As such, CH2M HILL proposes no changes to Seqwater's proposed Employee Expenses based on the escalation factors adopted.

5.3.6 Prudency

Investment in employment of suitably qualified and capable staff is a critical factor in Seqwater's ability to deliver bulk water to its clients that meets both current/forecast demand and regulatory/legislative requirements. CH2M HILL therefore, considers Seqwater's continued investment in employment expenses – both base salary/wage and appropriate employment entitlements – to be prudent.

5.3.7 Efficiency

CH2M HILL originally had difficulty reconciling the account codes presented in the 2013/14 Actual figures provided with those provided for the 2014/15 forecast. This lack of reporting continuity influenced CH2M HILL's decision to focus its analysis on the 2013/14 actual costs, with due consideration of the factors that might influence these costs from 2013/14 to 2014/15. This decision has been taken because the 2013/14 year data is at a level of disaggregation that enables a more detailed cost assessment.

Specific cost item adjustments

Salaries and Wages - Awards

The 2013/14 actual expenditure for cost code 511001 – Salary and Wages – Awards was $45.24 million, compared to a forecast value of $56.05 million. The real 24% increase in reported salaries and wages from 2013/14 to 2014/15 does not correlate with the proposed 0.76% increment in FTEs in the same period and is not likely to be attributable to a radical change in staff skill/payment profiles. On this basis, CH2M HILL recommends that the 2014/15 figure is better determined by multiplying the salary and wages unit rate for 2013/14 by the proposed FTEs in 2014/15.

Forecast FTE

CH2M HILL only has a basis to investigate the FTE figures provided for the ICT area of the Service, People and Technology Business Unit. CH2M HILL accepts that the 43 FTE allocated to this area in 2013/14 and the 44 FTE forecast for 2014/15 has been and may continue to be required to facilitate consolidation of the merged entity business systems in the short-term. CH2M HILL anticipates, however that these staffing levels will drop once the systems have been commissioned and fully tested. A time horizon of two years should be allowed for Seqwater to achieve full system approval.

CH2M HILL also understands that Seqwater plans to implement new systems under a Software as a Service (SaaS) arrangement, in accordance with current Queensland Government views on best practice. One of the key drivers for SaaS implementation is the reduction of “non-core” staff demand.

Implementation of such a system not only reduces the requirement for ICT staff, but also requires a different skill-base for its efficient management/administration. CH2M HILL notes that a reduction of employment costs related to SaaS implementation is likely to be offset to some degree by an increase in operational expense, driven by SaaS subscription payments.

SaaS delivery is at an early stage of maturity worldwide and there is limited research available to establish the level of staff reduction that may apply to a given business. Given both the software and hardware is no longer hosted or maintained locally, it is safe to say that most staff associated with database administration, software support and server maintenance would be redundant.

Workers Compensation

The cost item *515101 – Worker’s Compensation Expenses* increases from $169,263 to $269,931 from 2012/13 to 2103/14 and to $580,558 in the 2014/15 forecast. This represents increases of 59% and 115% year-on-year which CH2M HILL has no basis for substantiation. CH2M HILL notes that from the 2012/13 to the 2014/15 years, the expense per FTE for this cost item increases from $290 to $871 and this cannot be attributed to the real increase in WorkCover premiums. It is recommended that the 2013/14 unit rate be applied to the 2014/15 FTE figures to determine this expense.

Annual Leave

The Annual Leave figure provided in the 2014/15 forecast is $1,114,444, compared to the 2013/14 figure of $5,086,383 and CH2M HILL believes that the summary process employed in producing the 2014/15 figures may be flawed. The 2013/14 figure is very close to the figure derived if all staff members take their allocated four week's leave each year and CH2M HILL believes this is the best approach to determining future leave liabilities. A corresponding adjustment will be required for the leave loading that applies.

Seqwater Override Adjustments

In addition to the cost items discussed above, Seqwater identified a number of 'Override' expenditure increases related to Employee Expenses in the forecast figures. These increases have been applied on a Business Unit and cost category basis. An assessment of the efficiency of these proposed increases is also provided below.

APDD employee cost increase

Seqwater has included a positive adjustment to the APDD Business unit's employee costs of $174,657 in FY2016/17 and FY2017/18, dropping to $100,697 for the remaining forecast years. Whilst the 'APDD Chapter' was referenced as the source of substantiating information for this increase, CH2M HILL could find any reference in Section 8.3 of the Seqwater submission that reconciled to the annual figures or total for this adjustment. Seqwater subsequently provided a spreadsheet that presented how the annual figures were calculated, but failed to provide and rationale for the proposed adjustment. As a result, CH2M HILL cannot recommend that this adjustment be made.

SPT pro-rata IT cost disbursement

A positive $1,180,820 per annum employee cost adjustment has been forecast from FY2016/17 to cover pro-rata IT Costs. The adjustment note indicates that this is *'...as per 2014-15 budget applied to FY OPEX of $22.8M page 178 v11 pro-rata RIG assumption'*. CH2M HILL understands that the 'RIG' reference relates to Regulatory and Investment Governance Team.

Seqwater has provided some detail on this allocation in the form of overview document and spreadsheet, however neither document provides any robust argument for either the source of, business case for or approval of the "Budget Option 3 – Comply to QLD Govt and Increase ICT Capability" cost scenario presented. Furthermore, the spreadsheet employs a cost apportioning approach based on Actual 2013/14 figures that has computational errors.

In the absence of robust cost substantiation, CH2M HILL cannot recommend that this adjustment be made.

5.3.8 Efficiency gains

During the course of the review, Seqwater has provided evidence of a number of operational efficiency initiatives. These include process-level initiatives like the development of a robust Asset Management Framework for the business and specific initiatives like the EBA-driven operational efficiency initiatives. From an analytical perspective, CH2H HILL expects that the efficiencies identified through these initiatives are already quantified and captured in the operating expenses actual costs and forecasts provided by Seqwater.

Seqwater has also highlighted a number of specific efficiencies in 'Override' expenditure decreases related to Employee Expenses in the forecast figures. These efficiencies have been

applied on a Business Unit and cost category basis. CH2M HILL's assessment of these efficiencies is provided below.

OPS – Catchment employee cost savings

Seqwater has identified the following employee expense savings for the OPS – Catchment Business Unit over the forecast years:

- Removal of a one-off Day 2 Termination payment of $45,000 from FY2015/16
- [redacted]
- A $150,000 reduction to the Greenprint initiative from FY2015/16

The references for these savings have been identified in the Seqwater Submission. Savings figures provided represent an appropriate cost reduction from FY2014/15 levels. CH2M HILL recommends therefore, that the proposed efficiencies remain in the operational expenditure forecasts.

5.3.9 Assessment of Prudency and Efficiency

CH2M HILL believes that Seqwater must allocate an appropriate level of investment in staff capacity and skills to assure delivery to its customers and effectively manage all business and operational risks. It follows that CH2M HILL has assessed Seqwater's investment in employment expenses as prudent.

In the course of assessing actual and proposed employment expenditure, with the knowledge gained on future Seqwater business plans, CH2M HILL identified a number of inconsistencies that represent opportunities for efficiency improvement. These opportunities were primarily related to the gap between 2013/14 actual costs and 2014/15 cost forecasts for some employment expenditure cost items. Cost items where potential efficiencies were identified included:

- An unsubstantiated jump in average staff salaries wages – particularly within the CEO's office;
- A reduction in ICT FTEs as a result of the implementing corporate support systems through a SaaS delivery mechanism;
- High staff redundancy/termination costs that carry-through into the cost forecasts;
- A significant and unsubstantiated increment in WorkCover expenditures;
- A significant and unsubstantiated increment in "Other Allowance" expenditures;

In addition, CH2M HILL identified that the annual leave figure reported in the 2014/15 forecast figure is too low to be representative of likely future leave liabilities. This figure is unsustainable and CH2M HILL has included an appropriate positive adjustment to address this shortfall.

5.3.10 Assessment of reported expenditure

Seqwater has identified proposed operating expenditure of $1,063.21 million (real 2014 terms) over the forecast period from 2014-15 to 2027-28 for employment related expenses. Table 5-8 below identifies CH2M HILL's recommended operational expenditure for the employment expenses cost category.

Table 5-8: *Employee Costs* recommended operational expenditure (M 2014)

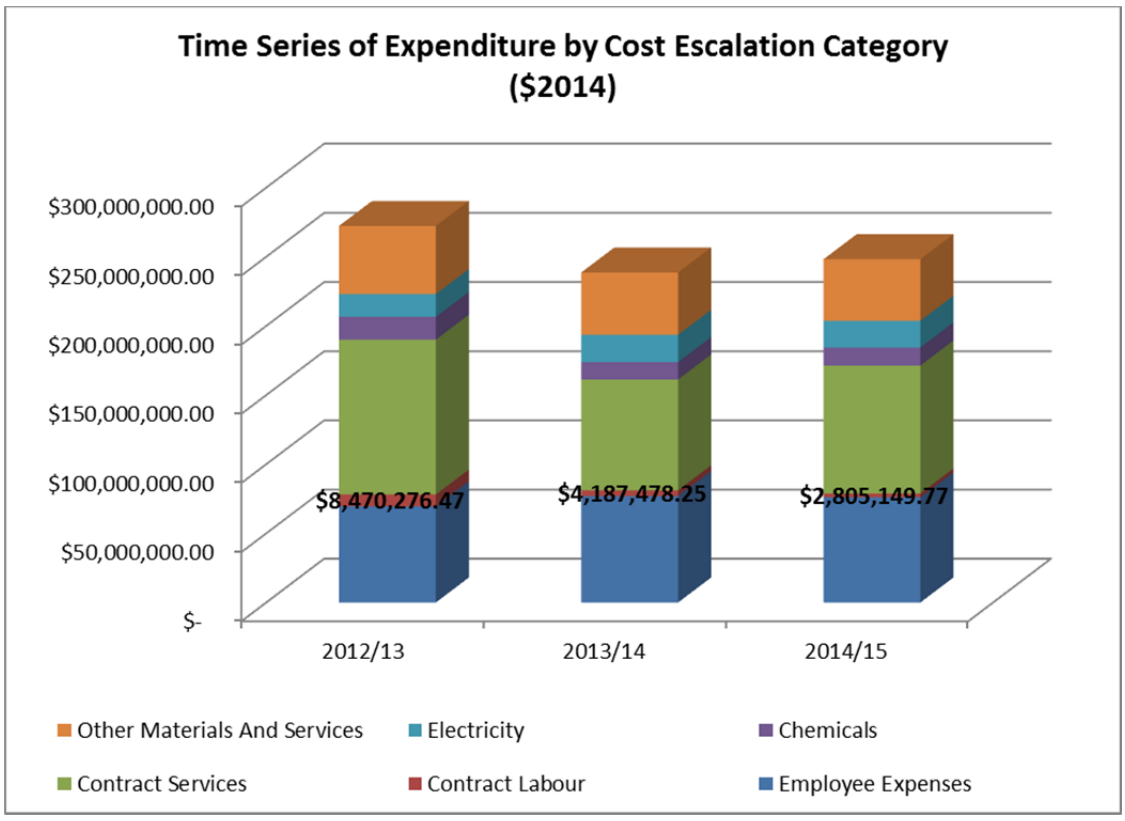
Operational Expenditure Profile	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Total Forecast
Seqwater Forecast Expenditure	$75.99	$75.88	$76.01	$75.94	$75.94	$75.94	$75.94	$75.94	$75.94	$75.94	$75.94	$75.94	$75.94	$75.94	$1,063.21
Proposed Adjustment – Overrides	-	-$0.17	-$1.36	-$1.28	-$1.28	-$1.28	-$1.28	-$1.28	-$1.28	-$1.28	-$1.28	-$1.28	-$1.28	-$1.28	-$15.63
Proposed Adjustment – CH2M HILL Review	-$1.33	-$1.33	-$1.33	-$2.96	-$2.96	-$2.96	-$2.96	-$2.96	-$2.96	-$2.96	-$2.96	-$2.96	-$2.96	-$2.96	-$36.53
CH2M HILL Recommended Expenditure Profile	**$76.97**	**$72.66**	**$72.38**	**$70.36**	**$70.36**	**$70.36**	**$70.36**	**$70.36**	**$70.36**	**$70.36**	**$70.36**	**$70.36**	**$70.36**	**$70.36**	**$989.37**

5.4 Contract Labour

5.4.1 Overview of expenditure

Contract labour is a subset of Seqwater labour costs alongside employment costs. It is considered separately to employment costs from an economic viewpoint because it has a different escalation cost profile. Contract Labour represents Seqwater's smallest expense category and one that has been reducing with time. In the 2013/14 financial year, Contract Labour expenses accounted for 5.16% of all human resource expenditure and 1.76% of all operational expenditures. These expenditures relate to the commissioning of personnel to meet short-term staff capacity needs or to provide one-off, specialist advice to the business, where having this expertise in-house would not be cost-effective. A comparison of historic and forecast employee expenses against other operational cost categories is presented in Figure 5-7 below:

Figure 5-7: Historical and forecast relationship between Seqwater operational cost categories



Source: Analysis of Seqwater Operational Expense Spreadsheets

CH2M HILL has not presented figures beyond 2014/15, as the all cost figures provided by Seqwater are constant in real terms beyond the 2014/15 year.

The individual cost components that make up the Contract Labour cost category are as follows:

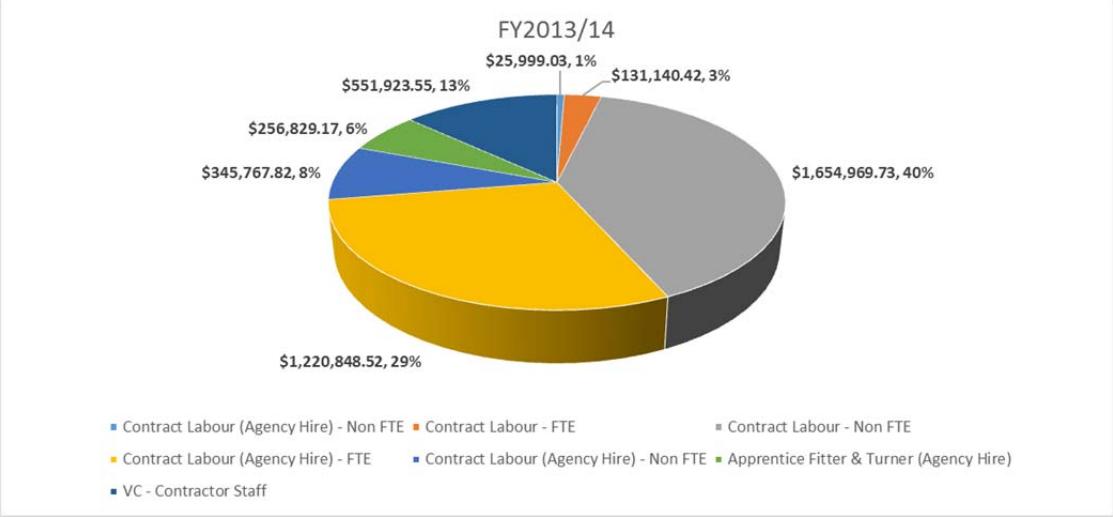
522224 - Contract Labour - FTE
522225 - Contract Labour – Non-FTE
522226 - Contract Labour (Agency Hire) - FTE
522227 - Contract Labour (Agency Hire) – Non-FTE
522228 – Apprentice Electricians (Agency Hire)
522229 - Apprentice Fitter & Turner (Agency Hire)
622302 – VC – Contractor Staff

CH2M HILL believes that the six-figure prefix for these cost components is a General Ledger account code from the Seqwater Corporate Information System (CIS). It is also believed that FTE contracts relate to backfill of existing Seqwater employees, whereas non-FTE contracts relate to skills/personnel augmentation.

CH2M HILL assumes that the last cost code relates to ad-hoc labour hire provided by Seqwater's Maintenance Contractor (Veolia) for services outside the scope of the current Maintenance Contract. In-scope employment expenses are captured in the Contract Services expenditure category covered in Section 5.4 of this Review.

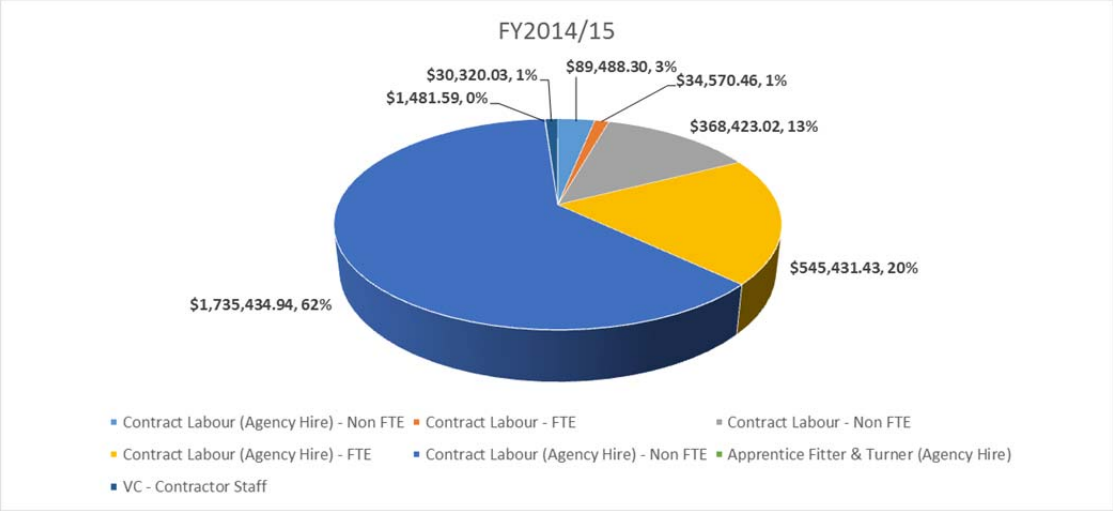
The percentage of contract labour expenditure by the cost codes defined above for the 2014 and 2015 Financial Years is presented in Figure 5-8 and Figure 5-9 below:

Figure 5-8: FY2013/14 expenditure on Contract Labour by cost code



Source: Analysis of Seqwater Operational Expense Spreadsheets

Figure 5-9: FY2015/15 forecast expenditure on Contract Labour by cost code

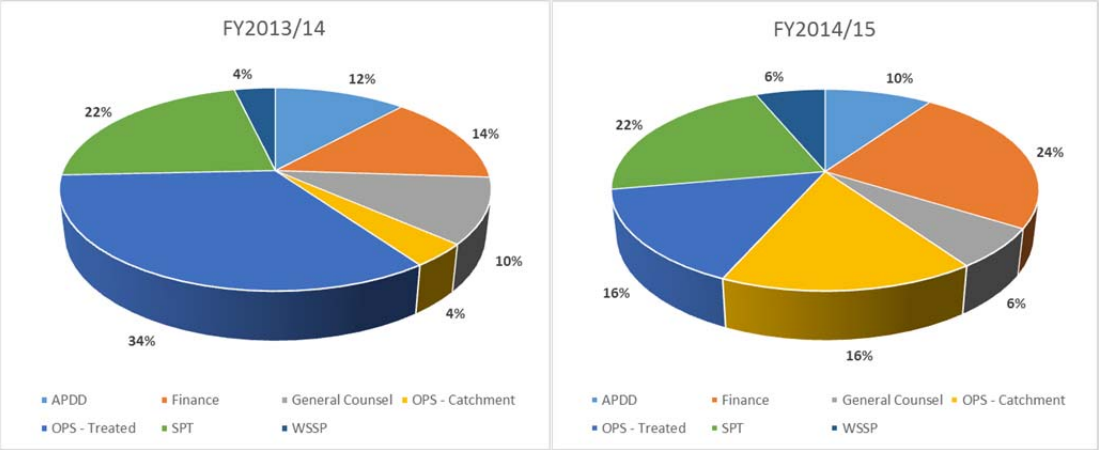


Source: Analysis of Seqwater Operational Expense Spreadsheets

Notable changes from the actual; 2013/14 figures to the forecast figures are a significant decrease in Agency-hired FTE labour and a larger increase in Agency-hired non-FTE labour.

The percentage of contract labour expenditure by Business Unit for the 2014 and 2015 Financial Years is presented in Figure 5-10 below:

Figure 5-10: Contract Labour expenditure by Business Unit for FY 2014 and 2015



Source: Analysis of Seqwater Operational Expense Spreadsheets

It can be noted from the Figure above that there are major shifts in the proportion of expenditure on Contracted Labour driven both by changes in demand and by the general decrease in funding for this cost category.

5.4.2 Documentation provided

The following documentation has been provided:

- Seqwater Submission to QCA (Chapter 8)
- Opex model 2014-09-25 Q1 FY15 revised (as corrected by CH2M HILL)
- Seqwater opex data 26-9-14 consolidated spreadsheet – used only for analysis of 2012/13 opex data
- Q1 narratives spreadsheet – detailing departures from previously submitted operational cost model

5.4.3 Drivers

The two primary drivers of contract labour expenditures are:

1. A shortfall of internal human resources to meet business demands; and
2. A short-term requirement for specialist inputs that cannot be sourced internally.

Given the level of business consolidation and development currently underway at Seqwater, an elevated level of specialist labour contracting is to be expected.

5.4.4 Unit rates

CH2M HILL has only been provided with limited information on actual contract labour rates beyond the individual CIS cost records, therefore specific unit rates like hourly rate cannot be established.

At a macro-level, Seqwater contract labour expenditures represented 5.16% of the total human resource spend in 2013/14 and is forecast to reduce this to 3.56% in 2014/15. The ABS used to publish method of employment figures which would assist in putting the Seqwater benchmark onto context, but its reporting approach was changed in 2002. Statistics at that time showed that 2.9% of the total labour force was employed under a contract labour arrangement and CH2M HILL understandings that this figure would have increased since 2002, with more recent, but less robust figures quoted at between 3.5% and 5.0%. The most comprehensive source of information on this topic is the Adecco Temporary Labour Report 2013, which found that temporary labour made up 3.8% of total workforce and was increasing at a rate of approximately 2% per annum.

Given that Seqwater's business is subject to some seasonal and weather-induced variation in human resource demand, the quoted target value of 3.56 % appears reasonable to CH2M HILL.

5.4.5 Escalation factors

In developing its expenditure forecasts for Contract Labour expenditure, Seqwater has applied the escalation factors outlined in Table 5-9.

Table 5-9: Proposed Contract Labour escalation factors

Year	2013-14	2014-15	2015-16	2016-17	2017-18 to 2027-28
Rate (nominal)	3.46%	3.46%	3.38%	3.38%	3.38%
Rate (real)*	0.45%	0.45%	0.86%	0.86%	0.86%

Source: Seqwater Bulk Water Prices 2015 to 2018 - Submission to QCA, p. 118.
* Real refers to 2013-14 dollars

These escalation factors are the same as those applied to Employment Expenses, in accordance with PwC advice. More detail on our review of the PwC Report on cost escalation can be found in Section 5.3.5.

Summary findings on escalation factors

Based on the above analysis, CH2M HILL considers the Contract Labour escalation factors proposed by Seqwater for the period from 2013-14 to 2027-28 (see Table 5-9) to be consistent with prevailing market conditions and historical trends, and therefore reasonable and appropriate. As such, CH2M HILL proposes no changes to Seqwater's proposed Employee Expenses based on the escalation factors adopted.

5.4.6 Prudency

Investment in contract labour will enable Seqwater to improve business efficiency by enabling rapid and cost-effective response to short-term peaks in the requirement for specific labour skill sets. CH2M HILL therefore, considers that Seqwater's limited expenditure on contract labour to be prudent.

5.4.7 Efficiency

Achieving an economically optimum balance of contract labour to permanent employees is a function of trading the productivity benefits of short-term, well-scoped, but higher cost contracted work with longer-term, lower cost, but potentially less productive permanent staff. This balance will be different for each business, but the optimal mix will generally be higher for organisations that need to adapt to influences beyond their ability to control. Bulk water authorities like Seqwater fall into this category because they need to be responsive to weather .events that have a significant influence on human resource demand.

CH2M HILL endeavoured to identify benchmarks that would support its assessment of Seqwater's proposed expenditure on Contract Labour, in the context of its total human resource expenditures, but found limited information in research. The ABS published baseline figures for the total Australian workforce in 2002 indicating that at the time of reporting; the percentage of contracted labour (through labour hire firms) was 2.9%. Unfortunately, the ABS changed its approach to reporting method of employment shortly after 2002, so a more recent ABS statistic is not available. CH2M HILL did however, identify other less quantified statistics were identified that indicated that this figure has increased significantly since 2002.

Taking the conservative figure of 2.9% by expenditure into account, the general need for bulk water authorities to be responsive to changes in weather and considering the minimum 30% premium the labour hire market expects for personnel provided, CH2M HILL accepts that 3.56% of total human resource expenditure is reasonable. CH2M HILL also acknowledges Seqwater's success in reducing contract labour costs from $8,470,276 in 2012/13 to a proposed $2,805,150 in 2014/15.

Based on its review of the available data, CH2M HILL has assessed Seqwater's proposed expenditure on Contract Labour to be efficient.

Seqwater Override Adjustments

Seqwater has identified a number of 'Override' expenditure increases related to Contract Labour expenditures in the forecast figures. These increases have been applied on a Business Unit and cost category basis. An assessment of the efficiency of these proposed increases is also provided below.

SPT pro-rata IT cost disbursement

Seqwater has forecast a positive $22,651 per annum contract labour adjustment from FY2016/17 to cover pro-rata IT Costs. The adjustment note indicates that this is *'...as per 2014-15 budget applied to FY OPEX of $22.8M page 178 v11 pro-rata RIG assumption'*. CH2M HILL understands that the 'RIG' reference relates to Regulatory and Investment Governance Team.

Seqwater has provided some detail on this allocation in the form of an overview document and spreadsheet, however neither document provides any robust detail on either the source of, business case for or approval of the "Budget Option 3 – Comply to QLD Govt and Increase ICT Capability" cost scenario presented. Furthermore, the spreadsheet employs a cost apportioning approach based on Actual 2013/14 figures that has computational errors. Without further substantiation, CH2M HILL cannot recommend that this adjustment be made.

5.4.8 Efficiency gains

Seqwater has highlighted a specific efficiency in the form of an 'Override' expenditure decrease related to Contract Labour expenditure in the forecast figures. This efficiency has been applied to the OPS – Catchment Business Unit and CH2M HILL's assessment of this proposal is provided below.

OPS – Catchment contract labour savings

Seqwater has identified the following contract labour saving for the OPS – Catchment Business Unit over the forecast years:

- A reduction in contract labour totalling $118,000 per annum starting in FY2015/16 to offset the one-off expenditure in FY2014/15 for administrative and support services for the pending Flood class action
- A reduction in contract labour supporting the sustainable operating model, totalling $200,000 per annum and starting in FY2015/16 to offset the one-off expenditure on this initiative in FY2014/15.

The references for these savings have been identified and substantiated in the Seqwater Submission. Savings figures provided represent an appropriate cost reduction from

FY2014/15 levels. CH2M HILL recommends therefore, that the proposed efficiencies remain in the operational expenditure forecasts.

5.4.9 Assessment of Prudency and Efficiency

CH2M HILL believes that Seqwater will continue to have a need for Contract Labour to address short term capacity requirements in specific (and generally, specialist) skill areas in order to meet customer and regulatory requirements at an acceptable level of risk. It follows that CH2M HILL has assessed Seqwater's investment in employment expenses as prudent.

Limited statistical information is available on either the current or optimal proportion of Contract Labour to permanent labour from a cost perspective, either within or outside of the Water sector. It is CH2M HILL's assessment however; that the proposed 3.56% of total workforce expenditure is within the range of acceptable limits for an organisation whose workforce demand is significantly impacted by both seasonal fluctuations and occasional severe weather events.

Taking our analysis and these considerations into account, CH2M HILL finds Seqwater's proposed expenditure for Contract Labour to be efficient.

5.4.10 Assessment of reported expenditure

Seqwater has identified proposed operating expenditure of $35.4 million (real 2014 terms) over the period from 2014-15 to 2027-28 for employment related expenses. Table 5-10 below identifies the recommended operational expenditure for the employment expenses cost category.

Table 5-10: *Contract Labour* recommended operational expenditure (M 2014)

Operational Expenditure Profile	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Total Forecast
Seqwater Forecast Expenditure	$2.81	$2.49	$2.51	$2.51	$2.51	$2.51	$2.51	$2.51	$2.51	$2.51	$2.51	$2.51	$2.51	$2.51	$35.41
Proposed Adjustment – Overrides	-	-	-$0.02	-$0.02	-$0.02	-$0.02	-$0.02	-$0.02	-$0.02	-$0.02	-$0.02	-$0.02	-$0.02	-$0.02	-$0.27
Proposed Adjustment – CH2M HILL Review	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CH2M HILL Recommended Expenditure Profile	**$2.81**	**$2.49**	**$2.49**	**$2.49**	**$2.49**	**$2.49**	**$2.49**	**$2.49**	**$2.49**	**$2.49**	**$2.49**	**$2.49**	**$2.49**	**$2.49**	**$35.14**

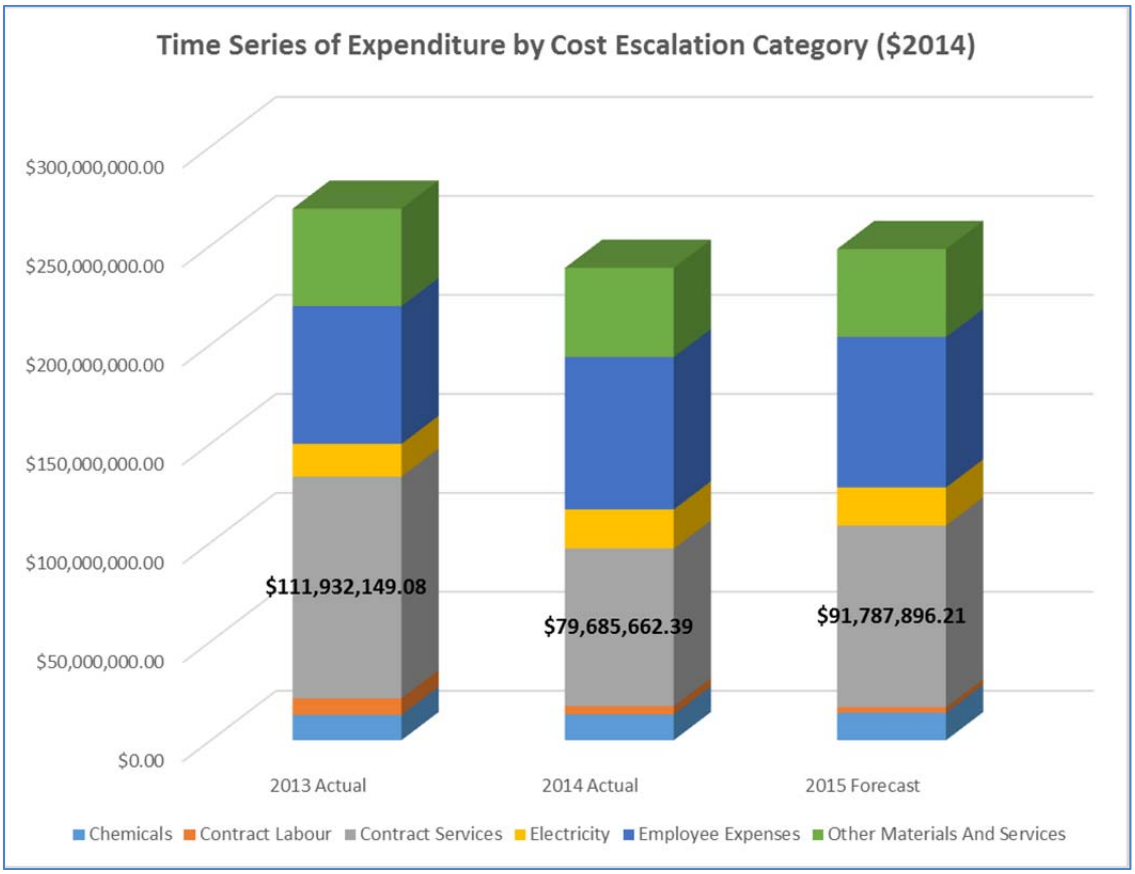
5.5 Contract Services

5.5.1 Overview of expenditure

Contract Services represent Seqwater's largest operational expense category. At a planned expenditure of $91.8 million in 2014/15, it accounts for 33.4% of all operational expenditures. These expenditures relate to procurement of all goods and services not related to backfilling or augmentation of Seqwater staff roles. Seqwater staff backfilling or augmentation costs are covered in Contract Labour Section of this Review (Section 5.4).

A comparison of historic and forecast Contract Services expenditure against other operational cost categories is presented in Figure 5-11 below:

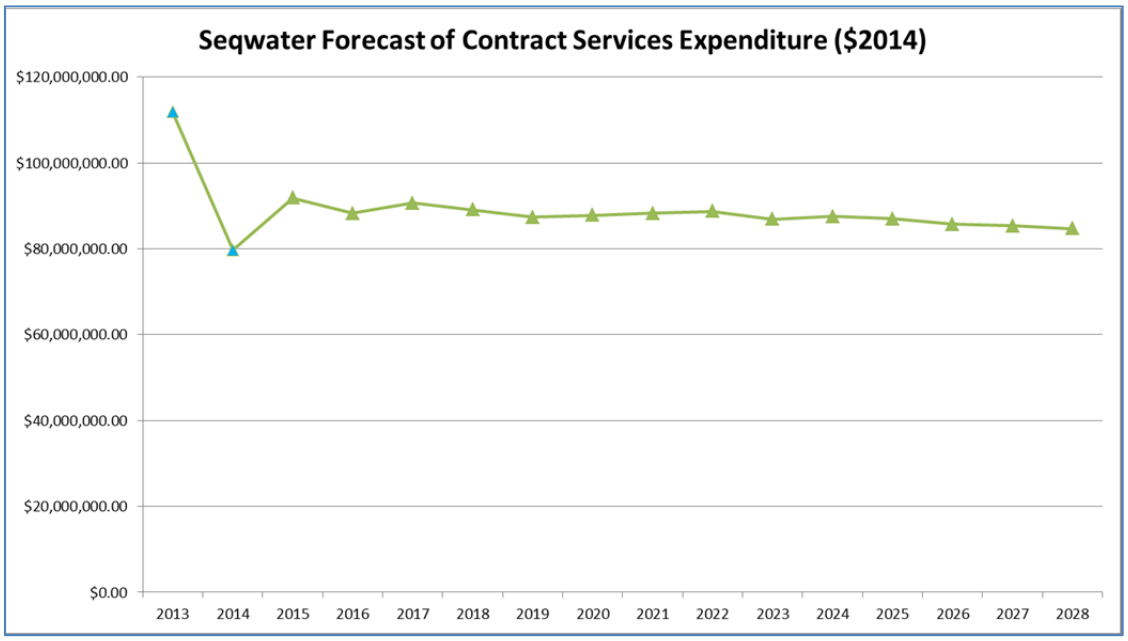
Figure 5-11: Historical and forecast relationship between Seqwater operational cost categories



Source: Analysis of Seqwater Operational Expense Spreadsheets

Seqwater forecasts contract services expenditure to significantly increase in 2014/15 and then steadily reduce to approximately $5 million above 2013/14 levels by 2028. The contract services forecast expenditure profile is presented in Figure 5-12 below:

Figure 5-12: Seqwater forecast of contract services expenditure



Source: Analysis of Seqwater Operational Expense Spreadsheets

The individual cost components that make up the Contract Services cost category are as follows:

515344 - Training - External
522003 - Equipment Hire - external
522006 - Contractors - Service Level Agreements
522012 - Veolia Contract Svces - fixed
522032 - WQM-Other water qual monitor
522033 - WQM - Sampling
522037 - WQM-Routine Testing
522038 - WQM – Passive Sampler Testing
522039 - WQM-Unscheduled Testing
522041 - WQM – Event Monitoring
522042 - WQM - Offtake Testing
522043 - WQM - Sewage Treatment Plant Monitoring
522044 - WQM - Central Process Laboratory Consumables
522045 - WQM - Central Instrument Maintenance Contract
522047 - WQEM - Permit Applications & Amendments
522048 - WQEM - Compliance Auditing
522058 - WQM - Southern Process Laboratory Consumables
522059 - WQM - Southern Instrument Maintenance Contract
522060 - WQM - Northern Process Laboratory Consumables
522061 - WQM - Northern Instrument Maintenance Contract
522062 - Contractor - Civil Maintenance
522063 - Contractor - Civil Construction
522064 - Contractor - Electrical Mtce
522065 - Contractor - General Mtce
522066 - Contractor - Mechanical Mtce
522067 - Contractor - Mowing & Slashing
522068 - Contractor - Plumbing & Drain

522069 - Contractor - Waste Management
522070 - Contractor - Lab Instrument Maintenance
522071 - Contractor - Pest / Animal Control
522072 - Contractor - Mechanical Construction
522074 - Contractor - General Construction
522075 - Contractor - Process Improvement
522082 - MP-Building & Civil Mtce Svces
522083 - MP-Control System Mtce Svces
522084 - MP-Electrical Mtce Svces
522085 - MP-Instrument Mtce Svces
522086 - MP-Mechanical Mtce Svces
522087 - MP-Pipeline Mtce Svces
522088 - MP-Specialised Mtce Svces
522091 - CP- Weed Control Services
522092 - CP-Slashing/Mowing Services
522093 - CP-Specialist Aquatic Weed Con
522094 - CP-Fencing Services
522095 - CP-Pest/Animal Control Service
522096 - CP-Fire Management
522097 - CP-Vegetation Mgmnt Svces
522098 - CP-Civil Work - Catchment Panel
522203 - Contractor - Other
522204 - Apprentice Electricians (Agency Hire)
522206 - Consultancy - Dam Safety Moni
522207 - Consultancy - Others
522208 - Consultancy - Human Resource
522209 - Consultancy - Information Tech
522210 - Consultancy - Water Quality
522211 - Consultancy - Safety
522212 - Consultancy - Community Reference Group
522213 - Consultancy - Engineering
522214 - Consultancy – Process Improvement
522217 - Consultancy – Natural Assets
522219 - Consultancy – Asset Management Planning
522220 - Consultancy - Project Management
522222 - Consult-Energy Management
522230 - Consult-Eng - Asset Management
522236 - Consultancy - Communication
522237 - Consultancy - Procurement
522238 - Consultancy - Strategy Planning
522240 - Consultancy - Economic & Regulatory
522241 - Consult-Economic and Financial Modelling
522242 - Consult-Financial Advisory
522244 - Consult-Benchmarking & Engineering Cost
522251 - Consult-Env - Specialist research
522253 - Consult-Env - Env. sustainability
522255 - Consult-Env - Modelling and optimisation
522257 - Consult-Env - Aquatic ecology
522365 - Consultancy - Legal Advice
522522 - Contractor - WTP Residual Management

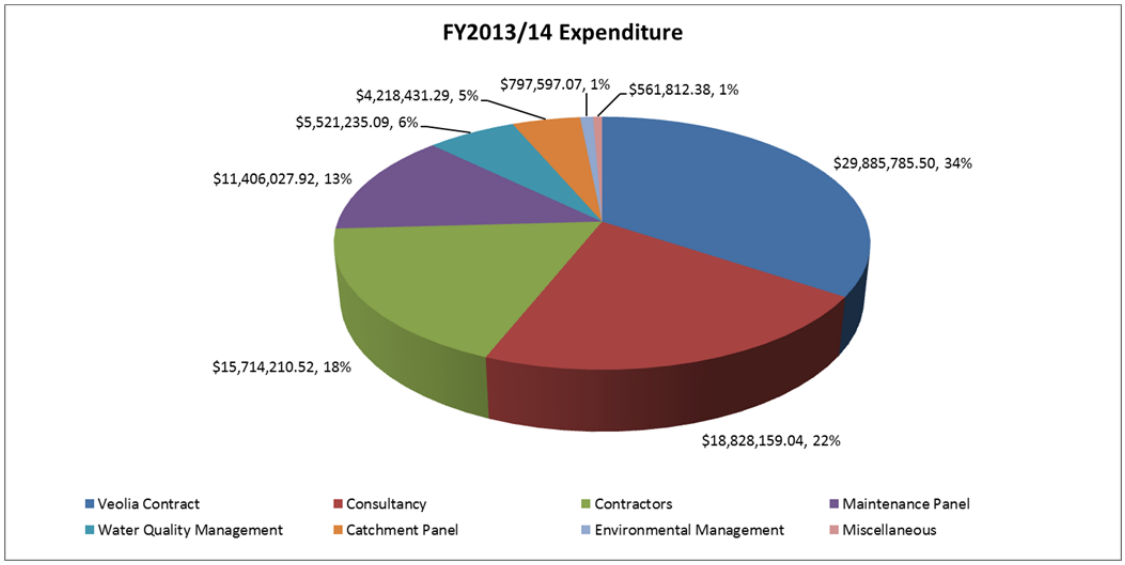
542002 - External Audit (QAO)
611002 - VC-Salaries & Wages
611003 - VC-Overtime
611113 - VC-Fringe Benefits Tax
611202 - VC-Staff Training
611203 - VC-Recruitment Costs
611206 - VC-Staff Benefits
621002 - VC- Treatment Chem - Lime
621003 - VC-Treatment Chem - Co2 Carbon Dioxide
621017 - VC-Treatment Chem - Sodium Bisulphite
621018 - VC-Treatment Chem - Antiscalent
621028 - VC- Treatment Chem - Ferric Sulphate
621101 - VC-Energy - Electricity Usage - Variable
621203 - VC-Operations Variable Margin
621204 - VC-Disposals - Sludge Wet
621206 - VC-Disposals -Trade Waste
622207 - VC-Disposals - Chemical
622209 - VC-Disposals - Other Plant
622210 - VC-Disposals - Garbage
622211 - VC-Disposals - Security Bin
622220 - VC-R&M - Preventative
622221 - VC-R&M - Breakdown
622222 - VC-R&M - Projects
622223 - VC-R&M - Asset Replacement - Civil
622227 - VC-R&M - Spare Parts Stock Used - Civil
622240 - VC-Water Analysis - Routine/Contract
622241 - VC-Water Analysis - Additional/Extraordi
622245 - VC-Water Analysis - Freight/Courier Cost
622250 - VC-Rentals - Plant Equipment
622255 - VC-Safety Equipment
622256 - VC-Safety Clothing
622257 - VC-Safety Other
622260 - VC-Treatment Water Consumption Fixed
622264 - VC-Consumables - Plant
622265 - VC-Consumables - Lab
622267 - VC-Office Equipment & Fittings
622268 - VC-Tools & Equipment
622303 - VC - IT Expenses
622309 - VC - Travel
622311 - VC-Consultants - Engineering
622312 - VC-Consultants - Operational
622320 - VC-Consultants - Financial
622321 - VC-Consultants - Admin
622332 - VC-IT Network Costs
622333 - VC-IT Consumables
622335 - VC-IT Maintenance Agreements & Warrantie
622336 - VC-IT Hardware And Software
622340 - VC-Telephone/Fax
622350 - VC-MV Lease Costs
622351 - VC-MV Fuel

622352 - VC-MV Repairs & Maintenance
622355 - VC-MV Parking Leases
622360 - VC-Consumables - Office
622361 - VC-Rentals - Office Equipment (Excl IT)
622362 - VC-Office Rent / Lease
622363 - VC-Freight & Courier Costs
622364 - VC-Stationery & Photocopier
622365 - VC-Entertainment
622366 - VC-Office Catering
622367 - VC-Staff Amenities
622370 - VC-Ground Maintenance
622371 - VC-Office Repairs & Maintenance
622372 - VC-Security
622380 - VC-Subscriptions
622410 - VC-Insurance - Other (Excl Vehicles)
622420 - VC-Guarantee Fees
622501 - VC-Operations Fixed Margin

The six-figure prefix for these cost components is a General Ledger account code from the Seqwater Corporate Information System (CIS). Most of the code designations are self-explanatory. The VC designation in the code descriptions relate to work done by Veolia Contractors (Seqwater's Maintenance Contractor) within the scope of their Maintenance Contract. Veolia's out-of-scope labour hire and chemical costs have been considered in Sections 5.4 and 5.6, respectively.

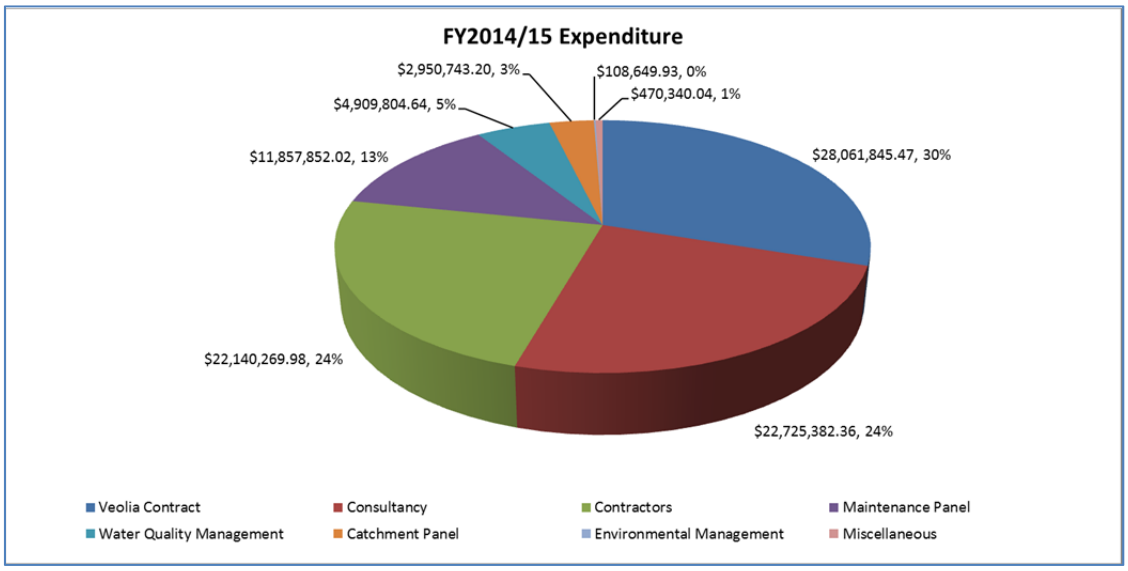
The percentage of contract services expenditure by code categories defined above for the 2013/14 and 2014/15 Financial Years is presented in Figure 5-13 and Figure 5-14 below:

Figure 5-13: FY2013/14 expenditure on Contract Services by cost code summary



Source: Analysis of Seqwater Operational Expense Spreadsheets

Figure 5-14: FY2014/15 expenditure on Contract Services by cost code summary



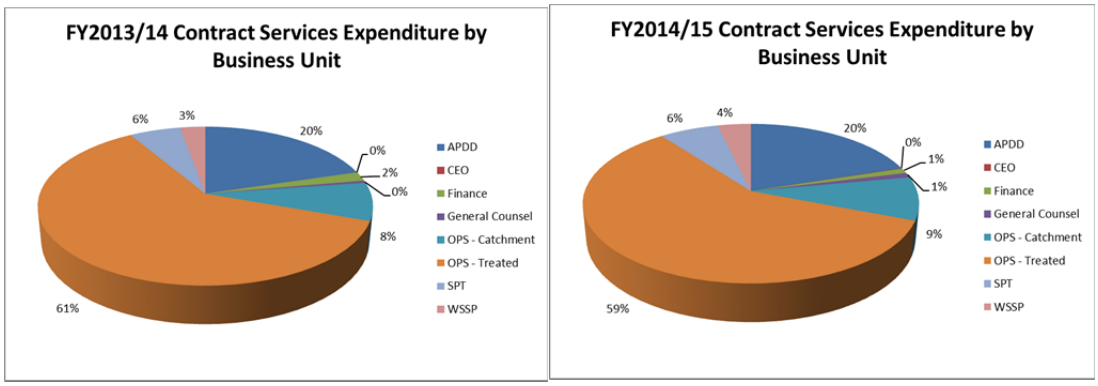
Source: Analysis of Seqwater Operational Expense Spreadsheets

Note: The figures in Figure 5-14 above do not include cost overrides applied at the cost category level as they cannot be disaggregated to the individual cost codes.

Increases in the Veolia Contract costs, Consultancies and Contractors are evident between the 2013/14 actual figures and the 2014/15 forecasts. These increases are offset to some degree by decreases in Water Quality/Environmental Management, and the Catchment Panel contracts.

The percentage of contract services expenditure by Business Unit for the 2013/14 and 2014/15 Financial Years is presented in Figure 5-15 below:

Figure 5-15: Contract Services expenditure by Business Unit for FY 2014 and 2015



Source: Analysis of Seqwater Operational Expense Spreadsheets

This breakdown shows limited variation in Business Unit expenditure on contract services from the 2013/14 year to the forecast. It also shows that the Operations – Treatment group is the primary consumer of contract services, which is to be expected.

5.5.2 Documentation provided

- Seqwater Submission to QCA (Chapter 8)
- Opex model 2014-09-25 Q1 FY15 revised (as corrected by CH2M HILL)
- Seqwater opex data 26-9-14 consolidated spreadsheet – used only for analysis of 2012/13 opex data
- WCRWS Q1 opex forecast Veolia spreadsheet showing operational cost forecasts for the Western Corridor Raw Water Scheme
- 20140929_OCRW QCA – Contractor Services overview – commentary provided by Recreation and Catchment Services Business Unit providing detail on the contract services procured by it
- ICT response – consultancy.docx – SPT ICT Business Unit commentary on determination of ICT consultancy costs
- Consultancy expenditure- APDD WQE.xlsx – Supporting details for APDD Consultancy expenditures
- Operating cost actions –Other Consultancies FINAL.docx – Seqwater response to Other Consultancies RFI in Draft Report
- Q1 narratives spreadsheet – detailing departures from previously submitted operational cost model

5.5.3 Drivers

As can be seen from the breakdown of contract services expenditure by cost code in Section 5.5.1 above, contract services are procured for a wide range of reasons. This breakdown also shows that this expenditure is dominated by the purchase of goods or services related to the assessment, planning and ongoing operation of Seqwater infrastructure. On this basis, the primary drivers for contract services expenditure are:

- Regulatory and legal obligations in relation to the supply of bulk water services;
- Addressing and addressing growth in demand, through appropriate asset planning / specification; and
- Ongoing operations and maintenance of existing infrastructure.

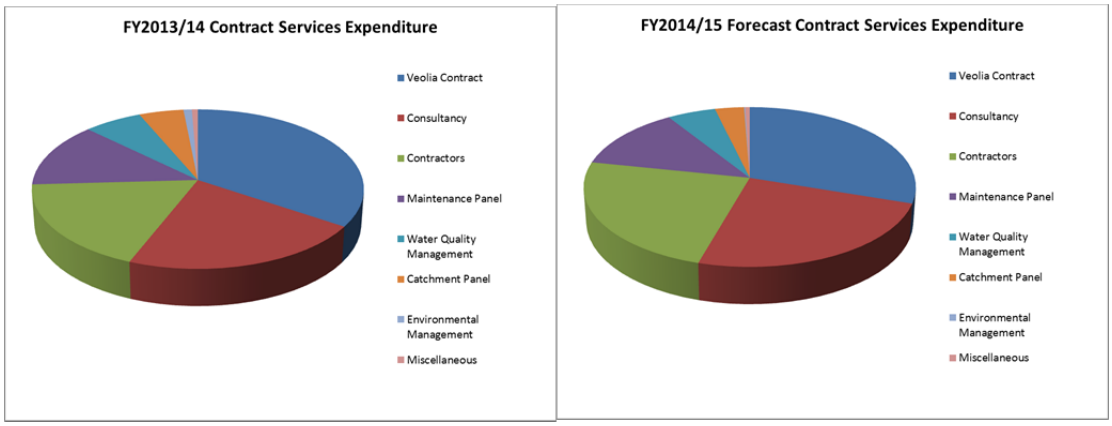
The factors that generally influence demand for contract services expenditure include:

- Changes in regulatory compliance requirements that influence the specification for new infrastructure and drive the renewal of current infrastructure
- Weather patterns that impact demand for operation and maintenance effort
- The age profile of various asset items in the asset portfolio driving contracted services for reconstruction or renewal
- The relative economic efficiencies of internal versus external service delivery (often driven by internal capability/capacity and the level of market competition)
- The need for specialist advice or services that are not required on a regular basis

- The organisation's status, in terms of annual and multi-annual business/operational planning

Figure 5-16 below shows a large change in actual expenditure on the Contractors cost item between FY2012/13 and FY 2013/14. The significant decrease is largely attributable to a reduction in civil construction expenditure and associated investigation works in the 2013/14 year driven by a drop in renewal or upgrade need. Organisations like Seqwater go to some trouble to smooth these expenditures, but dips and troughs are inevitable.

Figure 5-16: Contract Services expenditure by Contract Type for FY 2013 and 2014



Source: Analysis of Seqwater Operational Expense Spreadsheets

5.5.4 Unit rates

CH2M HILL has been provided with only limited information on the Veolia Contract forecasts and has no information on the actual labour hours or achievement that relate to the individual cost records. Specific unit rates like hourly rate or cost per m^2 cannot therefore, be established at the activity level.

To inform the assessment of Seqwater's forecast Contract Services costs, CH2M HILL has reviewed those costs at a macro level. A summary of this review is outlined in Table 5-11 below. It should be noted that the following analysis excludes corporate-related activities.

Table 5-11: Contract Services expenditure against measures of service provision (real 2014)

	2012-13 Actual	2013-14 Actual	2014-15 Forecast
Total Contract Services ($M)	111.932	80.123	91.787
Total Operating Expenses ($M)	272.258	238.596	248.145
Demand (ML)	282431	298003	297384
Water Sales Revenue ($M)1	709.862	686.708	777.077
Contract Services / Total Opex (%)	39.1%	36.4%	37.0%
Contract Services per ML ($)	396.3	268.9	308.7
Contract Services per $ of Water Revenue	0.158	0.117	0.118

Sources: CH2M HILL analysis of Opex model 2014-09-25 Q1 FY15 revised.xlsm,
Seqwater opex data 26-9-14 consolidated.xlsx, Seqwater 2012-13 Annual Report, and Seqwater 2013-14 Annual Report.
Note: 1 – Excludes irrigation, CSO and grant, lease, interest and other source of non-water revenue

This confirms CH2M HILL's hypothesis that contract services expenditures are largely insensitive to revenue or operational demand drivers, as Seqwater has a choice whether it meets these demands with internal or outsourced resources. Furthermore, whole-of-life cost decisions taken by the business on asset investment can have a significant impact on the nature of and demand for contract services.

General trends in the water sector would indicate that a greater proportion of the Seqwater operational workload will be taken-up under Contract. This may not necessarily result in a significant increase in contract services expenditure as the Business Case for the increased investment in this category should be predicated on an associated increase in business and operational efficiency.

5.5.5 Escalation factors

In developing its expenditure forecasts for Contract Services, Seqwater has applied the escalation factors outlined in Table 5-12.

Table 5-12: Proposed Contract Services escalation factors

Year	2013-14	2014-15	2015-16	2016-17	2017-18 to 2027-28
Rate (nominal)	3.46%	3.46%	3.38%	3.38%	3.38%

Source: Seqwater Bulk Water Prices 2015 to 2018 - Submission to QCA, p. 118.

As noted previously, Seqwater engaged PwC to analyse historical price movements and other relevant information (including Government and industry forecasts) and recommend escalation forecasts to be applied against the relevant broad operating expenditure categories for the purposes of its 2015-2018 Submission.

For the purposes of its Submission, Seqwater adopted PwC's recommended weighted escalation factor for Contract Services as outlined in Table 5-13.

Table 5-13: Weighted Contract Services escalation factors

Year	Weight	2013-14	2014-15	2015-16	2016-17	2017-18 to 2027-28
Wage Price Index (WPI)	38%	3.50%	3.50%	3.50%	3.50%	3.50%
CPI	15%	3.00%	3.00%	2.50%	2.50%	2.50%
Non-residential building construction	46%	3.58%	3.58%	3.58%	3.58%	3.58%
Weighted Index	-	**3.46%**	**3.46%**	**3.38%**	**3.38%**	**3.38%**

Source: PricewaterhouseCoopers, Cost escalation forecasts (Appendix E), p.23.

In developing the above weighted index, PwC adopted the following methodology:[8]

- For contracts with rise and fall provisions, WPI and CPI forecasts were applied to labour and generals costs respectively, based on weights provided in contract escalation clauses

[8] PricewaterhouseCoopers, 2014. *Cost Escalation Forecasts (Appendix E)*, p.22.

- For consultancy expenses, it was assumed that labour was the dominant cost driver and WPI forecasts were applied to these costs
- For contracts without rise and fall provisions, or where costs could not be linked to a specific contract, the 10-year average growth rate of the non-residential building construction index was applied.

A review of the appropriateness of Seqwater's approach and the forecasts informing the weighted escalation factor for Contract Services is presented below.

Review of regulatory precedent in South East Queensland

A review of recent price monitoring reviews undertaken by the QCA indicate that a range of difference methodologies to develop escalation factors for contractor costs have been applied by water businesses in South East Queensland and accepted by the QCA. CH2M HILL notes that there appears to be no one single approach to escalating contractor costs advocated by the QCA, rather the QCA has previously accepted escalation factors based on estimates of general inflation, the Queensland WPI forecast, and non-residential construction prices.

As such, CH2M HILL considers that Seqwater's proposed approach to adopt a weighted escalation factor based on the nature of its service contracts is reasonable. With respect to using historical growth rates in non-residential construction indices to develop forecasts, CH2M HILL recognises that such an approach is imperfect. In particular, it is noted that such an index is likely to less relevant to a civil engineering activity as opposed to industrial and commercial building activity. However, given limited availability to relevant data, the QCA and accepted such indices previously.

CH2M HILL has not, however, undertaken a detailed review of Seqwater's contractor agreements and therefore cannot comment on the individual weights applied to each index, as outlined in Table 5-13 above.

Review of forecasts

A review of the general inflation forecast, Queensland WPI and non-residential building construction index is outlined below.

Queensland Treasury and Trade WPI forecast

CH2M HILL has reviewed the forecasts presented by PwC against updated forecasts published in the recent *2014-15 Budget Strategy and Outlook* by QTT. A comparison of the respective forecasts for annual percentage change in WPI is presented in Table 5-14 below.

Table 5-14: Wage price index forecasts, Queensland

Source	2013-14	2014-15	2015-16	2016-17	2017-18
2013-14 Forecast[a]	3.50%	3.50%	3.50%	3.50%	Not stated
2014-15 Forecast[b]	2.75%	3.00%	3.25%	3.50%	3.50%

Sources: a. QTT, 2013. *2013-14 Budget Strategy and Outlook,* p.31, b. QTT, 2014. *2014-15 Budget Strategy and Outlook,* p.31

At the time of the 2015-18 Submission, CH2M HILL confirms that the RBA's CPI estimates have been consistently and accurately applied by Seqwater. However, it can be seen that

there has been some deviation from the forecasts reviewed by PwC and the revised forecasts developed by QTT as part of the *2014-15 Budget Strategy and Outlook*.

Based on a review of updated forecasts published by QTT, CH2M HILL recommends adjusting Seqwater's proposed weighted escalation factor for Contract Services for 2014-15 and 2015-16 in line with QTT's latest WPI forecasts.

General inflation forecasts

For the purposes of its weighted escalation factor for Contractor Services, Seqwater has adopted general inflation estimates published by the RBA in its *Statement on Monetary Policy* (May 2014). The RBA had estimated CPI for the year ending June 2015 to grow at between 2.5 and 3.5 percent, with Seqwater adopting the mid-point of the RBA's estimate (i.e. 3.0 percent) for the purposes of an escalation factor. For all remaining years in the forecast period (2015-16 to 2027-28), the mid-point of the RBA inflation target (2 to 3 per cent) has been applied. At the time of is 2015-18 Submission, CH2M HILL confirms that the RBA's CPI estimates have been consistently and accurately applied by Seqwater.

However, as noted above, the RBA has subsequently released updated estimates in which it is estimated that CPI for the year ending June 2015 will grow at between 1.75 and 2.75 percent updated (a mid-point of 2.25 percent).[9] For 2015-16, the RBA has forecast inflation to increase to between 2.5 and 3.5 percent (mid-point of 3.0 percent). This compares to the 2.5 percent adopted by Seqwater in its 2015-18 Submission.

Based on a review of updated inflation estimates published by the RBA, CH2M HILL recommends adjusting Seqwater's proposed weighted escalation factor for Contract Services for 2014-15 and 2015-16 in line with the mid-point of the RBA's latest forecasts for inflation.

Queensland non-residential building construction index

For the purposes of its weighted escalation factor for Contractor Services, Seqwater adopted the 10-year average to June 2013 of the non-residential building construction index, as published by the Australian Bureau of Statistics (ABS). In recommending a forecast to Seqwater, PwC calculated a 10-year average of 3.58%.

CH2M HILL has reviewed this against updated statistics published by the ABS in *Producer Prices Indexes – June 2014*. CH2M HILL has calculated a 10-year average to June 2014 of 2.28%. It is recognised that this represents a significant deviation from the forecast calculated by PwC. However, CH2M HILL notes that the 10-year average of the non-residential building construction index has been decreasing steadily as outlined in Table 5-15.

[9] RBA, 2014. *Statement of Monetary Policy (August 2014)*, p.71.

Table 5-15: Review of 10-year averages for the non-residential building construction index

Period	10-year average
10 years to June 2013	3.33%[1]
10 years to September 2013	3.21%
10 years to December 2013	2.92%
10 years to March 2014	2.39%
10 years to June 2014	2.28%

Source: ABS, Producer Prices Index – June 2014, Cat. No. 6427.0, Table 17
Note: 1 – CH2M HILL 10-year average to June 2013 is different that calculated by PwC, this is likely due to revised figures published by the ABS as the category has been updated.

Based on a review of updated figures published by the ABS, CH2M HILL recommends adjusting Seqwater's proposed weighted escalation factor for Contract Services in line with the latest 10-year average for the non-residential building construction index.

Summary findings on escalation factors

CH2M HILL considers that Seqwater's proposed approach to escalate Contract Services costs is reasonable given there appears to be no one single approach to escalating contractor costs advocated by the QCA. However, CH2M HILL recommends adjusting Seqwater's proposed escalation factors in line with updated WPI and CPI forecasts published by QTT and the RBA, respectively, and an updated 10-year average to June 2014 for the non-residential building construction index, as published by the ABS. No adjustment is proposed to the weightings for the respective indices.

Based on the above analysis, CH2M HILL recommends that Seqwater's weighted escalation factor for Contract Services be revised on the basis of that outlined in Table 5-16.

Table 5-16: CH2M HILL's revised weighted Contract Services escalation factor

Year	Weight	2013-14	2014-15	2015-16	2016-17	2017-18 to 2027-28
Wage Price Index (WPI)	38%	2.75%	3.00%	3.25%	3.50%	3.50%
CPI	15%	3.00%	2.25%	3.00%	2.50%	2.50%
Non-residential building construction	46%	2.28%	2.28%	2.28%	2.28%	2.28%
Weighted Index	-	**2.54%**	**2.53%**	**2.73%**	**2.75%**	**2.75%**

CH2M HILL, therefore, recommends that Seqwater's proposed escalation factor for Contract Services costs be adjusted as outlined in Table 5-17.

Table 5-17: Recommended escalation factors for Contract Services costs

Year	2013-14	2014-15	2015-16	2016-17	2017-18 to 2027-28
Seqwater proposed rate	3.46%	3.46%	3.38%	3.38%	3.38%
CH2M HILL recommended rate	2.54%	2.53%	2.73%	2.75%	2.75%
Difference	**-0.92%**	**-0.93%**	**-0.65%**	**-0.63%**	**-0.63%**

Note: The above rates are in expressed in nominal terms.

5.5.6 Prudency

The Contract Services expenditure is typically applied to activities within Seqwater's business that are necessary, but that Seqwater does not have the capability or capacity to undertake with internal resources. As stated in previous sections, the decision to "insource" or outsource these activities is an economic trade-off, with many financial, operational and industrial relations considerations.

Seqwater has developed – and is continually improving – its project specification, asset investment needs assessment, procurement and governance business frameworks. These frameworks seek to ensure that goods and services provided by the market are needed, appropriate and represent value-for-money. CH2M HILL also believes that given the technical nature of the business, it is unlikely that Seqwater would knowingly go to market for goods or services that do not support its business objectives.

CH2M HILL's review of the cost items that make up the contract services cost category show that these expenditures predominantly support business functions necessary for Seqwater to fulfil its regulatory legislative and operational obligations. CH2M HILL, therefore, considers Seqwater's continued investment in Contract Services to be prudent.

5.5.7 Efficiency

Because of the level of inter-year variability of Contract Services expenditures CH2M HILL considered cost codes for both the 2012/13 and 2013/14 Actual figures in its analysis. A statistical approach was applied to the analysis of Contract Services forecast efficiency, taking into account the materiality of any likely adjustment.

CH2M HILL only considered cost codes with over $1 million expenditure forecast for the 2014/15 year. For these cost codes, the 2012/13 to 2013/14 and 2013/14 to 2014/15 variances were averaged, to smooth any inter-year changes. Finally, cost codes where the average variances were positive and exceeded 20% were identified. The six cost codes that met these criteria are presented in Table 5-18 below:

Table 5-18: Contract Services cost codes for review (real 2014)

Cost Code	2014/15 Expenditure (M)	Average Variance (%)	Average Variance (M)
522083 - MP-Control System Mtce Svces	$1.29	38.6	$0.50
522084 - MP-Electrical Mtce Svces	$4.59	20.7	$0.95
522207 - Consultancy - Others	$7.14	37.9	$2.71
522209 - Consultancy - Information Tech	$4.07	40.8	$1.66
611002 - VC-Salaries & Wages*	$6.90	33.6	$2.32
622222 - VC-R&M - Projects	$2.26	41.0	$0.93.

Sources: CH2M HILL analysis of Opex model 2014-09-25 Q1 FY15 revised.xlsm,
* CH2M HILL notes that expenses against the Veolia Salaries and Wages cost code have dropped from 2013/14 to 2014/15, but have radically increased from 2012/13 levels.

CH2M HILL's review of these cost codes follows:

Specific cost item adjustments

522083 - MP-Control System Mtce Svces

Seqwater propose an increase in costs related to maintenance of Control Systems under the established Maintenance Panel arrangement from $350,789 in FY 2013/14 to $1,289,403 in the 2014/15 forecast year. 2012/13 actual expenditure for this cost item was $294,118.

CH2M HILL notes that significant consolidation and upgrade work is planned for the Maintenance Control System (MCS) and that these costs are captured in the forecast ICT cost codes. No substantiation has been provided in the Seqwater submission for the significant increase in the maintenance cost forecast for this activity. Furthermore, a significant Business Case driver for consolidation and upgrade of the MCS is a reduction in ongoing operational costs for the system.

In the absence of valid substantiation of these costs, CH2M HILL recommends that the 2014/15 forecast for this cost code should be adjusted to 2013/14 levels.

522084 - MP-Electrical Mtce Svces

Seqwater propose an increase in costs related to maintenance of electrical equipment under the established Maintenance Panel arrangement from $2,512,859 in FY 2013/14 to $4,588,281 in the 2014/15 forecast year. 2012/13 actual expenditure for this cost item was $2,689,474.

No substantiation has been provided in the Seqwater submission for the significant increase in the maintenance cost forecast for this activity.

In the absence of valid substantiation of these costs, CH2M HILL recommends that the 2014/15 forecast for this cost code should be adjusted to the average of 2012/13 and 2013/14 expenditures for this cost code.

522207 - Consultancy - Others

Seqwater propose an increase in costs related to undifferentiated consultancy services from $2,229,109 in FY 2013/14 to $7,140,314 in the 2014/15 forecast year. 2012/13 actual expenditure for this cost item was $1,726,492.

Whist the Seqwater submission references the need for additional consultancy services for a range business and operational improvement initiatives, an increase of the scale noted in this cost code warrants more specific and detailed justification.

Additional justification has been supplied by Seqwater in support of the 2013/14 to 2014/15 increase and the majority of initiatives identified either represent one-off expenditures that should not be continued in the out-year forecasts or ongoing expenditures that should already be captured in the actual expenditure figures. Documentation was provided by Seqwater demonstrating that specific consultancies are subject to an appropriate level of governance priori to their procurement, but CH2M HILL has not received adequate substantiation for the almost $5 million increase in the forecast.

The Seqwater response did highlight that the approach applied to capitalising consultancy work related to capital delivery projects may significantly impact the ability to accurately track future consultancy expenditure. CH2M HILL suggests that some form of shadow coding of these cost items may be beneficial to maintain an audit trail of these costs.

CH2M HILL concludes from the assessment of information supplied by Seqwater that insufficient justification has been provided to support the proposed increase in consultancy expenditure. It is recommended therefore, that the 2014/15 forecast for this cost code should be adjusted to the 2013/14 expenditure level for this cost code.

522209 - Consultancy - Information Tech

Seqwater propose an increase in costs related to consultancy services related to information technology from $2,193,669 in FY 2013/14 to $4,067,233 in the 2014/15 forecast year. 2012/13 actual expenditure for this cost item was $749,687. The Breakdown of this expenditure by Business Unit is presented in Table 5-19 below:

Table 5-19: Disbursement of Information Technology Consultancy Forecast Expenditures

Business Unit	Forecast Expenditure
OPS - Catchment	$74,079.72
OPS - Treated	$243,376.41
SPT	$3,749,767.26

Sources: CH2M HILL analysis of Opex model 2014-09-25 Q1 FY15 revised.xlsm,

CH2M HILL notes that the majority of the proposed expenditure will be procured by the SPT Business Group. The Seqwater submission indicates that a significant component of this Business units costs relate to ICT service provision, but allocates these costs to the Other Materials and Services cost category, not the Contract Services category. Regardless of this, an increase of the scale noted in this cost code, warrants more specific and detailed justification than what is provided in the Submission and subsequent clarification documents.

In the absence of valid substantiation of these costs, CH2M HILL recommends that the 2014/15 forecast for this cost code should be adjusted to the 2013/14 expenditure level.

611002 - VC-Salaries & Wages

Seqwater propose a decrease in costs related to salary and wage expenses under the Veolia maintenance services contract from $8,200,250 in FY 2013/14 to $6,895,641 in the 2014/15 forecast year. 2012/13 actual expenditure for this cost item was $2,258,044.

The Seqwater submission references a 4% increment in Veolia labour costs as a result of an EBA roll-over, but the proposed change is more likely to be a result of changes in Veolia staff numbers. Additional information has been provided by Veolia for the WCRWS Scheme, but the information requested on GCDP remains outstanding at the time of reporting. A holistic view of Veolia staff utilisation or requirements is therefore, not possible.

CH2M HILL recommends that the 2014/15 forecast for this cost code be accepted on the proviso that justification for the costs is provided.

622222 - VC-R&M - Projects

Seqwater propose an increase in costs related to Repair and Maintenance Projects under the Veolia maintenance services contract from $87,610 in FY 2013/14 to $2,263,082 in the 2014/15 forecast year. 2012/13 actual expenditure for this cost item was $407,821.

The Seqwater submission makes no reference to repair and maintenance projects, but CH2M HILL believes that this cost code may capture expenditures on preventative maintenance or breakdown activities that have been packaged into capital projects.

Additional information has been provided by Veolia for the WCRWS Scheme, but the information requested on GCDP remains outstanding at the time of reporting. The information provided by Veolia to-date does not support a significant increase in repair and maintenance projects. CH2M HILL believes this may be because the maintenance / breakdown forecasts provided capture the pre-packaged costs of these works.

In the absence of valid substantiation of these costs, CH2M HILL recommends that the 2014/15 forecast for this cost code should be adjusted to the average of 2012/13 and 2013/14 expenditures for this cost code.

Seqwater Override Adjustments

Seqwater has identified a number of 'Override' expenditure adjustments in the forecast figures. These increases have been applied on a Business Unit and cost category basis. An assessment of the efficiency of the proposed increases related to Contract services is provided below.

QCA Review Fees

Seqwater proposes to increment the Contract Services cost category by $500,000 every three years in the forecast period to cover the cost of any consultancy required to enable a response to QCA Reviews. CH2M HILL recommends that this adjustment is not applied, as the baseline figures for the pre-adjusted forecasts include an allocation of $639,061 per annum under the cost code *541104 – QCA Fees*. This figure covers both the proposed adjustment in this cost category and the proposed three-yearly adjustment of $1.25 million to the Other Materials and Services cost category.

5.5.8 Efficiency gains

Seqwater has highlighted a specific efficiency in the form of an 'Override' expenditure decrease related to Contract Services expenditure in the forecast figures. This efficiency has been applied to the APPD Business Unit and CH2M HILL's assessment of this proposal is provided below.

APPD contract services savings

Seqwater has identified a saving in contract service saving for the APDD Business Unit totalling $57.9 M over the forecast years. The value of these savings range from $1.1 M to $7.1 M and generally increase with time. The fluctuating nature of the adjustment suggests a level of rigour in its determination and the forecast spreadsheet references the Seqwater submission as the source of detail for substantiation.

References in the submission that may substantiate these savings have been identified, but they only relate to the 2014/15 year and do not provide any detail on the year-on-year adjustments.

CH2M HILL recommends that the proposed efficiencies remain in the operational expenditure forecasts, but notes that the provision of more detail on the method of calculation for these adjustments would be highly beneficial.

5.5.9 Assessment of Prudency and Efficiency

The cost items that make up the contract services cost category predominantly represent outsourced versions of business activities that are necessary for Seqwater to fulfil its regulatory legislative and operational obligations. The method of delivery of these functions is immaterial to the prudency and CH2M HILL, therefore, considers Seqwater's continued investment in Contract Services to be prudent.

5.5.10 Assessment of reported expenditure

Seqwater has identified proposed operational expenditure of $1,229 million (real 2014 terms) over the period from 2014-15 to 2027-28 for contract services. Table 5-20 below identifies CH2M HILL's recommended operational expenditure for the contract services cost category.

In the course of assessing actual and proposed contract services expenditure, CH2M HILL identified a number of inconsistencies that represent opportunities for efficiency improvement. These opportunities were primarily related to the general and significant increase in costs for specific activities from 2013/14 actual costs to the 2014/15 cost forecasts. Cost items where material efficiencies were identified included:

- A reduction in External Training;
- A reduction in undifferentiated Consultancies;
- A reduction in Information Technology Consultancy;
- A reduction in some contract services provided under Seqwater's Maintenance Services Panel arrangements;
- A reduction in repair and maintenance project costs delivered under the current Veolia Maintenance Contract;

In all of the cases above, the cost increases have not been adequately substantiated by the information provided in either the Seqwater submission or in response to subsequent information requests. CH2M HILL also noted that allocation of Contract Services expenditures to CIS cost codes was far less consistent than for other cost items. More consistent allocation will enable more accurate cost reporting and better cost control.

Table 5-20: *Contract Services* recommended operational expenditure (M 2014)

Operational Expenditure Profile	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Total Forecast
Seqwater Forecast Expenditure	$91.79	$88.28	$90.67	$89.06	$87.35	$87.77	$88.11	$88.72	$86.92	$87.56	$86.97	$85.74	$85.32	$84.73	$1,229.1
Proposed Adjustment – Overrides	-	-	-	-$0.50	-	-	-$0.50	-	-	-$0.50	-	-	-$0.50	-	-$2.00
Proposed Adjustment – CH2M HILL Review	-$12.1	-$12.1	-$12.1	-$12.1	-$12.1	-$12.1	-$12.1	-$12.1	-$12.1	-$12.1	-$12.1	-$12.1	-$12.1	-$12.1	-$171.1
CH2M HILL Recommended Expenditure Profile	**$79.71**	**$76.2**	**$78.59**	**$76.49**	**$75.28**	**$75.69**	**$75.64**	**$76.64**	**$74.84**	**$74.84**	**$74.98**	**$74.90**	**$73.66**	**$72.74**	**$1,058.0**

5.6 Chemicals

5.6.1 Overview of expenditure

The chemical expenditure forecast is largely variable in nature and is primarily related to expenditure at the treatment plants associated to dosing raw and treated water with various chemicals to manage the quality of the water being delivered to end users. Additional chemical dosing is also undertaken at discrete points (dosing stations) within the distribution network to maintain the desired disinfection residuals to end users.

These variable chemical costs are driven largely by water volume, raw chemical prices and the quality of the raw water supplied to the treatment plants. There are some fixed and indirect costs associated to chemical expenditure and these are related to chemical delivery charges, chemical facility charges, chemical disposal charges and some minor other chemicals that are used on an infrequent basis. These fixed chemical costs equate to around $598,633 or 4% of the overall chemical expenditure for the 2013/2014 reporting period and around $466,047 or 3% of the overall chemical expenditure for the 2014/2015 reporting period and appear to be prudent in nature and Seqwater have made efficiency efforts to reduce these costs year on year through improved procurement practices and therefore these fixed cost will not be covered any further in this review as the majority of the chemical expenditures are associated to the variable chemical costs. For the purpose of capturing the water volumes treated or forecast in this review the water demand for the 2015-2030 period and actual water volume for the 2013/2014 year have been taken directly from the demand forecast tab in the "OPEX model 2014-09-25 Q1 FY15 revised" excel spreadsheet supplied by Seqwater".

The majority of the chemical costs are broken out into four distinct areas of operation:

- OPS Treated - Operational and Contractual Performance (Tugan Desal and AWTP's)
- OPS Treated - Supply (Treated Water) – North WTP's and Stations
- OPS Treated - Supply (Treated Water) - South WTP's and Stations
- OPS Treated - Supply (Treated Water) - Central WTP's and Stations

The actual total expenditure for chemicals for the 2013/14 reporting period based on the revised expenditure values supplied by Seqwater, including chemical costs associated with the Tugan desalination plant and AWTP's is $13.31 million. This cost is based on a total volume of 298,003 ML resulting in an average chemical cost of $44.66 per ML of water treated. The forecast expenditure for chemicals for the 2014/15 reporting period based on the revised expenditure values supplied by Seqwater is $13.84 million. This cost is based on a total demand forecast of 297,384 ML resulting in an average chemical cost of $46.55 per ML of water treated, an increase of $534,503 or $1.89/ML (4%) on the 2013/2014 period.

The change in chemical expenditure is explained in more detail in following sections.

Table 5-21 below presents a summary of the total chemical expenditure relative to reporting period and also relative to actual flow or forecasted demand:

Table 5-21: Seqwater Chemicals Expenditure – Summary Assessment

Measure	2012-13*	2013-14	2014-15	2015-16	2016-17	2017-18
Total chemical Expenditure **	$13,362,296	$13,310,226	$13,844,729	$14,430,951	$14,944,913	$15,495,005
Proportion of total operating expenditure	5.02%	5.51%	5.58%	5.79%	5.98%	6.18%
Actual or Demand Flow (ML)	280257*	298,003	297,384	311,656	324,232	337,655
$ / ML	$47.68	$44.66	$46.55	$46.30	$46.09	$45.89
% Annual Change	N/A	-6.32%	4.23%	-0.54%	-0.46%	-0.44%

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xlsx
* Volume reported in 2012/13 Annual Report
** Includes chemical expenditure associated with the Tugan desalination plant and the AWTP's that is categorised as contract services expenditure.

As noted by Seqwater in its 2015-18 Submission, Seqwater competitively tenders its chemical contracts on a two year cycle. Seqwater currently has several main suppliers, reflecting best value delivery to various geographical areas or for specific chemicals.[10] In Seqwater's 2015-18 Submissions, chemical use is also dependent on raw water characteristics which are impacted by water quality and seasonal events. Overall, periods of high rainfall are typically associated with degraded raw water characteristics, requiring higher-levels of chemical dosing and treatment. This is evidenced by the significant reduction in chemical application across WTPs in 2014-15 compared to the preceding three years, primarily due to rainfall across Seqwater's catchments in 2014-15 being approximately 50 percent of that in the three preceding years. No adjustment has been made by Seqwater in the determination of future chemical costs based on water quality beyond the 2014/2015 period.

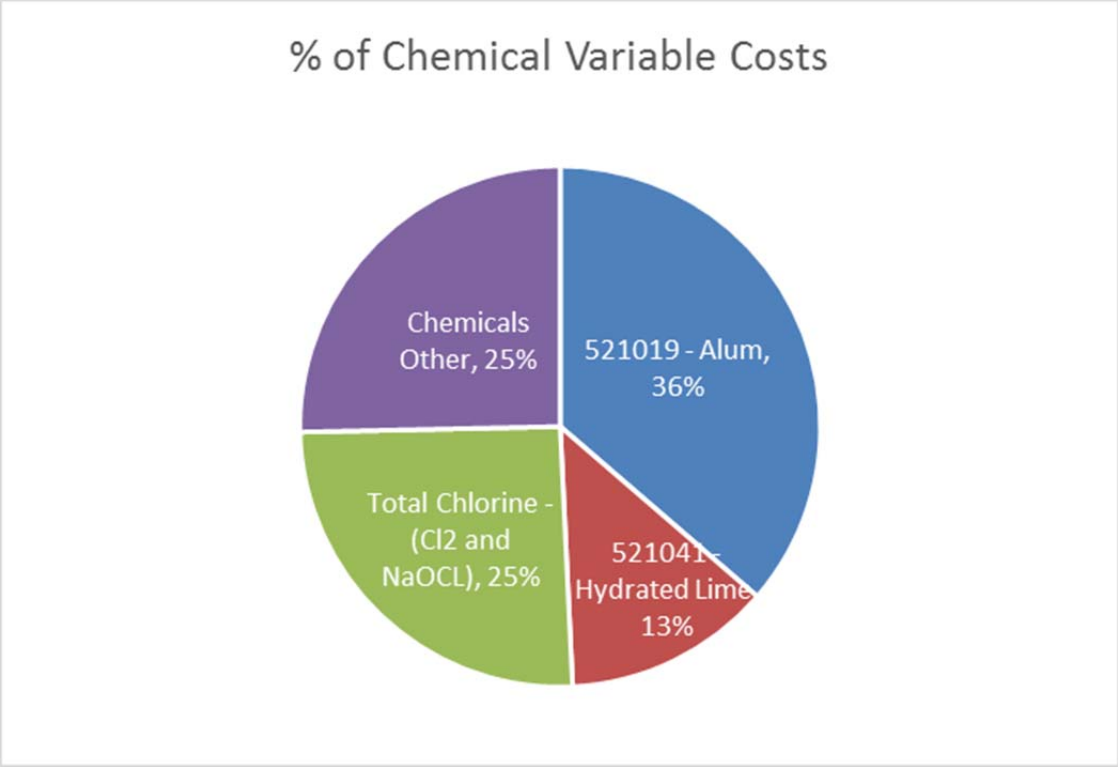
In the 2014/15 period there are three main chemicals that make up approximately 74% of the typical chemical expenditure costs annually and these are as follows:

- Alum (36%)
- Hydrated Lime (13%)
- Sodium Hypochlorite and Chlorine (25%)

Figure 5-17 below shows the breakdown of actual chemical costs in 2013/14 and clearly demonstrates how the three chemicals above dominate chemical expenditure.

[10] Seqwater, 2014. *Seqwater Bulk Water Prices 2015 to 2018 – Submission to the Queensland Competition Authority*, p.186.

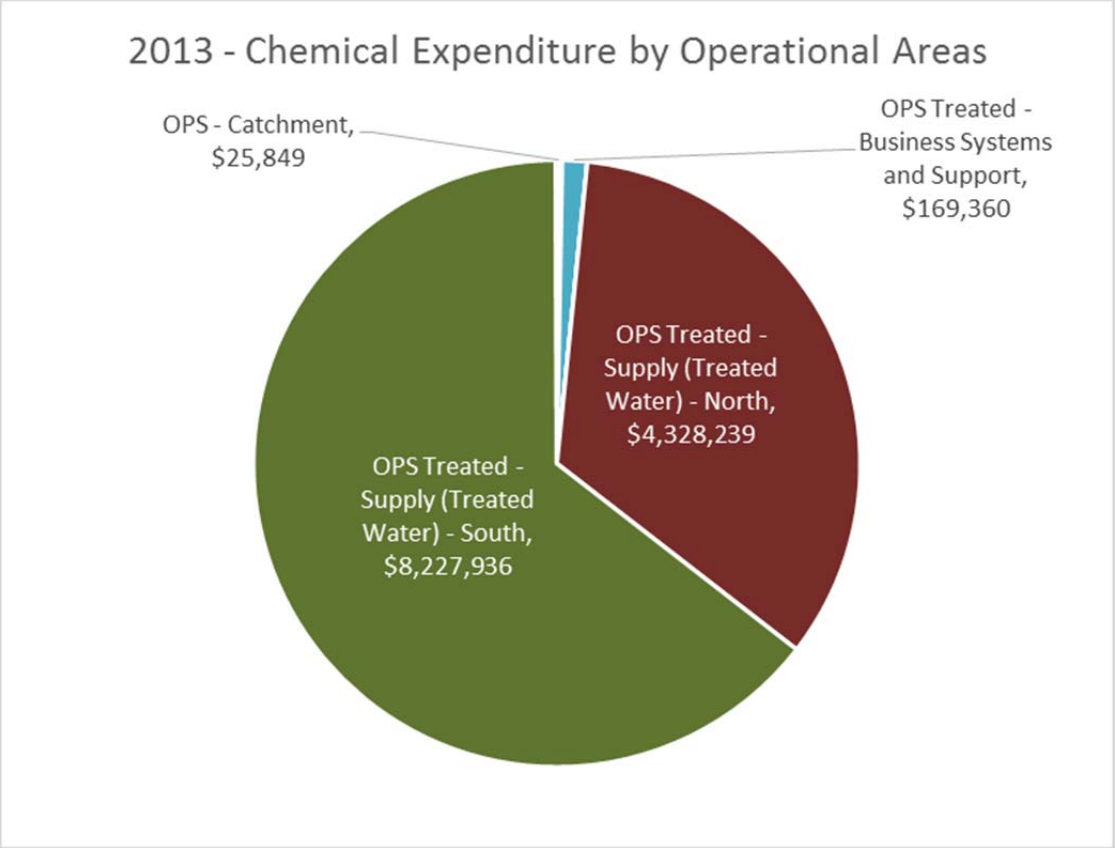
Figure 5-17: Breakdown of chemical expenditure (2013/14 actual costs, $2014)



The chemical consumption associated to these chemicals is typically driven by water quality characteristics and flow demand.

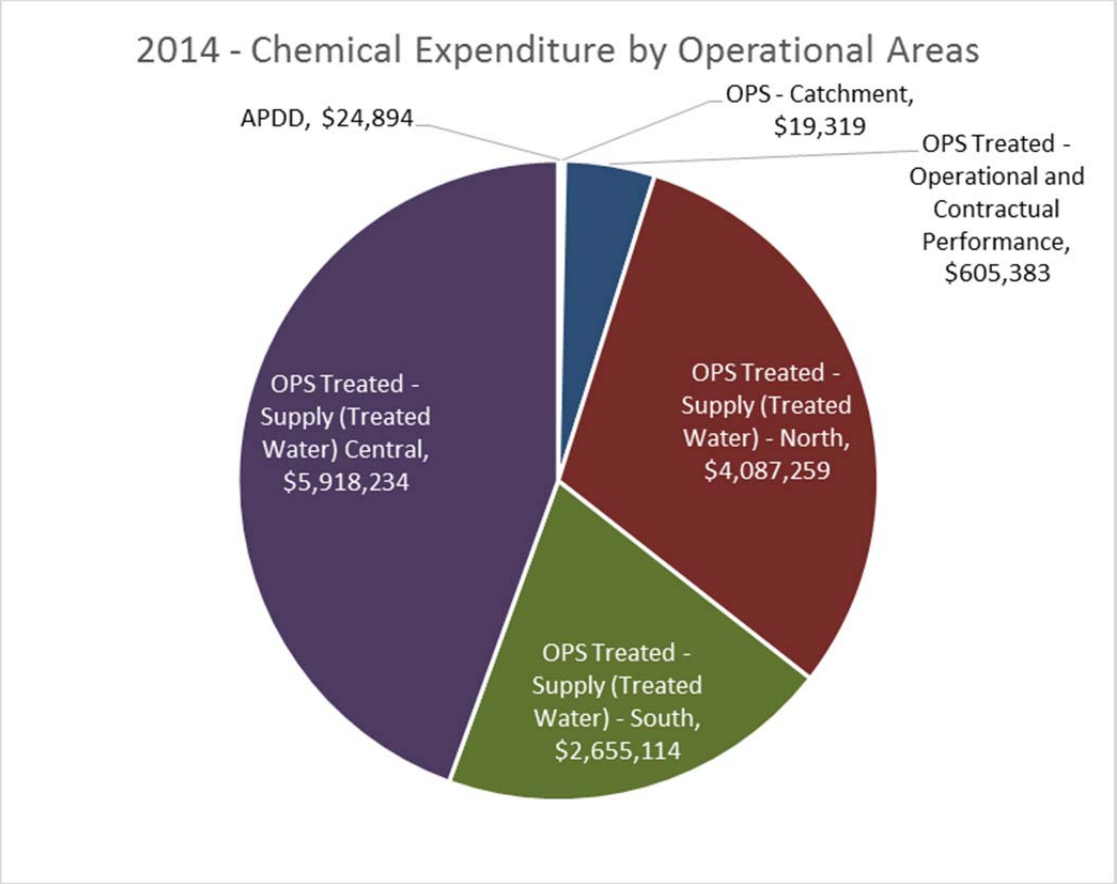
In the 2012/2013 period the majority of chemical expenditure was captured across two main operational areas, OPS Treated - Supply (Treated Water) - North and OPS Treated - Supply (Treated Water) - South.

Figure 5-18: Chemical Expenditure by Operational Areas (2012/13 actual costs, $2014)



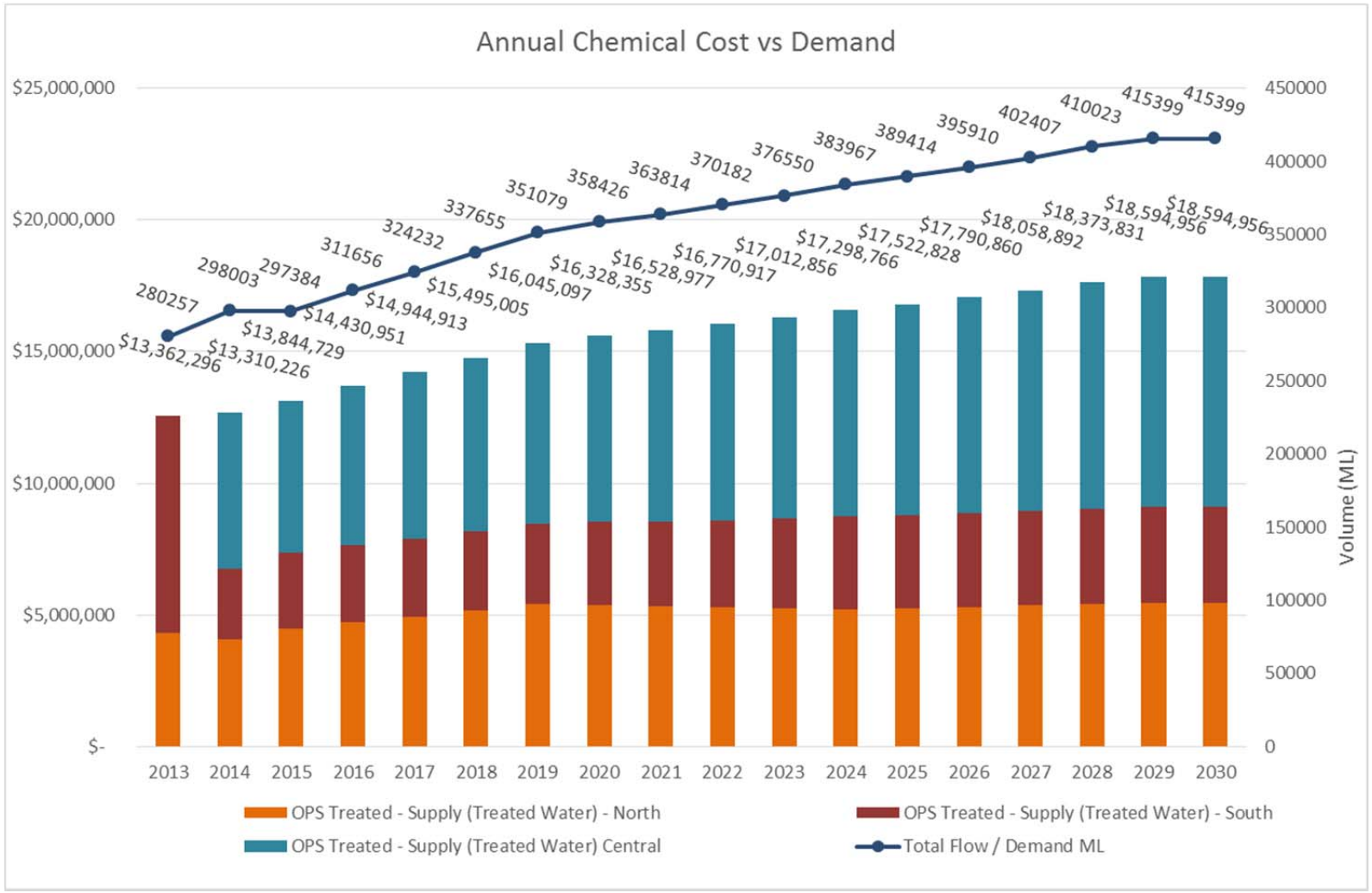
For the 2013/2014 period the majority of the chemical expenditure was expended by four main operational areas, OPS Treated - Supply (Treated Water) – North, OPS Treated - Supply (Treated Water) – South, OPS Treated - Supply (Treated Water) – Central (split out from south) and OPS Treated - Operational and Contractual Performance (Tugan desalination plant and AWTP's) (inherited from merger). For the remaining periods the majority of the chemical expenditure costs are captured in the same four operational areas.

Figure 5-19: Chemical Expenditure by Operational Areas (2013/14 actual costs, $2014)



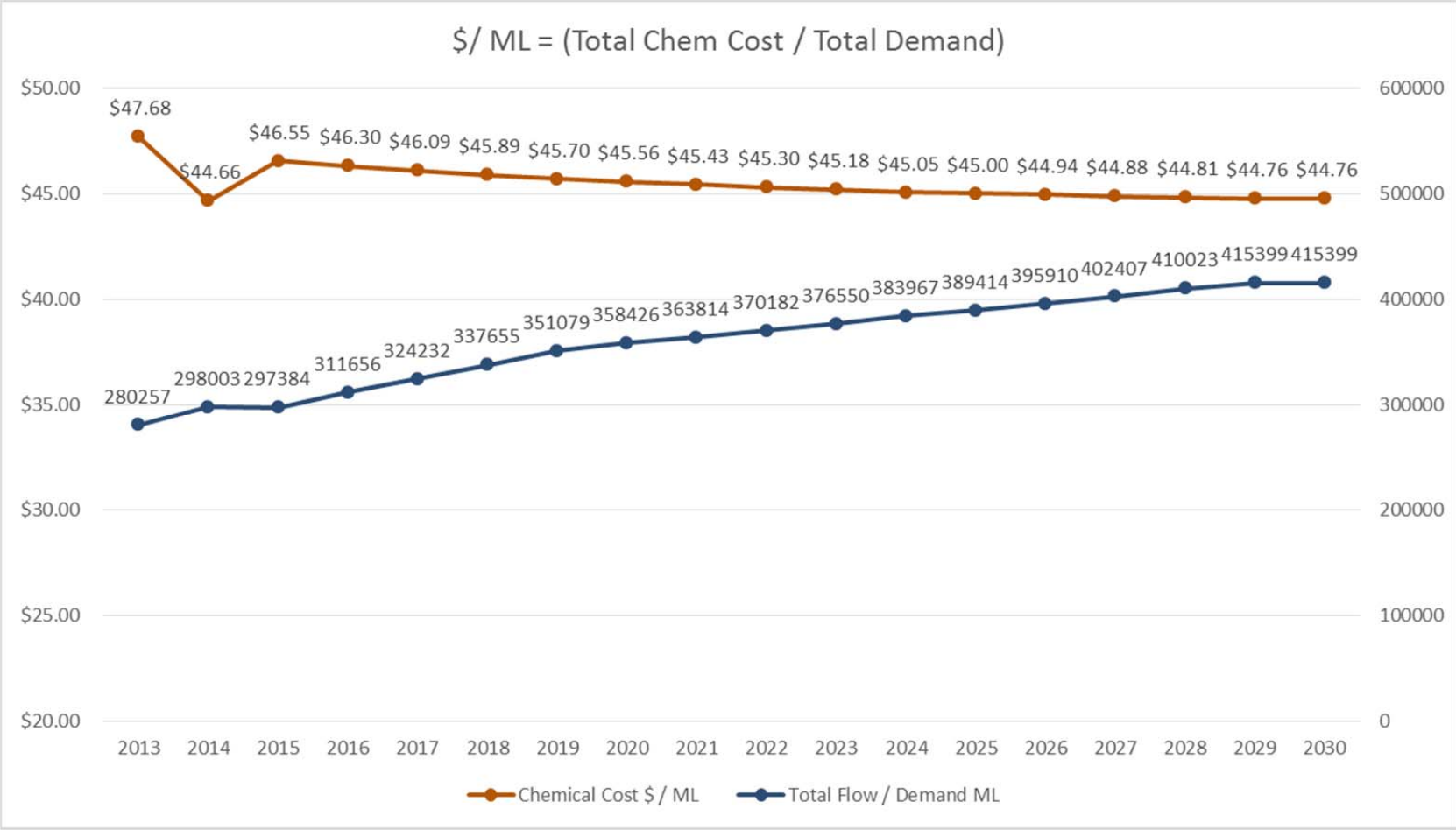
Seqwater has developed its 2014-15 budget for chemicals based on historical levels of chemical consumptions across its portfolio of WTPs and adjusted these consumption levels based on projected production levels at each WTP under the Annual Operations Plan, with revisions based upon current bulk commodity pricing. For the remaining years the chemical expenditure variable costs have been based on projected production rates for variable chemical costs with no escalation based on chemical pricing, as depicted in Figure 5-20 and Figure 5-21 below.

Figure 5-20: Annual Chemical Expenditure vs Demand ($2014)



Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xlsx

Figure 5-21: Annual Chemical Expenditure represented as $/ML ($2014)



Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xlsx

5.6.2 Documentation provided

Documentation reviewed in respect of the *Chemical costs* included:

- Seqwater, Seqwater Bulk Water Prices 2015 to 2018 Submission to the Queensland Competition Authority, July 2014
- Seqwater, OPEX model 2014-09-25 Q1 FY15 revised.xlsm, September 2014
- Seqwater, Seqwater opex data 26-9-14 consolidated.xlsx, September 2014
- Seqwater, Opex efficiencies support.doc, September 2014
- WCRWS Q1 opex forecast Veolia.xlsx, September 2014
- ALL CONTRACT PRICES - as at 01-09-14.xlsx, September 2014
- Q1 Chemical budget.xlsx, September 2014
- Q1 narratives.xlsx, September 2014
- OTW A – P.XLS (various chemical supporting information)

5.6.3 Drivers

As noted by Seqwater in its 2015-18 Submission, chemical contracts are competitively tendered on a two year cycle. Seqwater currently has several main suppliers, reflecting best value delivery to various geographical areas or for specific chemicals.[11]

The Seqwater's 2015-18 Submissions also state that chemical consumption is dependent on raw water characteristics which are impacted by weather. Overall, periods of high rainfall are associated with poorer raw water characteristics, requiring higher-levels of treatment. This is evidenced by the significant reduction in chemical application across WTPs in 2014-15 compared to the preceding three years, due to rainfall across Seqwater's catchments in 2014-15 being approximately 50 percent of that in the three preceding years.

In addition to water quality and demand, Seqwater are also impacted by weather events that may lead to drought situations causing a low storage volume in the catchment areas and therefore the start-up of the AWTP's and increased production through the Tugan desalination plant. However Seqwater noted in the 2015-18 Submission supporting documents that the WCRWS has been placed in care and maintenance mode and there will be no supply of purified recycled water to any customers. As part of this process, plans have been developed for the WCRWS to be available to augment drinking water supplies when key water grid storages reach 40% of full capacity. This has been noted as being critical to meeting the long term water security needs of SEQ.

As noted in the Independent Review of Cost Forecasts – SEQWATER -Western Corridor Recycled Water Scheme -QE06934R002 undertaken by Jacobs, the following statement was made

> *"AWTP - The variable component comprises expenditures associated with energy usage, chemical treatment and cleaning, and sludge and waste disposal. As the scheme is being decommissioned, there are no variable costs for FY 2015. As such, Jacobs has not reviewed these variable costs further."*

[11] Seqwater, 2014. *Seqwater Bulk Water Prices 2015 to 2018 – Submission to the Queensland Competition Authority*, p.186.

Seqwater has stated in its 2015-18 Submission documents that the chemical cost increases are due to production increases under the AOP and bulk chemical cost increase trends. Seqwater have also stated that it has recently commenced a longer term analysis and planning process for the management of chemical suppliers. This work is in its very early stages any material improvements to chemical contractor management will be demonstrated in the 2018 review.

Seqwater have also indicated in its submission, that a Chemical Improvement Management plan is also under development, which defines a program of activities to drive efficiency across sourcing, contractual arrangements, stock management, and on site management.

Due to the limited raw water quality information submitted as part of the Seqwater 2015-18 Submission and the infancy of Seqwater implementing their Chemical Improvement Management plan, determining the overall impact on chemical consumption in this review has been limited to the assessment of chemical costs driven by demand and price escalation only. For future reviews it would be prudent to review the baseline raw water quality envelop for any impacted WTP's as part of the future Chemical Improvement Management plan, this will assist to determine optimum chemical consumption so that a more thorough determination of chemical efficiency by WTP could be assessed.

The following operational areas have been reviewed and identified in the determination of the chemical expenditure variances between the 2013/2014 period and the 2014/2015 period. This variance equates to a $1.89 per ML or a 3.9% increase from the 2013/2014 period with no noticeable increase in demand flow. The 2014/2015 chemical expenditure also forms the base year for future chemical expenditures that are escalated by demand flows and chemical price escalation on a year by year basis.

Contracted Operations

The following plants are operated under contract by a third party operations contractor (Veolia). The chemical costs that are associated with the operation of these plants are included in Seqwater's pricing submission under the contract services cost category and are escalated out to year 2030 according to that category.

Tugan Desalination Plant

For the 2013/2014 period chemical expenditure at the Tugan desalination plant was $367,656 with a total volume produced of 1860 ML equating to $197.66 per ML of water treated. For the forecasted 2014/2015 period the Tugan desalination plant is forecasted to produce a reduced volume of 1241 ML with an associated chemical cost of $552,323 equating to $445.06 per ML of water treated. This equates to an increase of $184,666 or an additional $247.40 per ML. Based on CH2M HILL's detailed review chemical costs per chemical between 2013-14 and 2014-15 the largest increase in chemical cost was attributed to Lime.

The cost expenditure for lime has increased from $27,965 in 2013/14 to $518,641 in 2014/15.

Additional justification has been supplied by Seqwater in support of the 2013/14 to 2014/15 increase in $ per ML for the Tugan desalination plant chemical costs. This additional information provided an explanation for a $184,000 reduction in the 2014/2015 chemical cost. The chemical cost only reducing by $184K equates to an increase of 50% in the cost per ML from the 2013/14 period. (In 2013/14 the cost equated to $197.66 per ML and for the 2014/2015 period the cost is with the $184,000 adjustment equates to $296.80 per ML. This

50% increase has not been justified and therefore the recommendation is that the Tugan desalination plant chemical costs should be reduced by $306,527 to be in line with the reduction in flow demand for the 2014/15 period and to maintain the $197.66 per ML. .

This finding has been captured and included in the revised forecast numbers that are displayed in the summary findings section.

AWTP's

The 3 AWTP's (Luggage, Bundamba and Gibson Island) had chemical expenditure of $237,727 for the 2013/2014 period and show a combined production volume of 1424 ML equating to $166.94 per ML. For the 2014/2015 period the AWTP's are forecasted to be shutdown with one off chemical costs for chemical disposal equating to a total of $162,391. In evaluating the 2015/2016 forecasted period there was evidence that this chemical cost has been captured for all future years when in fact it should only be incurred in the 2014/2015 year when the plants are shutdown. ***This finding has been captured and included in the revised forecast numbers that are displayed in the summary findings section.***

Table 5-22 below illustrates the current and forecast Chemical Expenditure for the Tugan desalination plant and the AWTP's for the 2013/2014 period and up to and including the 2017/2018 period.

Table 5-22: Seqwater Chemicals Expenditure – Summary Assessment Tugan desalination plant and AWTP's

	2013-14	2014-15	2015-16	2016-17	2017-18
Tugan Desalination Chemical Expenditure	$367,656	$552,323	$552,323	$552,323	$552,323
AWTP's Chemical Expenditure	$237,727	$162,392	$162,392	$162,392	$162,392
Total for Desalination and AWTP's Chemical Expenditure	$605,383	$714,715	$714,715	$714,715	$714,715
Proportion of total Chemical expenditure	4.55%	5.16%	4.95%	4.78%	4.61%
Actual or Demand Flow (ML)*	1,860	1,241	1,241	1,241	1,241
$ / ML	$325.47	$575.92	$575.92	$575.92	$575.92
% Annual Change		43%	0%	0%	0%

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xls
*Note: This flow is only associated to the Tugan Desalination Plant as AWTP's are shutdown– information sourced from Demand Tab in Opex model 2014-09-25 Q1 FY15 revised.xlsm.

Seqwater Operated Treatment Plants

Based on the current Seqwater 2015-18 Submission and supporting documentation provided there are a total of 28 Seqwater operated treatment plants that have a projected flow demand for 2015 and beyond. Of the identified 28 Seqwater operated treatment plants there are 12 treatment plants that have been identified that have a chemical expenditure variance

of more than ±$10,000 and a $ per ML variance of more than ±5% when comparing the actual 2013/2014 period against the forecast period of 2014/2015 for the same demand flows. Details of these Treatment Plants are presented in Table 5-23 below:

Table 5-23: Seqwater Chemical Expenditure – Summary Assessment of the 12 WTP's with a $ per ML variance of more than ±5%

Treatment Plant	2013-14 $	2013-14 ML	2014-15 $/ML	2014-15 $	2014-15 ML	2014-15 $/ML	Up or Down
Beaudesert WTP	$47,926	1017	$47.11	$35,583	1017	$34.98	↓
Capalaba WTP	$188,396	3969	$47.47	$221,695	3969	$55.85	↑
Esk WTP	$25,593	255	$100.32	$49,570	255	$194.30	↑
Image Flat WTP	$248,457	3423	$72.58	$285,012	3423	$83.25	↑
Lowood WTP	$148,663	3130	$47.50	$122,146	3130	$39.03	↓
Mount Crosby West Bank WTP	$1,275,865	27566	$46.28	$1,023,713	27566	$37.14	↓
Mudgeeraba WTP	$876,478	20928	$41.88	$980,192	20928	$46.84	↑
Noosa WTP	$238,115	5907	$40.31	$432,096	5907	$73.15	↑
North Stradbroke Island WTP	$200,467	9525	$21.05	$282,666	9525	$29.68	↑
Petrie WTP	$265,685	6209	$42.79	$328,185	6209	$52.86	↑
Totals	**$3,515,652**	**81929**	**$43.08**	**$3,760,858**	**81929**	**$46.67**	↑

For each of the WTP's above, a brief commentary on the associated variances has been provided below:

Beaudesert WTP

The reduction of $12.13 Per ML for this WTP is primarily due to a reduction in variable costs mainly attributed to chlorine and polymer, with other chemical costs also reduced to zero expenditure compared to the 2013-14 period and with the additional information supplied by Seqwater this cost has been justified based on water quality variances and efficiencies.

Table 5-24: Beaudesert WTP - Chemical Costs

WTP Chem Description	Budget 14/15	Actuals 13/14
Beaudesert WTP-SO-521037 - Chlorine	$11,854	$14,449
Beaudesert WTP-SO-521048 - Polymer	$19,854	$24,950
Beaudesert WTP-SO-521078 - Sodium Fluoride	$2,394	$2,355
Beaudesert WTP-SO-522010 - Other Chemicals		$2,484
Beaudesert WTP-SO-522501 - Chemical Facility Charge	$1,482	$992
Beaudesert WTP-SO-522504 – Chemical Facility Charge – Chlorine		$1,193
Beaudesert WTP-SO-522505 - Other Chemical - WTP	-	$1,229
Beaudesert WTP-SO-522506 - Chemical Delivery Charge	-	$275
Totals	**$35,583**	**$47,927**
Flow Actual/Demand (ML)	**1017**	**1017**
$ per ML	**$34.98**	**$47.11**
Variance to 2013/2014 period ($)	**-$12,344**	
$ per ML Variance	**-$12.13**	
% Variance	**-26%**	

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xls

Capalaba WTP

The increase of $8.39 Per ML for this WTP is primarily due to an increase in variable costs associated to Chlorine(12% increase) and Hydrated Lime (50% increase). It is noted that other chemical costs and facility charges are reduced to zero expenditure compared to the 2013-14 period and polymer costs have been budgeted to drop by 31%. Chlorine and to some degree Hydrated Lime can be impacted by changing water quality conditions and with the additional information supplied by Seqwater this cost has been justified in that regard.

Table 5-25: Capalaba WTP Chemical Costs

WTP Chem Description	Budget 14/15	Actuals 13/14
Capalaba WTP-SO-521012 - Activated Carbon	$3,830	-
Capalaba WTP-SO-521019 - Alum	$88,561	$83,524
Capalaba WTP-SO-521037 - Chlorine	$51,459	$41,222
Capalaba WTP-SO-521041 - Hydrated Lime	$60,615	$33,916
Capalaba WTP-SO-521048 - Polymer	$9,452	$13,777
Capalaba WTP-SO-521079 - Sodium Fluorosilicate	$5,802	$4,504
Capalaba WTP-SO-522010 - Other Chemicals		$4,414
Capalaba WTP-SO-522500 - WTP Chem Disp -Flu Bags/Wast	$1,975	-
Capalaba WTP-SO-522501 - Chem Facility Chg	-	$3,224
Capalaba WTP-SO-522504 - Chemical Facility Charge – Chlorine	-	$3,816
Totals	**$221,695**	**$188,397**
Flow Actual/Demand (ML)	**3969**	**3969**
$ per ML	**$55.85**	**$47.47**
Variance to 2013/2014 period ($)	**$33,299**	
$ per ML Variance	**$8.39**	
% Variance	**18%**	

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xls

Esk WTP

The increase of $93.98 Per ML for this WTP is primarily due to an increase in variable costs associated to Carbon Dioxide, an increase of 683% which seems excessive compared to the other chemical expenditure increases at this WTP. The additional information supplied by Seqwater has highlighted a clerical error in the Carbon Dioxide costs for the 2014/15 year and an adjustment of $27,493 for this chemical cost is to be reduced from the Other Chemical costs. ***The costs for the 2014/2015 budget under Other Chemicals is to be reduced by $27,493 due to an Seqwater clerical error in the 2014/15 budget amount.***

Table 5-26: Esk WTP Chemical Costs

WTP Chem Description	Budget 14/15	Actuals 13/14
Esk WTP-CN-521019 - Alum	$5,112	$3,679
Esk WTP-CN-521033 - Carbon Dioxide	$33,181	$4,917
Esk WTP-CN-521037 - Chlorine	$5,461	$5,021
Esk WTP-CN-521076 - Soda Ash	$2,498	$2,356
Esk WTP-CN-521078 - Sodium Fluoride	$602	$336
Esk WTP-CN-522501 - Chem Facility Chg		-
Esk WTP-CN-522501 - Chem Facility Chg	$2,222	$3,481
Esk WTP-CN-522503 - Chemical Facility Charge – Carbon Dioxide	-	$3,319
Esk WTP-CN-522504 - Chemical Facility Charge – Chlorine	-	$835
Esk WTP-CN-522506 - Chemical Delivery Charge	$494	$1,367
Esk WTP-CN-Variable Chemical costs	-	$284
Totals	**$49,570**	**$25,594**
Flow Actual/Demand (ML)	**255**	**255**
$ per ML	**$194.30**	**$100.32**
Variance to 2013/2014 period ($)	**$23,976**	
$ per ML Variance	**$93.98**	
% Variance	**94%**	

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xls

Image Flat WTP

The increase of $10.68 Per ML for this WTP is primarily due to an increase in variable costs associated to Alum (28% increase), Chlorine (26% increase) and Hydrated Lime (31157%). These chemicals are typically impacted by water quality conditions and with the additional information supplied by Seqwater this cost has been justified in that regard.

Table 5-27: Image Flat WTP Chemical Costs

WTP Chem Description	Budget 14/15	Actuals 13/14
Image Flat WTP-NO-521012 - Activated Carbon	$41,659	$39,203
Image Flat WTP-NO-521019 - Alum	$102,794	$81,092
Image Flat WTP-NO-521037 - Chlorine	$38,203	$30,692
Image Flat WTP-NO-521041 - Hydrated Lime	$7,101	$23
Image Flat WTP-NO-521072 - Potassium Permanganate	$884	-
Image Flat WTP-NO-521076 - Soda Ash	$79,429	$84,840
Image Flat WTP-NO-521079 - Sodium Fluorosilicate	$4,829	$4,849
Image Flat WTP-NO-521084 - Sodium Hypochlorite	$730	-$297
Image Flat WTP-NO-522010 - Other Chemicals	$1,185	$2,635
Image Flat WTP-NO-522501 - Chem Facility Chg		$2,421
Image Flat WTP-NO-522504 - Chemical Facility Charge – Chlorine	$4,445	$2,790
Image Flat WTP-NO-522505 - Other Chemical - WTP		-
Image Flat WTP-NO-522520 - WTP Chemical Waste Disposal - Other	$3,753	$209
Totals	**$285,012**	**$248,457**
Flow Actual/Demand (ML)	**3423**	**3423**
$ per ML	**$83.25**	**$72.58**
Variance to 2013/2014 period ($)	**$36,555**	
$ per ML Variance	**$10.68**	
% Variance	**15%**	

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xls

Lowood WTP

The decrease of $8.47 Per ML for this WTP is primarily due to an decrease in variable costs associated to Alum (25% decrease), Chlorine (11% decrease) and Hydrated Lime (9% decrease). These chemicals are typically impacted by water quality conditions and with the additional information supplied by Seqwater this cost has been justified in that regard.

Table 5-28: Lowood WTP Chemical Costs

WTP Chem Description	Budget 14/15	Actuals 13/14
Lowood WTP-NO-521000 - Chemicals	-	-$77
Lowood WTP-CN-521019 - Alum	$54,625	$73,496
Lowood WTP-CN-521037 - Chlorine	$32,772	$37,473
Lowood WTP-CN-521041 - Hydrated Lime	$10,846	$12,013
Lowood WTP-CN-521048 - Polymer	$4,824	$4,226
Lowood WTP-CN-521072 - Potassium Permanganate	$1,533	-
Lowood WTP-CN-521078 - Sodium Fluoride	$8,025	$10,373
Lowood WTP-CN-521084 - Sodium Hypochlorite	$632	-$1,423
Lowood WTP-CN-522010 - Other Chemicals	$5,433	$1,878
Lowood WTP-CN-522501 - Chem Facility Chg	$3,457	$1,563
Lowood WTP-CN-522504 - Chemical Facility Charge – Chlorine	-	$2,272
Lowood WTP-NO-522505 - Other Chemical - WTP	-	$284
Lowood WTP-NO-522506 - Chemical Delivery Charge	-	-
Lowood WTP-CN-522520 - WTP Chemical Waste Disposal - Other	-	$5,085
Lowood WTP-CN-Variable Chemical costs	-	$1,500
Totals	**$122,146**	**$148,664**
Flow Actual/Demand (ML)	**3129**	**3129**
$ per ML	**$39.03**	**$47.50**
Variance to 2013/2014 period ($)	**-$26,517**	
$ per ML Variance	**-$8.47**	
% Variance	**-18%**	

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xls

Mount Crosby West Bank WTP

The decrease of $9.15 Per ML for this WTP is primarily due to a decrease in variable costs associated to Alum (32% decrease), Ammonia Anhydrous (17% decrease) and Sodium Hypochlorite (19% decrease). In addition to the decrease in these variable costs there has also been a significant increase in Sodium Hydroxide costs (262% increase) and it is also worth noting that in the 2012-13 period the cost for Sodium Hydroxide was $131,464. With the additional information supplied by Seqwater this cost has been justified due to efficiency gains in chemical dosing and water quality improvements.

Table 5-29: Mount Crosby West Bank WTP Chemical Costs

WTP Chem Description	Budget 14/15	Actuals 13/14
Mount Crosby West Bank WTP-CN-521019 - Alum	$405,186	$602,446
Mount Crosby West Bank WTP-CN-521024 - Ammonia Anhydrous	$71,262	$87,209
Mount Crosby West Bank WTP-CN-521041 - Hydrated Lime	$118,455	$107,104
Mount Crosby West Bank WTP-CN-521048 - Polymer	$29,909	$20,549
Mount Crosby West Bank WTP-CN-521072 - Potassium Permanganate	$830	-$741
Mount Crosby West Bank WTP-CN-521079 - Sodium Fluorosilicate	$35,926	$43,350
Mount Crosby West Bank WTP-CN-521080 - Sodium Hydroxide	$18,278	-$11,400
Mount Crosby West Bank WTP-CN-521084 - Sodium Hypochlorite	$338,928	$425,375
Mount Crosby West Bank WTP-CN-522010 - Other Chemicals	$4,939	$301
Mount Crosby West Bank WTP-SO-522010 - Other Chemicals	-	$1,279
Mount Crosby West Bank WTP-CA-522505 - Other Chemical - WTP	-	$393
Totals	**$1,023,713**	**$1,275,866**
Flow Actual/Demand (ML)	**27566**	**27566**
$ per ML	**$37.14**	**$46.28**
Variance to 2013/2014 period ($)	**-$252,153**	
$ per ML Variance	**-$9.15**	
% Variance	**-20%**	

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xls

Mudgeeraba WTP

The increase of $4.96 Per ML for this WTP is primarily due to an increase in variable costs associated to Carbon Dioxide (33% increase), Sodium Hydroxide (49% increase) and Hydrated Lime (33%) and polymer costs have been budgeted to decrease by 51%. These chemicals are typically impacted by water quality conditions and with the additional information supplied by Seqwater this cost has been justified in that regard.

Table 5-30: Mudgeeraba WTP Chemical Costs

WTP Chem Description	Budget 14/15	Actuals 13/14
Mudgeeraba WTP-SO-521012 - Activated Carbon	$5,985	-$48
Mudgeeraba WTP-SO-521019 - Alum	$218,503	$210,238
Mudgeeraba WTP-SO-521033 - Carbon Dioxide	$180,388	$137,006
Mudgeeraba WTP-SO-521041 - Hydrated Lime	$175,638	$133,338
Mudgeeraba WTP-SO-521048 - Polymer	$40,374	$82,964
Mudgeeraba WTP-SO-521072 - Potassium Permanganate	$846	$42
Mudgeeraba WTP-SO-521079 - Sodium Fluorosilicate	$26,843	$23,989
Mudgeeraba WTP-SO-521080 - Sodium Hydroxide	$125,945	$85,686
Mudgeeraba WTP-SO-521084 - Sodium Hypochlorite	$167,148	$163,117
Mudgeeraba WTP-SO-522010 - Other Chemicals	$3,951	$4,254
Mudgeeraba WTP-SO-522501 - Chem Facility Chg	$34,571	$18,792
Mudgeeraba WTP-SO-522503 - Chemical Facility Charge – Carbon Dioxide	-	$16,029
Mudgeeraba WTP-SO-522505 - Other Chemical - WTP	-	$1,071
Totals	**$980,192**	**$876,478**
Flow Actual/Demand (ML)	**20927**	**20927**
$ per ML	**$46.84**	**$41.88**
Variance to 2013/2014 period ($)	**$103,714**	
$ per ML Variance	**$4.96**	
% Variance	**12%**	

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xls

Noosa WTP

The increase of $32.84 Per ML for this WTP is primarily due to an increase in variable costs associated to Alum (54% increase), Hydrated Lime (1034% increase), Polymer (1118% increase), Sodium Hydroxide (375% increase) and Sodium Hypochlorite (32% increase). Based on the fact the flows for both years are reported the same and the costs for Alum, Hydrated Lime, Polymer and Sodium Hydroxide in 2014/2015 are higher than the associated 2013/2014 chemical costs there may be an accounting error or the true cost has not been captured in the 2013/2014 year due to a change in operation or design. ***The additional information supplied by Seqwater has highlighted a clerical error in the Noosa WTP chemical cost for the 2014/15 year and an adjustment of $153,463 for the Noosa chemical cost is to be reduced from the Other Chemical costs later in this section.***

Table 5-31: Noosa WTP Chemical Costs

WTP Chem Description	Budget 14/15	Actuals 13/14
Noosa WTP-NO-521019 - Alum	$166,286	$109,080
Noosa WTP-NO-521041 - Hydrated Lime	$52,343	$4,674
Noosa WTP-NO-521048 - Polymer	$36,688	$3,050
Noosa WTP-NO-521072 - Potassium Permanganate	$1,526	-$2,673
Noosa WTP-NO-521079 - Sodium Fluorosilicate	$11,576	$7,100
Noosa WTP-NO-521080 - Sodium Hydroxide	$72,632	$15,487
Noosa WTP-NO-521084 - Sodium Hypochlorite	$83,143	$63,585
Noosa WTP-NO-522010 - Other Chemicals	$2,469	$748
Noosa WTP-NO-522500 - WTP Chem Disp -Flu Bags/Wast	$494	-
Noosa WTP-NO-522505 - Other Chemical - WTP	$4,939	$36,803
Noosa WTP-NO-522520 - WTP Chemical Waste Disposal - Other		$259
Totals	**$432,096**	**$238,116**
Flow Actual/Demand (ML)	**5907**	**5907**
$ per ML	**$73.15**	**$40.31**
Variance to 2013/2014 period ($)	**$193,980**	
$ per ML Variance	**$32.84**	
% Variance	**81%**	

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xls

North Stradbroke Island WTP

The increase of $8.63 Per ML for this WTP is primarily due to an increase in variable costs associated to Alum (122% increase) and Hydrated Lime (53%) with a decrease in fixed costs of $10,416. Alum and Lime are typically impacted by water quality conditions and with the additional information supplied by Seqwater this cost has been justified in that regard.

Table 5-32: North Stradbroke Island WTP Chemical Costs

WTP Chem Description	Budget 14/15	Actuals 13/14
North Stradbroke Island WTP-SO-521019 - Alum	$52,187	$23,753
North Stradbroke Island WTP-SO-521037 - Chlorine	$36,943	$31,431
North Stradbroke Island WTP-SO-521041 - Hydrated Lime	$177,216	$116,952
North Stradbroke Island WTP-SO-521048 - Polymer	$1,417	$4,124
North Stradbroke Island WTP-SO-521078 - Sodium Fluoride		$65
North Stradbroke Island WTP-SO-521079 - Sodium Fluorosilicate	$13,915	$13,726
North Stradbroke Island WTP-SO-522010 - Other Chemicals	$988	-
North Stradbroke Island WTP-SO-522501 - Chem Facility Chg		$4,619
North Stradbroke Island WTP-SO-522504 - Chemical Facility Charge – Chlorine		$5,349
North Stradbroke Island WTP-SO-522505 - Other Chemical - WTP		$448
Totals	**$282,666**	**$200,468**
Flow Actual/Demand (ML)	**9525**	**9525**
$ per ML	**$29.68**	**$21.05**
Variance to 2013/2014 period ($)	**$82,198**	
$ per ML Variance	**$8.63**	
% Variance	**41%**	

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xls

Petrie WTP

The increase of $10.07 Per ML for this WTP is primarily due to an increase in variable costs associated to Alum (22% increase), Hydrated Lime (46% increase) and Sodium Hypochlorite (91% increase). Alum, Lime and Chlorine are typically impacted by water quality conditions and with the additional information supplied by Seqwater this cost has been justified in that regard.

Table 5-33: Petrie WTP Chemical Costs

WTP Chem Description	Budget 14/15	Actuals 13/14
Petrie WTP-NO-521019 - Alum	$185,971	$154,623
Petrie WTP-NO-521041 - Hydrated Lime	$48,081	$33,252
Petrie WTP-NO-521048 - Polymer	$2,502	$1,497
Petrie WTP-NO-521072 - Potassium Permanganate	$3,207	-$6,926
Petrie WTP-NO-521079 - Sodium Fluorosilicate	$7,654	$6,361
Petrie WTP-NO-521080 - Sodium Hydroxide	$26,960	$24,589
Petrie WTP-NO-521084 - Sodium Hypochlorite	$47,774	$25,275
Petrie WTP-NO-522010 - Other Chemicals	$5,689	$3,213
Petrie WTP-NO-522500 - WTP Chem Disp -Flu Bags/Wast	$346	-
Totals	**$328,185**	**$265,686**
Flow Actual/Demand (ML)	**6208**	**6208**
$ per ML	**$52.86**	**$42.79**
Variance to 2013/2014 period ($)	**$62,499**	
$ per ML Variance	**$10.72**	
% Variance	**24%**	

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xls

5.6.4 Benchmarking

Benchmarking comparisons of the $ per ML of chemical costs incurred by different organisations is generally compromised by the fact that each treatment plant or dosing system in an organisation is specific to a given region or network and is directly influenced by regional weather patterns. Due to these factors the feed water quality can vary significantly so it is hard to accurately evaluate the true cost of chemicals at a $ per ML basis for specific treatment plants without first understanding the influence of the feed water quality envelop that each organisation has to operate the treatment plants within. As there is limited to no water quality envelope information provided as part of this submission it is difficult to accurately benchmark chemical costs with other organisations. The only factor that can be evaluated related to benchmarking is the escalation factors that influence chemical pricing and these are covered in the following Section.

5.6.5 Escalation factors

In developing its expenditure forecasts for Chemicals, Seqwater has applied the escalation factors outlined in Table 5-34.

Table 5-34: Proposed Chemical escalation factors

Year	2013-14	2014-15	2015-16	2016-17	2017-18 to 2027-28
Rate (nominal)	3.00%	3.00%	2.50%	2.50%	2.50%

Source: Seqwater Bulk Water Prices 2015 to 2018 - Submission to QCA, p. 118.

As noted above, Seqwater engaged PwC to analyse historical price movements and other relevant information and recommend escalation factors to be applied for the purposes of its 2015-2018 Submission. With respect to Chemicals, Seqwater has adopted PwC's recommendation of escalating its costs in line with general inflation using the Consumer Price Index (CPI).

A review of the appropriateness of Seqwater's approach and its proposed escalation factors in relation to Chemical costs is presented below.

Review of regulatory precedent in South East Queensland

A review of recent price monitoring reviews undertaken by the QCA indicate that water businesses in South East Queensland have adopted reasonably consistent approaches to escalating chemical costs, using an estimate of general inflation, typically the Reserve Bank of Australia's CPI.

The QCA has supported and accepted this approach, and has rejected alternative approaches to escalating chemical costs. For example, in its 2010 price review submission the Gladstone Area Water Board (GAWB) proposed to escalate its chemicals costs according to the three year (2007 to 2009) average of the ABS Articles Produced by Manufacturing Industries – Chemicals index, equal to 4.84 percent per annum.[12] In its Final Report, the QCA stated:[13]

> *The Authority maintains a view that indexes based on three years observations at the peak of the construction cycle do not provide appropriate escalation factors and GAWB has not proposed an alternative approach.*

Consequently, GAWB's proposal was rejected and the QCA determined that CPI should be applied to chemical cost escalation over the regulatory period from 2010 to 2015.[14]

As such, CH2M HILL considers that Seqwater's proposed approach to escalate chemical costs in line with general inflation is appropriate.

Review of general inflation forecasts

Seqwater's proposed escalation factors for Chemical costs are based on general inflation estimates published by the RBA in its *Statement on Monetary Policy* (May 2014). At the time of publication (May 2014), the RBA had estimated CPI for the year ending June 2015 to grow at between 2.5 and 3.5 percent. For the purposes of Chemical cost escalation factors,

[12] GAWB, 2010. *Expenditure Proposals for the 2010 Price Review*, p.38.
[13] QCA, 2010. *Final Report – Gladstone Area Water Board: Investigation of Pricing Practices*, p.142.
[14] QCA, 2010. *Final Report – Gladstone Area Water Board: Investigation of Pricing Practices*, p.142.

Seqwater adopted the mid-point of the RBA's estimate (i.e. 3.0 percent). For all remaining years in the forecast period (2015-16 to 2027-28), the mid-point of the RBA inflation target (2 to 3 per cent) has been applied. At the time of is 2015-18 Submission, CH2M HILL confirms that the RBA's CPI estimates have been consistently and accurately applied by Seqwater.

However, the RBA has subsequently released its latest *Statement on Monetary Policy* (August 2014), in which the RBA now estimates CPI for the year ending June 2015 to grow at between 1.75 and 2.75 percent (a mid-point of 2.25 percent). The RBA states that the material decrease in forecast inflation for the 2014-15 year is due to below-trend growth in the economy in the near term and low growth of domestic costs, combined with the abolition of the carbon price.[15] For 2015-16, the RBA has forecast inflation to increase to between 2.5 and 3.5 percent (mid-point of 3.0 percent). This compares to the 2.5 percent adopted by Seqwater in its 2015-18 Submission.

Based on a review of updated inflation estimates published by the RBA, CH2M HILL recommends adjusting Seqwater's proposed escalation factors for 2014-15 and 2015-16 in line with the mid-point of the RBA's latest forecasts for inflation. Given the level in uncertainty of inflation over the remaining forecast period, CH2M HILL considers Seqwater's proposed approach to adopt the mid-point of the RBA inflation target (2 to 3 percent) appropriate.

Summary findings of escalation factors

CH2M HILL considers that Seqwater's proposed approach to escalate chemical costs in line with general inflation is appropriate. However, CH2M HILL recommends adjusting Seqwater's proposed escalation factors for 2014-15 and 2015-16 in line with the mid-point of the RBA's latest forecasts for inflation, as published in the latest *Statement on Monetary Policy* (August 2014). CH2M HILL considers Seqwater's proposed approach to adopt the mid-point of the RBA inflation target (2 to 3 per cent) over the remainder of the forecast period to be appropriate.

Based on the above analysis, CH2M HILL recommends that Seqwater's Chemical costs be escalated based on the factors outlined in Table 5-35.

Table 5-35: Recommended escalation factors for Chemical costs

Year	2013-14	2014-15	2015-16	2016-17	2017-18 to 2027-28
Seqwater proposed rate	3.00%	3.00%	2.50%	2.50%	2.50%
CH2M HILL recommended rate	3.00%	2.25%	3.00%	2.50%	2.50%
Difference	-	-0.75%	0.50%	-	-

Note: The above rates are in expressed in nominal terms.

[15] The RBA's forecasts are based on modelling used by the Commonwealth's Department of Treasury which suggests that the removal of the carbon price would reduce CPI by 0.75 percent over 2014-15. The RBA notes that this effect is similar in size to the upward influence on inflation that was expected to result from the introduction of the carbon price in 2012-13. See: http://www.rba.gov.au/publications/smp/2014/aug/pdf/0814.pdf

The impact of the above recommendations on Seqwater's proposed forecast chemical costs is outlined in the CH2M HILL assessment of Reported Expenditure for Chemicals presented below.

5.6.6 Prudency

Chemical Expenditure related to water system operation is an essential activity to assist Seqwater's ongoing sustainable operations so they can meet their end user service levels and regulatory and legislative requirements as a bulk water provider. CH2M HILL, therefore, considers Seqwater's continued investment in chemical expenditure to be prudent.

5.6.7 Efficiency

As noted in earlier sections of this report, there has been an observed lack of original supporting documentation that clearly articulates the variances between 2013-14 Actual figures and the 2014-15 forecasts. Upon the issuing of additional information Seqwater have justified these variances expect for those at the Esk and Noosa WTP which have been attributed to clerical errors.

The lack of summarised water quality information and water quality projections did impact CH2M HILL's ability to identify the specific variances in chemical expenditure between these years and therefore the review has focused on Seqwater's justification for the changes related to Chemical cost variances. Under these circumstances and in the absence of any summarised water quality information for each WTP provided by Seqwater that would enable the establishment of a cost audit-trail on chemical expenditure, CH2M HILL has focused its analysis on the 2013-14 to 2014-15 variance and the basis for the escalations, with due consideration of the factors provided by Seqwater that might influence these chemical costs such as water quality characteristics, demand flow or chemical escalation. This decision has been taken because the variance in actual data presented is significant in nature and is above acceptable escalation factors unless water quality or a fundamental change in operation was a key driving factor for the change. CH2M HILL are satisfied in this instance that Seqwater have provided sufficient information to support the variances identified other than those attributed to clerical error or increased cost expenditure related to the Tugan desalination plant and AWTP's

The drivers for the variance of $534,502 in forecasted expenditure related to chemical expenditure are:

- 'Variable Chemical Costs' - forecast to increase by $557,757 in 2014-15
- 'Fixed Chemical Costs' – forecast to decrease by $132,586 in 2014-15.
- 'Contracted Desalination and AWTP Chemical Costs '– forecast to increase by $109,331 in 2014-15.

Given that levels of expenditure across the 'Fixed Chemical Costs' category are forecast to trend down slightly, CH2M HILL has not sought to undertake a detailed review of these cost categories as they relate to chemical costs.

An assessment of the efficiency of the identified 'Variable Chemical Costs' items and the 'Contracted - Tugan Desalination and AWTP Chemical Costs' is provided below.

'Variable Chemical Costs'

As outlined in Section 5.8.3, Alum, Hydrated Lime, Sodium Hypochlorite make up at least 74% of the variable chemical costs with the remaining chemicals (other chemicals) making up the remaining 26% of variable chemical costs, the total chemical cost increased by $557,757 in 2014-15 from 2013-14 levels. The major chemical cost items that drove the increase in cost are identified below:

- 521019 – Alum
- 521041 - Hydrated Lime
- 521084 - Sodium Hypochlorite and 521037 - Chlorine
- Chemical Other

An assessment of the efficiency of the above items is outlined as follows.

521019 – Alum

2013-14 Actual Expenditure equates to $4,853,845

2014-15 Forecast Expenditure equates to $4,599,978

A real reduction of $253,867 has been reported from 2013-14 to 2014-15 for cost item 521019 – Alum, and has been forecast for the remainder of forecast period (2015-16 to 2027-28). This variance equates to a 5.2% reduction in Alum costs and providing the water quality envelop is similar or slightly better than the water quality envelop experienced in 2013-14 then CH2M HILL considers the reduction to be reasonable as based on the 'Q1 narratives document' supplied by Seqwater the actual chemical prices for Alum increased by 6% so the 5.2% reduction shows some level of efficiency based on the previous year. It would be prudent of Seqwater however to review the water quality envelop for the WTP's identified with a variance of greater than ±10% to evaluate if there is an opportunity for further reductions or adjustments in Alum costs. At a high level no change to reported expenditure is recommended.

521041 - Hydrated Lime

2013-14 Actual Expenditure equates to $1,483,661

2014-15 Forecast Expenditure equates to $1,635,360

A real increase of $151,699 has been reported from 2013-14 to 2014-15 for cost item 521041 - Hydrated Lime, and has been forecast for the remainder of forecast period (2015-16 to 2027-28). This variance equates to a 10.2 % increase in Hydrated Lime costs and based on the additional information supplied by Seqwater this cost has been justified based on some design modifications being made at some existing plants and the increased use of Hydrated Lime due to this. It would be prudent however for Seqwater to further review the water quality envelop for the WTP's identified with a variance of greater than ±10% that are not impacted by design or water quality conditions to see if there is an opportunity for further reductions or efficiencies. At a high level no change to reported expenditure is recommended.

521084 - Sodium Hypochlorite and 521037 – Chlorine

2013-14 Actual Expenditure equates to $3,082,119

2014-15 Forecast Expenditure equates to $3,219,582

A real increase of $137,463 has been reported from 2013-14 to 2014-15 for cost item 521084 - Sodium Hypochlorite and 521037 – Chlorine, and has been forecast for the remainder of forecast period (2015-16 to 2027-28). This variance equates to a 4.5% increase in Sodium Hypochlorite or Chlorine costs and based on the additional information supplied by Seqwater CH2M HILL considers the increase to be reasonable. It would be prudent however to further review the water quality envelop for the WTP's identified with a variance of greater than ±10% to evaluate if there is an opportunity for further reductions or adjustments in Sodium Hypochlorite and Chlorine costs especially in light of the fact that the Sodium Hypochlorite costs at the Mount Crosby West Bank WTP have been reduced by 24% in the 2014-15 period. At a high level no change to reported expenditure is recommended.

Chemical Other

2013-14 Actual Expenditure equates to $ 2,686,585

2014-15 Forecast Expenditure equates to $ 3,209,047

A real increase of $522,462 has been reported from 2013-14 to 2014-15 for 'other chemicals', and has been forecast for the remainder of forecast period (2015-16 to 2027-28). CH2M HILL notes that this $522,462 is primarily driven by costs related to the following chemical variances:

- 521000 – Chemicals (-$75,358 - 99.7% Decrease)
- 521024 - Ammonia Anhydrous ($119,381 - 27.6% Increase)
- 521033 - Carbon Dioxide ($131,925- 30.5% Increase)
- 521048 - Polymer ($70,028- 20.0% Increase)
- 521072 - Potassium Permanganate ($31,809 - >300% Increase)
- 521079 - Sodium Fluorosilicate ($37,498- 10.8% Increase)
- 521080 - Sodium Hydroxide ($222,267- 76.8% Increase)

Based on additional information supplied by Seqwater CH2M Hill recommends that an adjustment of $180,956 be made to the total "Other Chemical" costs due to clerical errors. The additional increases reflected above have been justified by Seqwater thru additional information supplied and these relate to actual chemical cost increases or changes in plant operations attributed to design modifications and water quality conditions.

'Contracted Services - Tugan Desalination Plant and AWTP Chemical Costs'

Tugan Desalination Plant Chemical Costs

As outlined earlier in this section, chemical expenditure for the 2013/2014 period at the Tugan desalination plant was $367,656 with a total volume produced of 1860 ML equating to $197.66 per ML of water treated. For the forecasted 2014/2015 period the Tugan desalination plant is forecasted to produce a reduced volume of 1241 ML with an associated chemical cost of $552,323 equating to $445.06 per ML of water treated. This equates to an increase of $184,666 or an additional $247.40 per ML. Upon review of the additional

information supplied by Seqwater in relation to the chemical expenditure at the Tugan desalination plant, CH2M HILL recommend that $306,527 be reduced from the $552,323 to reflect the comparative reduction in flow demand and in keeping with the $197.66 per ML that this plant has efficiently operated at in 2013/14 year for chemical costs. There was insufficient information to justify a 50% increase in chemical costs at the Tugan Desalination plant.

AWTP Chemical Costs

For the 2014/2015 period the AWTP's are forecasted to be shutdown with one off chemical costs for chemical disposal equating to a total of $162,391. In evaluating the 2015/2016 forecasted period there was evidence that this chemical cost has been captured for all future years when in fact it should only be incurred in the 2014/2015 year when the plants are shutdown. CH2M HILL recommend that this cost be captured for the 2014-15 period but for all other future periods this cost should be reduced to zero.

5.6.8 Efficiency gains

During the course of the review, Seqwater has provided evidence of a number of operational efficiency initiatives. Seqwater have also noted in their submission that a Chemical Improvement Management plan is also under development, which defines a program of activities to drive efficiency across sourcing, contractual arrangements, stock management, and on site management.

Additionally, processes internal to each WTP are currently being optimised and standardised where possible to ensure:

- improved performance assessment and optimisation through technology advances (monitoring, control, decision support)
- operations modelling to determine peak efficiency – developed, available, clear and in use
- process optimisation to ensure that individual WTPs are running at optimal efficiency, reliability and at an appropriate level of risk by modelling individual plants against varying operating conditions to develop a range of operating scenarios and modes as well as identifying opportunities to optimise individual treatment plant processes on an ongoing basis, enhance process documentation and standardised across fleet where practical.

CH2H HILL expects that the efficiencies identified through these initiatives are not fully quantified or captured in the operating expenses actual costs and forecasts provided by Seqwater but without summarised water quality information it is difficult to ascertain if Seqwater are able to obtain short term efficiencies. It would be prudent in future reviews that an established baseline $ per ML be established for each WTP based on optimum performance and a stipulated water quality envelop so Seqwater can report both internally and externally against this metric as it will help better define the efficiencies that are being made in regards to chemical costs. Assessment of Prudency and Efficiency

5.6.9 Assessment of Prudency and Efficiency

CH2M HILL considers that Seqwater must continue to allocate an appropriate level of investment and resources into better defining and managing chemical costs to assist its ongoing sustainable operations and meet its regulatory and legislative requirements as a bulk water provider. It follows that CH2M HILL has assessed Seqwater's investment in chemical expenditure as prudent.

In the course of assessing actual and proposed expenditure on chemical expenditure, with the knowledge gained on future Seqwater business plans, CH2M HILL identified a range of inconsistencies that represent opportunities for efficiency improvement. These opportunities were primarily related to the gap between 2013-14 actual costs and 2014-15 cost forecasts for chemical cost items at an individual chemical level. Cost items where efficiencies were identified included:

- An unsubstantiated increase or decrease in chemical costs related to some individual plants from a $ per ML perspective
- Considerable reductions in chemical costs in a small portion of WTP's but not others (this could be related to water quality but the impact of this should be evident across the majority of WTP's)
- A significant increase in other chemical costs
- An unsubstantiated increase in some chemical costs related to the Tugan Desalination Plant
- Unexplained chemical costs in year 2016-2028 related to AWTP's

In summary, CH2M HILL considers Seqwater's forecast chemical costs to be prudent but inefficient.

5.6.10 Assessment of reported expenditure

Table 5-36 below depicts the adjustments that would apply based on the recommendations discussed in this section. These recommendations include the adjustment for the Tugan Desalination Chemical expenditure and the Chemical Expenditure for 'Other Chemicals' based on the additional information that was supplied by Seqwater to substantiate the variances in costs.

Table 5-36: *Chemicals* recommended operational expenditure (M 2014)

Operational Expenditure Profile	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Total Forecast
Seqwater Forecast Expenditure	$13.84	$14.43	$14.94	$15.50	$16.05	$16.33	$16.53	$16.77	$17.10	$17.30	$17.52	$17.79	$18.06	$18.37	$230.45
Proposed Adjustment	-$0.65	-$0.66	-$0.67	-$0.68	-$0.68	-$0.69	-$0.69	-$0.69	-$0.70	-$0.70	-$0.70	-$0.71	-$0.71	-$0.72	-$9.64
CH2M HILL Recommended Expenditure Profile	$13.19	$13.77	$14.28	$14.82	$15.36	$15.64	$15.84	$16.08	$16.32	$16.60	$16.82	$17.08	$17.35	$17.66	$220.80

5.7 Other Materials and Services

5.7.1 Overview of expenditure

Other Materials and Services relate to a large and diverse range of cost items, including uniforms and protective items, materials and consumables, survey equipment, security, cleaning and software licenses. A summary overview of Seqwater's actual Other Materials and Services costs for 2012-13 and 2013-14 and forecast costs for 2014-15 is outlined in Table 5-38. Actual Other Materials and Services costs in 2013-14 were $45.044 million, and are forecast to decrease slightly to $44.451 million.

CH2M HILL notes that a significant proportion of Other Materials and Services expenses relates to corporate activities. Based on a review of Seqwater's operational expenditure, CH2M HILL has not been able to fully reconcile Other Materials and Services expenditure in 2013-14. Information provided by Seqwater notes that corporate-related Other Materials and Services expenses accounted for $25.042 million in 2013-14, while non-corporate Other Materials and Services were $20.309 (for a total of $45.351. While CH2M HILL has not been able to reconcile the difference of $0.307 million in 2013-14 reported expenditure, however, it is deemed to be immaterial for the purposes of the Review. CH2M HILL was able to reconcile forecast expenditure in 2014-15.

Total operating expenditure presented in Table 5-37 excludes accounting costs such as interest expense, depreciation and amortisation.

Table 5-37: Summary of Seqwater Other Materials and Services expenditure, 2012-13 to 2014-15 ($M, real 2014)

Component	2012-13 Actual	2013-14 Actual	2014-15 Forecast
Total Other Materials and Services	49.236	45.044	44.451
Total Other Materials and Services excl. Corporate Costs	23.332	20.309	13.608
Total Seqwater operating expenses[1]	268.522	238.596	248.145
Proportion of total operating expenditure	18.3%	18.9%	17.9%
Proportion of total operating expenditure (excl. Corporate Costs)	8.7%	8.5%	5.5%
Annual change		-8.5%	-1.3%
Annual change (excl. Corporate Costs)		-13.0%	-33.0%

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xlsx
Notes: 1 – Excludes interest expense and other accounting expenses such as depreciation and amortisation.

In real terms, Seqwater's total Other Materials and Services costs decreased by 8.5 percent from 2012-13 to 2013-14, and a forecast to slightly decrease by a further 1.3 percent in 2014-15. Non-corporate Other Materials and Services expenses have trended down more significantly, decreasing by 13 percent from 2013-14 to 2013-14, and a forecast to fall significantly by a further 33 percent, or $6.702 million, in 2014-15.

As a proportion of overall operation expenditure (excluding interest costs to QTC and accounting costs such as depreciation and amortisation), total Other Materials and Services costs are remaining relatively constant at approximately 18 percent. However, non-corporate Other Materials and Services costs are forecast to decrease significantly as a proportion of total operating expenditure, from 8.7 percent in 2012-13 to 5.5 percent in 2014-15.

A further breakdown of Seqwater's actual and forecast Other Materials and Services costs by business group for the period from 2012-13 to 2014-15 is outlined in Table 5-38 . Seqwater's costs are largely driven by the Operations – Treated Water business group accounted for approximately 48 percent of expenditure in 2012-13, 52 percent in 2013-14 and is forecast to account for around 57 percent in 2014-15. The Corporate Finance group is the next most significant source of expenditure.

Table 5-38: Other Materials and Services costs by business group, 2012-13 to 2014-15 ($M, real 2014)

Business Group	2012-13	2013-14	2014-15
Asset Portfolio Development & Delivery	2.542	1.193	0.779
Office of the CEO	1.698	0.289	1.309
Corporate Finance	11.303	8.526	11.127
General Counsel	9.462	9.008	9.504
OPS – Catchment and Raw Water	3.068	3.049	1.728
OPS - Treated Water	11.366	10.511	7.807
Service, People & Technology	9.538	10.700	11.311
Water Supply, Strategy and Policy	0.259	1.768	0.886
TOTAL CORPORATE COSTS	**49.236**	**45.044**	**44.451**

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xlsx

5.7.2 Documentation provided

Documentation reviewed in respect of the *Other Materials and Services* included:

- Seqwater, Seqwater Bulk Water Prices 2015 to 2018 Submission to the Queensland Competition Authority, July 2014
- Seqwater, OPEX model 2014-09-25 Q1 FY15 revised.xlsm, September 2014
- Seqwater, Seqwater opex data 26-9-14 consolidated.xlsx, September 2014
- Capex Opex Explanation.xlsx, October 2014
- CH2M Accounting Data in Response to Queries.xlsx, October 2014
- Legal.doc, October 2014
- Operating cost actions – Brand.doc, October 2014
- ICT response – consultancy, October 2014
- ICT cost summary updated.xlsx, October 2014
- ICT Overview consolidated, October 2014.

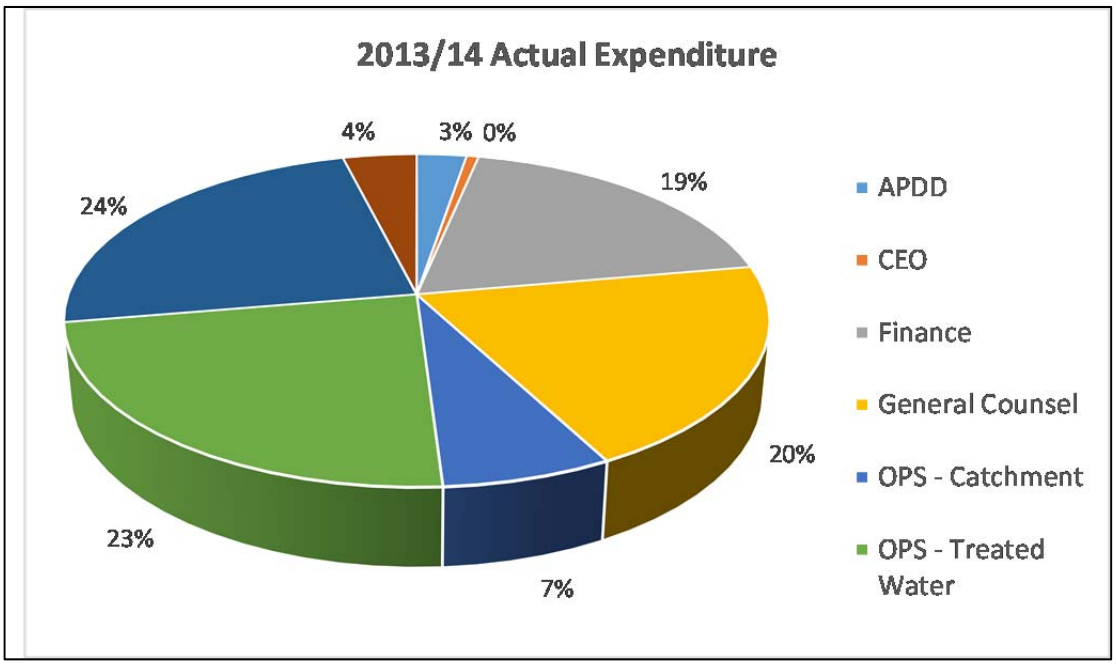
5.7.3 Drivers

The primary drivers for expenditure in Other Materials and Services are:

- Regulatory and legal obligations in relation to the supply of bulk water services
- Growth in demand, and the subsequent increase in sludge collection, transportation and disposal requirements
- Ongoing operations and maintenance of existing infrastructure.

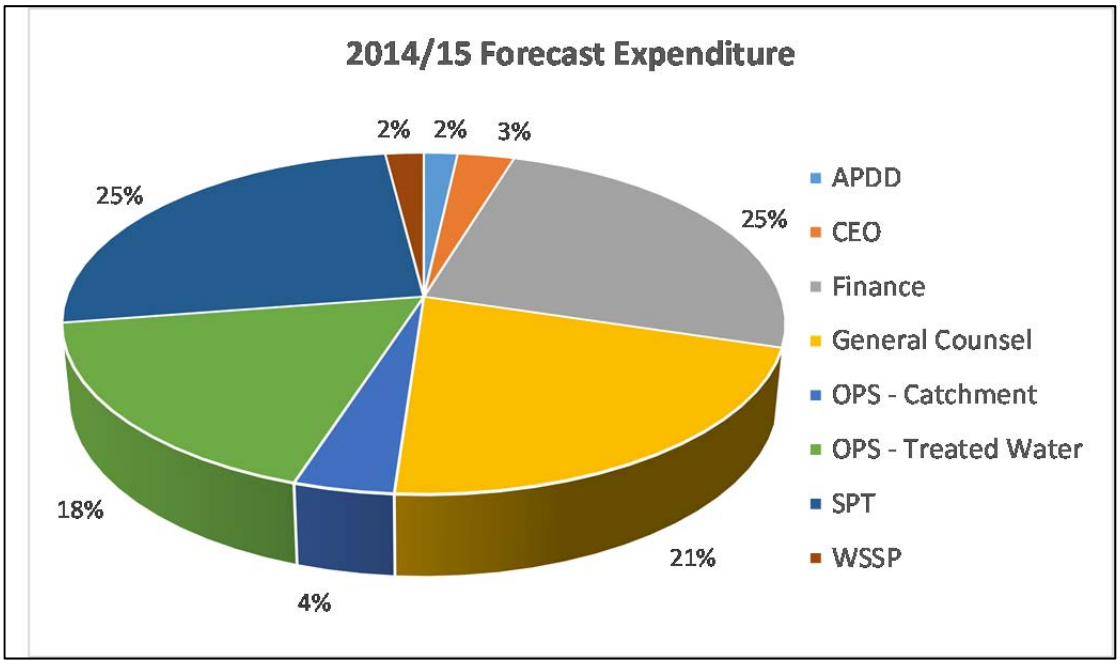
As outlined above, Other Materials and Services costs are forecast to decrease slightly to $44.451 million in 2014-15 from $45.044 million in 2013-14. While total Other Materials and Services costs are forecast to remain relatively constant, where expenditure is being incurred within Seqwater is change. Figure 5-22 and Figure 5-23 outline the proportion of expenditure incurred, or forecast to be incurred, by each Business Group for 2013-14 and 2014-15, respectively. As can be seen, Corporate Finance and Service, People and Technology account for approximately 50 percent of Other Materials and Services expenditure in 2014-15, up from a combined 43 percent. In contrast, the proportion of expenditure attributed to Operations – Treated Water is forecast to decrease from 23 percent to approximately 18 percent.

Figure 5-22: Other Materials and Services expenditure by Business Group – Actual 2013/14



Source: CH2M HILL analysis of Opex model 2014-09-25 Q1 FY15 revised.xlsm

Figure 5-23: Other Materials and Services expenditure by Business Group – Forecast 2014/15



Source: CH2M HILL analysis of Opex model 2014-09-25 Q1 FY15 revised.xlsm

5.7.4 Unit rates

CH2M HILL has not been provided with any information on actual contract labour other than the individual cost records, therefore specific unit rates like hourly rate cannot be established.

To inform the assessment of Seqwater's forecast Other Materials and Services costs, CH2M HILL has reviewed those costs at a macro level. A summary of this review is outlined in Table 5-39 below. It should be noted that the following analysis excludes corporate-related activities.

Table 5-39: Other Materials and Services against measures of service provision (real 2014)

	2012-13 Actual	2013-14 Actual	2014-15 Forecast
Total Other Materials and Services ($M)	49.236	45.044	44.451
Total Operating Expenses ($M)	268.522	238.596	248.145
Demand (ML)	282431	298003	297384
Water Sales Revenue ($M)[1]	709.862	686.708	777.077
Other Materials and Services / Total Opex (%)	18.3%	18.9%	17.9%
Other Materials and Services per ML ($)	174.3	151.2	149.5
Other Materials and Services per $ of Water Revenue	0.069	0.066	0.057

Sources: CH2M HILL analysis of Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xlsx, Seqwater 2012-13 Annual Report, and Seqwater 2013-14 Annual Report.
Note: 1 – Excludes irrigation, CSO and grant, lease, interest and other source of non-water revenue

Observations from the above review are summarised as follows:

- Other Materials and Services / Total Opex (%) – as noted above, Other Materials and Services as a proportion of total operating expenditure are trending downwards slightly over the period and are forecast to reach to 17.9 percent of total operating expenditure in 2014-15
- Other Materials and Services per ML ($) – the ratio of Other Materials and Services to volume of bulk water delivered is forecast to decrease to $149.5 per ML in 2014-15, representing a significant decrease from 2012-13
- Other Materials and Services per $ of Water Revenue – the ratio of Other Materials and Services against water sales revenue is forecast to decrease from $0.069 per dollar of revenue in 2012-13 to $0.057 in 2014-15.

Overall, based on a review of Other Materials and Services levels against the above measures of service provision, Seqwater is forecast to incur less costs per unit of service delivery in 2014-15 over 2013-14 levels. That is, Other Materials and Services as ratio of total operating expenditure, bulk water delivery and revenue are all trending downwards. Recognising that demand in bulk water is projected to increase over the forecast period, this may suggest that Seqwater is becoming more efficient.

5.7.5 Escalation factors

In developing its expenditure forecasts for Other Materials and Services, Seqwater has applied the escalation factors outlined in Table 5-40.

Table 5-40: Proposed escalation factors for Other Materials and Services

Year	2013-14	2014-15	2015-16	2016-17	2017-18 to 2027-28
Rate (nominal)	3.00%	3.00%	2.50%	2.50%	2.50%

Source: Seqwater Bulk Water Prices 2015 to 2018 - Submission to QCA, p. 118.

As noted above, Seqwater engaged PwC to analyse historical price movements and other relevant information and recommend escalation factors to be applied for the purposes of its 2015-2018 Submission. With respect to Other Materials and Services, Seqwater has adopted PwC's recommendation of escalating its costs in line with general inflation using the Consumer Price Index (CPI).

A review of the appropriateness of Seqwater's approach and its proposed escalation factors in relation to Other Materials and Services is presented below.

Review of regulatory precedent in South East Queensland

A review of recent price monitoring reviews undertaken by the QCA indicate that water businesses in South East Queensland have generally elected to use the expected growth in CPI as the escalation factor for 'other materials and services'. Given the heterogeneous nature of this expenditure category, and in the absence of a specific industry index, the QCA has accepted this approach while typically noting that such costs are primarily generated by administrative and management functions.

As such, CH2M HILL considers that Seqwater's proposed approach to escalate Other Materials and Services in line with general inflation, as estimated by CPI, is appropriate.

Review of general inflation forecasts

Consistent with its approach to escalating Chemical costs, Seqwater's proposed escalation factors for Other Materials and Services costs are based on general inflation estimates published by the RBA in its *Statement on Monetary Policy* (May 2014). The RBA had estimated CPI for the year ending June 2015 to grow at between 2.5 and 3.5 percent, with Seqwater adopting the mid-point of the RBA's estimate (i.e. 3.0 percent) for the purposes of an escalation factor. For all remaining years in the forecast period (2015-16 to 2027-28), the mid-point of the RBA inflation target (2 to 3 per cent) has been applied. At the time of is 2015-18 Submission, CH2M HILL confirms that the RBA's CPI estimates have been consistently and accurately applied by Seqwater.

However, as noted in CH2M HILL's review of Seqwater's proposed escalation factors for chemicals above, the RBA has subsequently released updated estimates in which it is estimated that CPI for the year ending June 2015 will grow at between 1.75 and 2.75 percent updated (a mid-point of 2.25 percent).[16] The major causes for the decrease in forecast inflation are the below-trend growth in the economy in the near term and low growth of domestic costs, combined with the abolition of the carbon price.[17] For 2015-16, the RBA has forecast inflation to increase to between 2.5 and 3.5 percent (mid-point of 3.0 percent). This compares to the 2.5 percent adopted by Seqwater in its 2015-18 Submission.

Based on a review of updated inflation estimates published by the RBA, CH2M HILL recommends adjusting Seqwater's proposed Other Materials and Services escalation factors for 2014-15 and 2015-16 in line with the mid-point of the RBA's latest forecasts for inflation. Given the level in uncertainty of inflation over the remaining forecast period, CH2M HILL considers Seqwater's proposed approach to adopt the mid-point of the RBA inflation target (2 to 3 percent) appropriate.

[16] RBA, 2014. *Statement of Monetary Policy (August 2014)*, p.71.

[17] The RBA's forecasts are based on modelling used by the Commonwealth's Department of Treasury which suggests that the removal of the carbon price would reduce CPI by 0.75 percent over 2014-15. The RBA notes that this effect is similar in size to the upward influence on inflation that was expected to result from the introduction of the carbon price in 2012-13. See: http://www.rba.gov.au/publications/smp/2014/aug/pdf/0814.pdf

Summary findings

CH2M HILL considers that Seqwater's proposed approach to escalate Other Materials and Services costs in line with general inflation is appropriate. However, CH2M HILL recommends adjusting Seqwater's proposed escalation factors for 2014-15 and 2015-16 in line with the mid-point of the RBA's latest forecasts for inflation, as published in the latest *Statement on Monetary Policy* (August 2014). CH2M HILL considers Seqwater's proposed approach to adopt the mid-point of the RBA inflation target (2 to 3 per cent) over the remainder of the forecast period to be appropriate.

Based on the above analysis, CH2M HILL recommends that Seqwater's Other Materials and Services costs be escalated based on the factors outlined in Table 5-41.

Table 5-41: Recommended escalation factors for Other Materials and Services costs

Year	2013-14	2014-15	2015-16	2016-17	2017-18 to 2027-28
Seqwater proposed rate	3.00%	3.00%	2.50%	2.50%	2.50%
CH2M HILL recommended rate	3.00%	2.25%	3.00%	2.50%	2.50%
Difference	-	-0.75%	0.50%	-	-

Note: The above rates are in expressed in nominal terms.

5.7.6 Prudency

The expenditure category Other Materials and Services is typically used as a broad 'catch all' for expenditures that do not meet the criteria for other expenditure categories. For Seqwater, this includes expenses relating to uniforms and protective items, materials and consumables, survey equipment, security, cleaning and plant-specific software licenses. Overall, expenditure in this category predominantly relates to operations and maintenance activities.

CH2M HILL considers that expenditure relating to this category is necessary to support Seqwater's ongoing sustainable operations and meet its regulatory and legislative requirements as a bulk water provider. CH2M HILL, therefore, considers Seqwater's continued investment in Other Materials and Services to be prudent.

5.7.7 Efficiency

As noted in earlier sections of this report, there has been an observed lack of reporting continuity between 2013-14 Actual figures provided with those provided for the 2014-15 forecast. This lack of reporting continuity has impacted CH2M HILL's ability to identify the changes in specific costs between these years and therefore any opportunities for cost savings. As such, CH2M HILL has focused its analysis on the 2013-14 actual costs, with due consideration of the factors that might influence these costs from 2013-14 to 2014-15. This decision has been taken because the 2013-14 year data is at a level of disaggregation that enables a more detailed cost assessment.

A review of 'Other Materials and Services' cost items indicates there are specific items that are forecast to increase significantly in 2014-15. Given the diverse nature of 'Other Materials

and Services' expenditure items, to ensure only those cost codes with a material impact were considered CH2M HILL identified and assessed cost codes with over $200,000 expenditure forecast for the 2014/15 year with a positive variance of over $100,000 from 2013/14. These specific cost items are identified in below.

Table 5-42: Other Materials and Services - major sources of cost growth 2014-15 ($, real 2014)

Cost Item	2013-14	2014-15	Change ($)
515302 - Training	38,782	301,674	262,892
521301 - WTP Residuals Disposal (Variable)	2,111,348	2,610,377	499,029
522002 - Safety	90,687	512,711	422,023
522100 - Prop - Rent Expense	2,794,751	3,811,920	1,017,170
522109 - Prop - Property Management	107,942	266,971	159,029
522118 - Local Gov Rates	390,340	2,252,023	1,861,684
522341 - ICT-Hardware Support & Maint	259,576	478,055	218,480
522366 - Legal Exp-Real Estate & Comm PropertyLaw	99,982	212,988	113,006
522367 - Legal Exp-Gen Corporate & Commercial Law	1,008,653	1,681,121	672,468
522381 - Sundry Expenses	98,342	459,462	361,120
522396 - Marketing and Advertising	233,183	1,151,299	918,117
522511 - WTP - Potable Water Expenses	165,358	348,273	182,915
522712 - PA-GPS / PDA	0	282,886	282,886
522901 - Plant & Fleet Hire - Internal	5,669	1,008,004	1,002,335
541110 - FLT-Motor Vehicle Registration	153,043	212,362	59,319
541104 - QCA Fees	0	639,061	639,061
TOTAL	**7,557,655**	**16,229,188**	**8,671,533**

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xlsx

Cost items identified in Table 5-42 above contribute approximately $8.672 million in increased expenditure in 2014-15.

CH2M HILL has undertaken an assessment of the efficiency of individual cost items identified in Table 5-42. Where expenditure against individual cost items has been deemed inefficient, as assessment is outlined below. Items that have not been reported against have been assessed as efficient based on the level of supporting documentation and substantiation provided by Seqwater. CH2M HILL has also identified significant gross expenditure increases reported by Seqwater as 'Overrides'. An assessment of the efficiency of these increases is also provided below.

Specific cost item adjustments

ICT – Hardware Support and Maint

A real increase of $218,480 (or 84 percent) has been reported from 2013-14 to 2014-15 for cost item *522341 – ICT – Hardware Support and Maint*, and has been forecast for the remainder of forecast period.

As noted above, CH2M HILL understands that Seqwater plans to implement new systems under a SaaS arrangement, in accordance with current Queensland Government views on best practice. A key driver for implementing SaaS is to reduce IT support costs and the need for consultancy services by outsourcing hardware and software maintenance and support to the SaaS provider. Seqwater has noted that the ICT hardware costs should, in reality, reduce overtime as it transitions to the SaaS platform.

Recognising the need to support the implementation the SaaS arrangement with any required hardware support in the short term, CH2M HILL recommends maintaining 2014-15 expenditure as reported, and then reducing annual expenditure over time as advised by Seqwater.

Legal Exp – Real Estate & Comm Property Law

The cost item *522366 – Legal Exp – Real Estate & Comm Property Law* is forecast to increase from $99,982 in 2013-14 to $212,988 in 2014-15 and remain at this level for the remainder of the forecast period. CH2M HILL understands that the increase in expenditure in 2014-15 (approximately $113,000) is for contract staff to cover maternity leave arrangements which are not anticipated to extend beyond the current financial year.. CH2M HILL recommends maintaining 2014-15 expenditure as reported to address maternity leave requirements, and then reducing annual expenditure over the remainder of the forecast period to actual 2013-14 levels.

Legal Exp – Gen Corporate & Commercial Law

The cost item *522367 – Legal Exp – Gen Corporate & Commercial Law* is forecast to increase from $1.008 million in 2013-14 to $1.681 million in 2014-15 and remain at this level for the remainder of the forecast period.

Seqwater has noted that the forecast increase in expenditure is predominantly due to legal expenses related to ongoing legal activities that are not reimbursable under current insurance arrangements. However, this is inconsistent with previous advice that Seqwater has provided CH2M HILL during the course of the Review. Despite the inconsistent information provided by Seqwater, CH2M HILL recommends maintaining forecast expenditure until 2017-18 (the final year of the current price path). However, given the uncertainty over the medium term with respect to existing legal activities, CH2M HILL recommends reducing annual expenditure to 2013-14 levels over the remainder of the forecast period (i.e. from 2018-19 to 2027-28).

PA – GPS/PDA

The cost item *522712 – PA – GPS/PDA* is forecast to be $282,886 in 2014-15 and remain at this level for the remainder of the forecast period. No expenditure was reported against this item in 2013-14. Seqwater has indicated that this expenditure relates to the purchase and installation of remote (GPS) monitoring units in all Seqwater fleet vehicles under an operating expenditure model whereby the hardware will be owned after a period of three years. It is recognised that such expenditure will assist Seqwater manage its fleet more efficiently,

however, CH2M HILL notes that no justification or substantiation for ongoing annual expenditure of $282,886 beyond 2016-17 has been provided by Seqwater.

CH2M HILL recommends maintaining expenditure as reported for the three years from 2014-15 to 2016-17, and then removing all expenditure from 2017-18 onwards.

QCA Fees

Seqwater has included an annual allowance of $639,061 for cost item *541104 – QCA Fees* to address regulatory fees charged directly by the QCA. While it is noted that this allowance is consistent with fees charged by the QCA to Seqwater, CH2M HILL understands that the QCA fees for Seqwater are only levied two out of every three years. CH2M HILL recommends removing the allowance of $639,061 in every third year of the forecast period, commencing in 2016-17.

Seqwater Override Adjustments

Seqwater has identified a number of 'Override' expenditure adjustments in the forecast figures. These increases have been applied on a Business Unit and cost category basis. In contrast to specific cost items identified above, these increases have been reported at a gross business group level against the Other Materials and Services cost escalation category. Override increases relating to Other Materials and Services are outlined in Table 5-43 below.

Table 5-43: Seqwater Override increases in Other Materials and Services cost

Business Group	Detail
OPS - Treated Water – Other Materials and Services	A fixed increase of $4.100 million forecast from 2019-20 onwards for the remainder of the period. Seqwater notes this increase relates to additional sludge disposal requirements at Mt Crosby and North Pine WTPs.
Service, People & Technology – Other Materials and Services	A fixed increase of $583,465 forecast from 2016-17 to the end of the forecast period. Seqwater notes that this is due to pro-rata IT costs being applied from 2016-17 onwards.
Water Supply, Strategy and Policy – Other Materials and Services	A $1.250 million cost item occurring every third year for QCA regulatory reviews.

Source: Opex model 2014-09-25 Q1 FY15 revised.xlsm

An assessment of the efficiency of the proposed 'Override' adjustments related to Other Materials and Services is provided below.

Operations – Treated Water – Other Materials and Services

Seqwater has reported an increase in forecast expenditure for *Operations – Treated Water – Other Materials and Services* of $4.100 million from 2019-20. In explaining this increase, Seqwater has stated:[18]

> *"It is anticipated sludge to landfill at these sites will approximately double current sludge disposal costs for Seqwater beyond 2020 (forecast at an additional $4M in FY20). New sludge processing equipment will increase the efficiency of truck loading and optimise loads, however these improvements*

[18] *Seqwater Bulk Water Prices 2015-18 – Submission to the QCA, p.189..*

will only partly mitigate the ongoing cost increase. The scope of increased costs will be better known and included in the FY18 review."

This is a significant increase in proposed expenditure, equating to approximately $37.495 million over the remainder of the forecast period. Consistent with good practice, CH2M HILL would expect such an increase in recurrent expenditure to be supported by an appropriately detailed business case and options assessment to identify the most efficient whole-of-life-cost option to manage sludge disposal at the site, as would be required for a capital expenditure project of this size. No substantiation or evidence of how the cost estimates have been derived has been provided by Seqwater in relation to this increase in expenditure. It is also noted that Seqwater is seeking to review this item as part of the 2018 review. As such, CH2M HILL considers this cost to be inefficient and recommends removing $4.100 million in annual expenditure from Seqwater forecasts from 2019-20 onwards.

Service, People & Technology – Other Materials and Services

Seqwater has proposed an increase in expenditure for *Service, People & Technology – Other Materials and Services* of $$583,465 for pro-rata IT costs based on the 2014-15 budget.

As noted above, Seqwater has provided some detail on proposed IT cost allocations in the form of an overview document and spreadsheet, however, neither document provides any robust detail on either the source of, business case for or approval of the "Budget Option 3 – Comply to QLD Got and Increase ICT Capability" cost scenario presented. Furthermore, the spreadsheet provided employs a cost apportioning approach based on Actual 2013-14 figures that has computational errors.

Given the lack of substantiation or evidence provided by Seqwater in relation to this increase in expenditure, CH2M HILL considers this cost to be inefficient and recommends removing $583,465 in annual expenditure from Seqwater forecasts from 2016-17 onwards.

Water Supply, Strategy and Policy – Other Materials and Services

Seqwater has reported a cost expenditure item of $1.250 million occurring every third year *Water Supply, Strategy and Policy – Other Materials and Services* for QCA regulatory fees.

As noted above, Seqwater has already made an allowance for QCA fees in its forecast operating expenditure under a specific cost item (*541104 – QCA Fees*). As such, CH2M HILL considers the inclusion of $1.250 million at reported intervals as 'double counting' and as such considers this cost to be inefficient and recommends its removal.

5.7.8 Efficiency gains

During the course of the review, Seqwater has provided evidence of a number of operational efficiency initiatives. With respect to Other Materials and Services, Seqwater has identified a range of business group level efficiency savings that it has quantified and captured in its forecast operating expenditure estimates. These are outlined in Table 5-44 below.

Table 5-44: Seqwater Override efficiency savings identified for Other Materials and Services

Business Group	Detail
Office of CEO – Other Materials and Services	A $250,000 annual reduction from 2015-16 from the allocation for class action communication support.
Finance – Other Materials and Services	A reduction in $4.2 million per annum from 2020-21 due to the Moreton Bay Outcome Charge – a legacy payment to Unitywater regarding the supply of recycled water from the Murumba Downs AWTP. This payment finishes in June 2020.
General Counsel – Other Materials and Services	An annual reduction of $975,000 due to an annual reduction of $575,000 from a reduction in 2011 Floods Class Action costs, and a $400,000 reduction due to the completion of the major framework projects.
Service, People & Technology – Other Materials and Services	A $750,000 annual reduction from 2019-20 in Brand and Community campaign investment spend, reducing to $250,000 per annum, to maintain awareness of dam public safety and related campaign messages.

Source: Opex model 2014-09-25 Q1 FY15 revised.xlsm

CH2M HILL considers the efficiency savings identified by Seqwater to be prudent and efficient and recommends that they be accepted by the QCA.

5.7.9 Assessment of Prudency and Efficiency

CH2M HILL considers that Seqwater must continue to allocate an appropriate level of investment in its Other Materials and Services activities, particularly with respect to minor operations and maintenance activities, to assist its ongoing sustainable operations and meet its regulatory and legislative requirements as a bulk water provider. It follows that CH2M HILL has assessed Seqwater's investment in Other Materials and Services as prudent.

In the course of assessing actual and proposed expenditure on corporate activities, with the knowledge gained on future Seqwater business plans, CH2M HILL identified a range of inconsistencies that represent opportunities for efficiency improvement. These opportunities were primarily related to the gap between 2013-14 actual costs and 2014-15 cost forecasts for some corporate cost items. Specific cost items where efficiencies were identified included:

- An increase in ICT hardware support and maintenance expense that is inconsistent with Seqwater's reported move to a SaaS platform
- An unsubstantiated increase in legal expenses related to real estate and commercial property law
- An unsubstantiated ongoing increase in general corporate and commercial legal expenses
- An unsupported ongoing increase in expenditure on GPS and PDA units

- The inclusion of an annual allowance for QCA fees when fees are only levied for two out every three years by the QCA.

With respect to a review of Seqwater Override Adjustments, CH2M HILL identified a lack of appropriate documentation and supporting evidence to justify the proposed expenditure. In particular, no evidence of business cases or options assessments or similar form of substantiation has been provided to demonstrate the efficiency of the proposed expenditure. Override cost items where inefficiencies were identified included:

- An unsubstantiated increase in *Operations – Treated Water – Other Materials and Services*
- An unsubstantiated increase in *Service, People & Technology – Other Materials and Services*
- The inclusion of 'double-counted' expenditure for *Water Supply, Strategy and Policy – Other Materials and Services*.

In summary, CH2M HILL considers Seqwater's forecast Other Materials and Services costs to be prudent but inefficient.

5.7.10 Assessment of Reported Expenditure

As a result of the assessment outlined above, CH2M HILL has identified adjustments to Other Materials and Services. Table 5-45 below identifies the recommended operational expenditure for Seqwater's forecast Other Materials and Services expenditure.

Table 5-45: *Other Materials and Services* recommended adjustments to operational expenditure (M, real 2014)

Operational Expenditure Profile	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Total Forecast
Seqwater Forecast Expenditure	$44.45	$43.27	$43.87	$45.16	$43.94	$48.09	$44.42	$43.81	$43.26	$44.56	$43.34	$43.39	$44.68	$43.48	$ 619.71
Other Materials and Services – Seqwater Overrides	-	-	-$0.58	-$1.83	-$0.58	-$4.68	-$5.93	-$5.28	-$4.68	-$5.93	-$4.68	-$4.68	-$5.93	-$4.68	-$ 49.50
Proposed Adjustment – CH2M HILL Review	-	-$0.22	-$0.91	-$0.67	-$1.34	-$1.98	-$1.44	-$1.48	-$2.18	-$1.54	-$1.54	-$2.18	-$1.54	-$1.54	-$ 18.55
Total Adjustment	-	-$0.22	-$1.50	-$2.51	-$1.92	-$6.66	-$7.37	-$6.76	-$6.86	-$7.47	-$6.22	-$6.86	-$7.47	-$6.22	-$ 68.05
CH2M HILL Recommended Expenditure Profile	**$44.45**	**$43.04**	**$42.38**	**$42.65**	**$42.02**	**$41.43**	**$37.05**	**$37.05**	**$36.40**	**$37.08**	**$37.12**	**$36.53**	**$37.21**	**$37.26**	**$ 551.66**

Note: Forecast expenditures have not been presented, as the approach taken to applying overrides at the Escalation Class level impacts reconciliation of figures at any level lower and can therefore be misleading.

5.8 Corporate costs

5.8.1 Overview of expenditure

The section outlines CH2M HILL's analysis of Seqwater's actual and forecast annual corporate costs and assessment of the prudency and efficiency these costs, including recommendations on potential efficiency savings.

Corporate costs relate to those general corporate expenditure items that cannot be reasonably allocated to other cost types, and includes items such as:

- General management and board costs
- Legal counsel
- Human resource management
- Risk management
- Insurance management
- Environment management
- Property management
- Financial management
- Costs incurred by the corporate office.

With respect to the allocation of corporate costs, Seqwater has advised the operating expenditure that cannot be readily be allocated or attributed to a specific site is categorised as corporate costs. Seqwater does not disaggregate corporate costs between regulated and non-regulated activities. All cost estimates presented in this section are in real 2014 terms.

A summary overview of Seqwater's actual corporate costs for 2012-13 and 2013-14 and forecast costs for 2014-15 is outlined in Table 5-47. CH2M HILL has not presented forecast corporate costs beyond 2014-15 as all costs have been forecast by Seqwater to remain constant at $60.951 million per annum over the forecast regulatory period from 2014-15 to 2027-28 in real terms ($2014). Total corporate costs presented in Table 5-46 exclude accounting costs such as interest expense and total operating expenditure excludes accounting costs such as depreciation expense and amortisation.

Table 5-46: Summary of Seqwater corporate costs 2012-13 to 2014-15 ($M, real 2014)

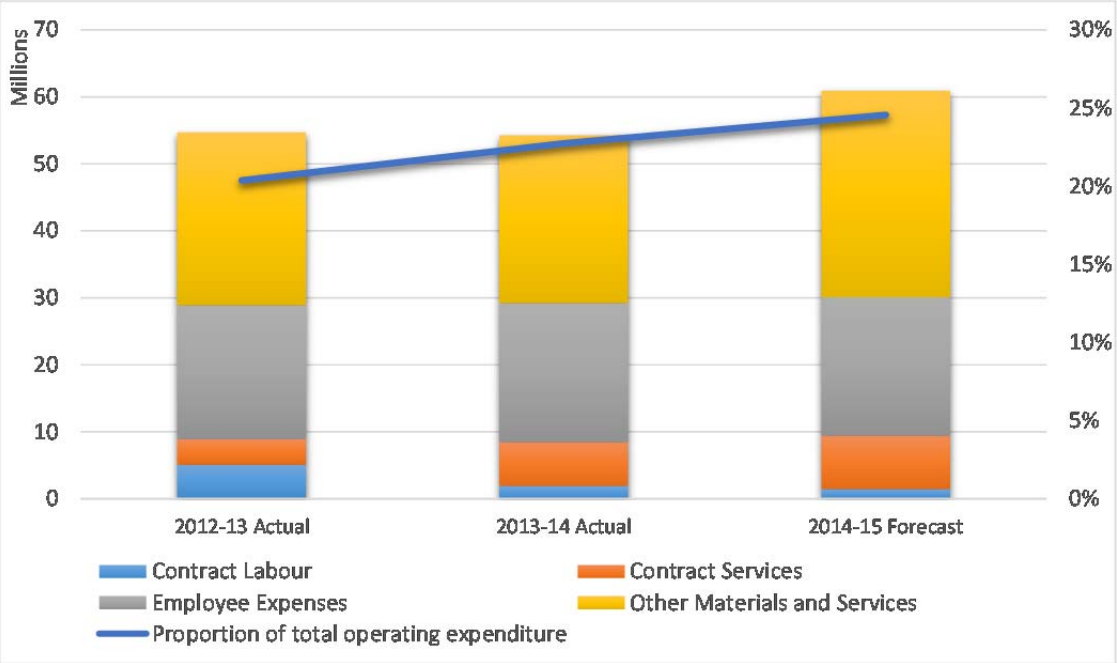
Component	2012-13 Actual	2013-14 Actual	2014-15 Forecast
Total corporate costs excluding interest expense	54.703	54.273	60.951
Total Seqwater operating expenses[1]	268.522	238.596	248.145
Proportion of total operating expenditure	20.37%	22.75%	24.56%
Annual change		-0.79%	12.30%

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xlsx
Notes: 1 – Excludes interest expense and other accounting expenses such as depreciation and amortisation.

In real terms, Seqwater's corporate costs were largely unchanged from 2012-13 to 2013-14, reducing marginally by 0.79 percent in real terms. However, corporate costs are forecast to increase by approximately 12 percent in 2014-15, or approximately $6.667 million. Significantly, corporate costs are increasing as a proportion of total operating expenditure (excluding interest costs to QTC and accounting costs such as depreciation and amortisation) over the period from 2012-13 to 2-14-15. Corporate costs are forecast to increase from 20.37 percent of total operating expenditure in 2012-13 to 24.56 percent in 2014-15.

A breakdown of Seqwater's actual and forecast corporate costs by cost category over the period from 2012-13 to 2014-15 is provided in Figure 5-24. The proportion of corporate costs against total operating expenditure is also shown.

Figure 5-24: Seqwater corporate costs by cost categories, 2012-13 to 2014-15 ($M, real 2014)



Across the three year period, the primary source of corporate cost within Seqwater is 'Other Materials and Services' expenditure, with 'Employee Expenses' as the other significant driver.

A further breakdown of Seqwater's actual and forecast corporate costs by business group for the period from 2012-13 to 2014-15 is outlined in Table 5-47. Seqwater's corporate costs are largely driven by the three Business Groups of Service, People and Technology, General Counsel and Finance which collectively combine for between approximately 87 percent and 95 percent of costs over the 2012-13 to 2014-15 periods, respectively.

Table 5-47: Seqwater corporate costs by business group, 2012-13 to 2014-15 ($M, real 2014)

Business Group	2012-13	2013-14	2014-15
Asset Portfolio Development & Delivery	0.905	0.010	0.039
Office of the CEO	4.459	2.253	4.744
Corporate Finance	14.236	11.762	15.420
General Counsel	12.040	12.459	13.452
OPS – Catchment and Raw Water	0.180	0.001	0.000
OPS - Treated Water	0.684	-0.013	0.000
Service, People & Technology	21.334	27.127	26.533
Water Supply, Strategy and Policy	0.865	0.676	0.763
TOTAL CORPORATE COSTS	**54.703**	**54.273**	**60.951**

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xlsx

A more detailed analysis of Seqwater's corporate costs is provided in the following sections.

5.8.2 Documentation provided

Documentation reviewed in respect of the *Corporate Costs* included:

- Seqwater, 07.4 A - Analysis of Fixed Operating Expenses - Board Meeting March 2014
- Seqwater, Seqwater Bulk Water Prices 2015 to 2018 Submission to the Queensland Competition Authority, July 2014
- Seqwater, OPEX model 2014-09-25 Q1 FY15 revised.xlsm, September 2014
- Seqwater, Seqwater opex data 26-9-14 consolidated.xlsx, September 2014

5.8.3 Drivers

This section identifies and describes the drivers for increases corporate costs in 2014-15 from 2013-14 and 2012-13 levels. In particular, consideration is given to whether increases in expenditure are being driven by legal obligations, growth requirements, increases in levels of service or investments in systems that will drive greater business efficiency going forward.

Seqwater has reported an increase in forecast corporate costs of $6.677 million in 2014-15 over actual 2013-14 costs, an increase of 12.30 percent in real terms ($2014). Table 5-49 provides a breakdown of Seqwater's actual expenditure in 2012-13 and 2013-14 and forecast expenditure in 2014-15 by cost category. The change in actual expenditure from 2013-14 to forecast expenditure in 2014-15 is also outlined in absolute and relative terms. The contribution of each cost category as a proportion of total corporate costs is illustrated in Figure 5-23.

As outlined in Table 5-48 and Figure 5-25 below, the primary cost category contributing to the increase in Seqwater's corporate costs is 'Other Materials and Services'. 'Other Materials and Services' is forecast to increase by $5.801 million to $30.843 million in 2014-15 and accounts for approximately 87 percent of all growth in corporate costs in 2014-15. 'Other Materials and Services' costs will account for over half (51 percent) of all corporate costs in 2014-15.

'Contract Services' is the other cost category contributing to overall increases in corporate costs, increasing by $1.429 million in 2014-15 from 2013-14 levels. Since 2012-13, corporate expenditure on 'Contract Services' has increased by $4.180 million.

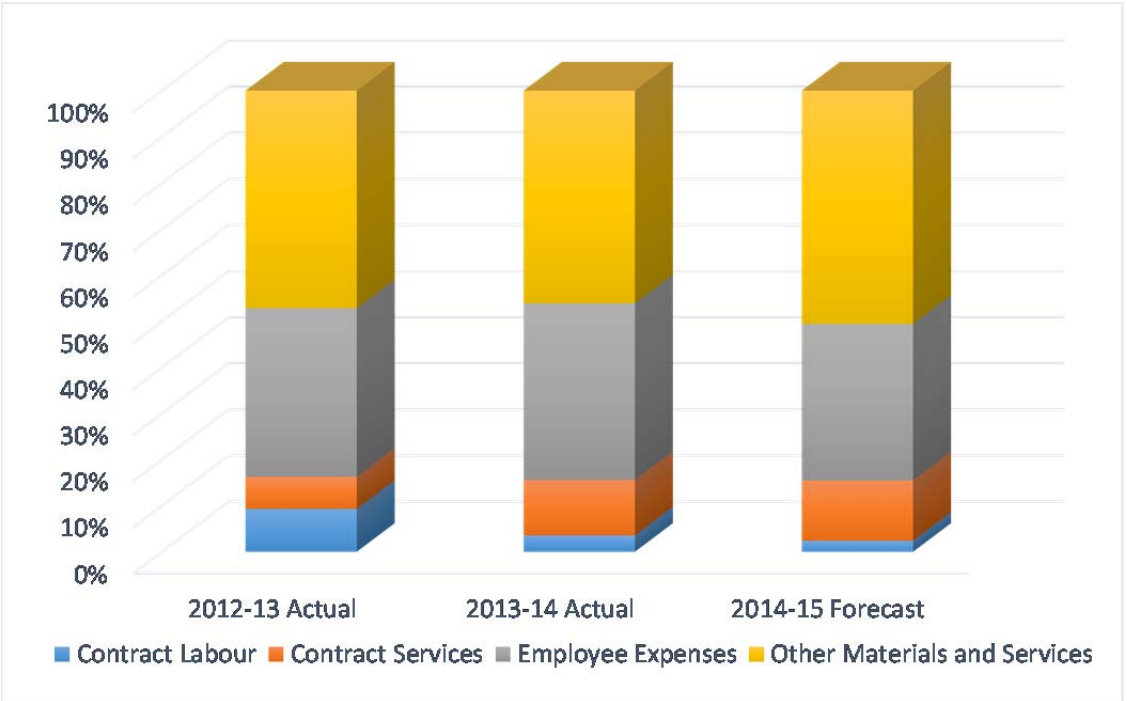
Table 5-48: Corporate costs by cost category, 2012-13 to 2014-15 ($M, real 2014)

Cost Category	2012-13 Actual	2013-14 Actual	2014-15 Forecast	Change FY14 to FY15 ($)	Change FY14 to FY15 (%)
Contract Labour	5.098	1.930	1.464	-0.466	-24.16%
Contract Services	3.795	6.546	7.975	1.429	21.83%
Employee Expenses	19.993	20.756	20.669	-0.087	-0.42%
Other Materials and Services	25.817	25.042	30.843	5.801	23.17%
TOTAL CORPORATE COSTS	54.703	54.273	60.951	6.677	12.30%

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xlsx

While 'Employee Expenses' is the second largest cost category contributing to corporate costs, it is forecast to reduce slightly in real terms in 2014-15, and has remained relatively stable over the three-year period from 2012-13 to 2014-15. A review and assessment of Seqwater's employee costs is outlined in Section 5.3. 'Contract Labour' is forecast to decrease by approximately 24 percent in 2014-15 to $1.464 million, and is not considered to be a significant driver of changes in corporate costs.

Figure 5-25: Corporate costs by cost category, 2012-13 to 2014-15 (%)



Based on the above analysis, CH2M HILL considers that the primary drivers for the increase in Seqwater's corporate costs in 2014-15 are:

- 'Other Materials and Services' – forecast to increase by $5.801 million in 2014-15
- 'Contract Services' – forecast to increase by $1.429 million in 2014-15.

These drivers of increased corporate costs are investigated in further detail below:

Other Materials and Services

A review of 'Other Materials and Services' items under the corporate cost category identify the individual contributors to the increase in expenditure in 2014-15. CH2M HILL recognises that there a many individual cost items within 'Other Materials and Services' that will be subject to cost fluctuation. However, CH2M HILL has identified the most significant causes of growth that cannot be immediately explained. Major sources of cost growth are identified in Table 5-49 below.

Table 5-49: Other Materials and Services - major sources of cost growth 2014-15 ($, real 2014)

Cost Item	2013-14	2014-15	Change ($)
Training	814	283,510	282,696
Safety	22,221	385,215	362,994
Motor Vehicle Fleet Expenses	3,341	1,499,769	1,496,428
Car Parking Expense	38,439	267,675	229,236
Prop - Cleaning	33,771	498,142	464,370
Memberships and Subscriptions	299,230	456,059	156,829
ICT-Hardware Support & Maint	260,711	474,104	213,394
Legal Exp - Real Estate & Comm Property Law	95,482	212,988	117,506
Legal Exp-Gen Corporate & Commercial Law	1,017,714	1,681,121	663,407
Sundry Expenses	42,961	222,906	179,945
Marketing and Advertising	220,044	1,148,702	928,657
PA-GPS / PDA	-	282,886	282,886
Plant & Fleet Hire - Internal	44,105	481,977	437,872
FLT-Motor Vehicle Registration	841	212,362	211,521
TOTAL	2,078,833	7,895,054	5,816,220

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xlsx

Cost items identified in Table 5-50 above contribute approximately $5.816 million in increased expenditure on corporate 'Other Materials and Services'.

CH2M HILL has also identified some significant expenditure increases reported by Seqwater as 'Overrides' in its operating expenditure model submitted to the QCA. In contrast to specific cost items identified above, these increases have been reported at a gross business group level against the Other Materials and Services cost escalation category. Override increases relating to corporate-related Other Materials and Services have been reported in Section 5.7 above.

An assessment of the prudence and efficiency of the above sources of cost increase is outlined in Sections 5.7.6 and 5.7.7.

Contract Services

CH2M HILL has reviewed Seqwater's reported corporate cost 'Contract Services' items to identify the major drivers for increases in expenditure in 2014-15. As noted above, it is recognised that there a many individual cost items within 'Contract Services' that are forecast to increase or decrease in 2014-15. However, CH2M HILL has identified the most significant sources of cost growth that cannot be immediately explained. Major sources of cost growth are identified in Table 5-50.

Table 5-50: Contract Services - major sources of cost growth 2014-15 ($, real 2014)

Cost Item	2013-14	2014-15	Change
Training - External	299,098	651,408	352,310
Consultancy - Others	630,448	875,128	244,680
Consultancy - Information Tech	1,859,206	3,749,767	1,890,561
TOTAL	**2,788,752**	**5,276,303**	**2,487,551**

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xlsx

The cost items identified in Table 5-50 above are forecast to contribute to approximately $2.488 million in increased expenditure on corporate 'Contract Services' in 2014-15. An assessment of the prudence and efficiency of the above sources of cost increase is outlined in Sections 5.5.6 and 5.5.7.

5.8.4 Unit costs of service provision

To inform the assessment of Seqwater's forecast corporate costs, CH2M HILL has reviewed corporate costs with respect to total operating expenditure, the volume of water delivered to retail water customers (demand), the number of FTEs and water sales revenue over the period from 2012-13 to 2014-15. A summary of this review is outlined in Table 5-51 below.

Table 5-51: Corporate costs against measures of service provision (real 2014)

	2012-13 Actual	2013-14 Actual	2014-15 Forecast
Total Corporate Costs ($M)	54.703	54.273	60.951
Total Operating Expenses ($M)	268.522	238.596	248.145
Demand (ML)	282,431	298,003	297,384
Full-time equivalent staff	582	617.2	622.2
Water Sales Revenue ($M)[1]	709.862	686.708	777.077
Corporate Costs / Total Opex (%)	20.4%	22.7%	24.6%
Corporate Costs per ML ($)	193.7	182.1	205.0
Corporate Costs per FTE ($)	93,991	87,935	97,960
Corporate Costs per $ of Water Revenue	0.077	0.079	0.078

Sources: Opex model 2014-09-25 Q1 FY15 revised.xlsm, Seqwater opex data 26-9-14 consolidated.xlsx, Seqwater 2012-13 Annual Report, Seqwater 2013-14 Annual Report.
Note: 1 – Excludes irrigation, CSO and grant, lease, interest and other source of non-water revenue

Observations from the above review are summarised as follows:

- Corporate Costs / Total Opex (%) – as noted above, corporate costs as a proportion of total operating expenditure are trending upwards over the period and are forecast to reach to 24.6 percent of total operating expenditure in 2014-15
- Corporate Costs per ML ($) – the ratio of corporate costs to volume of bulk water delivered is forecast to increase to $205 per ML in 2014-15, representing a significant increase from 2013-14
- Corporate Costs per FTE ($) – the ratio of corporate costs to FTEs measures the average level of 'corporate overhead' per FTE. Corporate costs per FTE are forecast to increase significantly in 2014-15 to $97,960 per FTE
- Corporate Costs per $ of Water Revenue – the ratio of corporate costs against water sales revenue is forecast to remain relatively stable, decreasing slightly from 0.079 in 2013-14 to $0.078 per dollar of revenue.

Overall, based on a review of corporate cost levels against the above measures of service provision, Seqwater is forecast to incur additional corporate costs per unit of service delivery in 2014-15 over 2013-14 levels. That is, corporate costs as ratio of total operating expenditure, bulk water delivery and FTEs are all trending upwards. While it is recognised that Seqwater has recently undergone a significant transitional period, CH2M HILL considers that this is evidence that Seqwater is becoming less efficient operationally over time, despite having had 18 months to harmonise various business systems and processes.

Benchmarking

Comparisons of the corporate costs incurred by different organisations are compromised by how different organisations are structured and what is included in their corporate costs. For example, functions that are centralised in one organisation, such as procurement or stores, may be decentralised in another. However, to further inform the assessment of Seqwater's forecast corporate, CH2M HILL compared Seqwater's corporate cost ratios against those calculated for Melbourne Water and Gladstone Area Water Board (GAWB).

In undertaking this analysis, CH2M HILL was aware of, and made allowances for, the limitations of benchmarking. These limitations include:

- Differences in organisational structures and in the definition of corporate costs between Australian authorities
- The relative size and maturity of the organisations
- The effects of inflation when comparing costs in absolute terms
- Nature of bulk water services provided by individual authorities.

A comparison of corporate costs for Seqwater, Melbourne Water and GAWB with respect to total operating expenditure, the volume of water delivered to retail water customers (demand), the number of FTEs and water sales revenue over the period from 2012-13 to 2013-14 is summarised in Table 5-52.

Table 5-52: Indicative corporate cost ratios for benchmark organisations

	Seqwater		Melbourne Water		GAWB	
	2012-13 Actual	2013-14 Actual	2012-13 Actual	2013-14 Actual	2012-13 Actual	2013-14 Actual
Total Corporate Costs ($M)	54.70	54.27	71.00[1]	88.10[1]	2.10	2.41
Total Operating Expenses ($M)	268.52	238.60	454.57	505.61	20.85	23.02
Demand (ML)	282,43	298,00	404,26	399,49	47,69[2]	46,82[2]
Full-time equivalent staff	582.0	617.2	830.0	812.0	79.0	81.3
Water Sales Revenue ($M)[3]	709.86	686.71	1,242.16	1,703.79	54.21	67.38
Corporate Costs / Total Opex (%)	20.4%	22.7%	15.6%	17.4%	10.1%	10.5%
Corporate Costs per ML ($)	193.7	182.1	175.6	220.5	44.0	51.5
Corporate Costs per FTE ($)	93,991	87,935	85,542	108,498	26,532	29,668
Corporate Costs per $ of Water Revenue	0.077	0.079	0.057	0.052	0.039	0.036

Note:

1 – Based on forecast figures reported in Water Plan 3

2 – Majority of GAWB's bulk water deliveries are for raw water (approximately 73% in 2013-14)

3 – Water sales revenue is not directly comparable, for example Melbourne Water receives revenue for bulk water, bulk treatment and waterways and drainage services

Recognising the inherent limitations in benchmark comparisons, it can be seen that Seqwater's performance is mixed when compared to Melbourne Water and GAWB. Seqwater has the highest indicative corporate costs as a proportion of total operating expenditure, and the highest ratio of corporate costs per dollar or revenue.

5.8.5 Escalation factors

For the purposes of its 2015-18 Submission, Seqwater has not applied a defined escalation factor specifically for 'corporate costs'. Depending on the nature of the specific corporate cost item, Seqwater has applied Employee Expenses, Other Materials and Services, or Contract Services escalation factor. For example, the Other Materials and Services escalation factor has been applied against 'minor catering expenses'.

CH2M HILL has not sought to undertake a review of the appropriateness of the application of escalation factors against individual cost items. CH2M HILL's assessment of the appropriateness of the escalation factors used in Seqwater's 2015-18 Submission is outlined in Sections 5.3.5, 5.5.5, 5.6.5 and 5.7.5 of this Report.

5.8.6 Prudency

Seqwater's corporate activities – such as ICT software and hardware support, legal, property management, finance and workplace health and safety – are essential support activities to assist its ongoing sustainable operations and meet its regulatory and legislative requirements as a bulk water provider. CH2M HILL, therefore, considers Seqwater's continued investment in corporate costs activities to be prudent.

5.8.7 Efficiency

As noted in earlier sections of this report, there has been an observed lack of reporting continuity between 2013-14 Actual figures provided with those provided for the 2014-15 forecast. This lack of reporting continuity has impacted CH2M HILL's ability to identify the changes in specific costs between these years and therefore any opportunities for cost savings. Under these circumstances and in the absence of any guidance provided by Seqwater that would enable the establishment of a cost audit-trail, CH2M HILL has focused its analysis on the 2013-14 actual costs, with due consideration of the factors that might influence these costs from 2013-14 to 2014-15. This decision has been taken because the 2013-14 year data is at a level of disaggregation that enables a more detailed cost assessment.

The key drivers for the increase in forecast expenditure on corporate activities are:

- 'Other Materials and Services' – forecast to increase by $5.801 million in 2014-15
- 'Contract Services' – forecast to increase by $1.429 million in 2014-15.

Given that levels in expenditure across the 'Contract Labour' cost category are forecast to remain relatively constant, and an assessment of 'Employee Expenses' has been addressed in Section 5.3 above, CH2M HILL has not sought to undertake a detailed review of these cost categories as they relate to corporate costs.

An overview of identified corporate 'Other Materials and Services' and 'Contract Services' cost items assessed as part of this Review is provided below. For reporting purposes, the assessment of efficiency of these corporate 'Other Materials and Services' and 'Contract Services' cost items is outlined in Sections 5.5.7 (Contract Services) and 5.7.7 (Other Materials and Services).

Other Materials and Services

As outlined in Section 5.8.3, Other Materials and Services is the dominant driver of growth in corporate costs, increasing by $5.816 million in 2014-15 from 2013-14 levels. Key cost items identified (see Table 5-50 above) include:

- Training – External
- Safety
- Motor Vehicle Fleet Expenses
- Car Parking Expense
- Prop – Cleaning
- Membership and Subscription
- ICT – Hardware Support and Maint
- Legal Exp – Real Estate & Comm Property Law
- Legal Exp – Gen Corporate & Commercial Law
- Sundry Expenses
- Marketing and Advertising
- PA – GPS/PDA
- Plant & Fleet Hire – Internal

- FLT – Motor Vehicle Registration.

An assessment of the efficiency of the above items is outlined in Section 5.7.7.

Contract Services

As outlined in Section 5.8.3, 'Contract Services' is a key source of growth in corporate costs, increasing by $1.429 million in 2014-15 from 2013-14 levels. Key cost items identified (see Table 5-51 above) include:

- Consultancy – Others
- Consultancy – Information Tech.

An assessment of the efficiency of the above items is outlined in Section 5.5.7.

5.8.8 Efficiency gains

During the course of the review, Seqwater has provided evidence of a number of operational efficiency initiatives. These efficiencies are reported at the business group level, by cost escalation categories. As such, any corporate-related efficiencies have been assessed as part of CH2M HILL's analysis outlined in Sections 5.3 to 5.7 above.

5.8.9 Assessment of Prudency and Efficiency

CH2M HILL considers that Seqwater must continue to allocate an appropriate level of investment in its corporate activities to assist its ongoing sustainable operations and meet its regulatory and legislative requirements as a bulk water provider. It follows that CH2M HILL has assessed Seqwater's investment in employment expenses as prudent.

In the course of assessing actual and proposed expenditure on corporate activities, with the knowledge gained on future Seqwater business plans, CH2M HILL has identified a range of corporate costs that represent opportunities for efficiency improvements across the 'Contract Services' and 'Other Materials and Services' expenditure categories. CH2M HILL's assessment of these cost items are outlined in Sections 5.5.9 and 5.7.9, respectively.

However, in summary, CH2M HILL considers Seqwater's forecast corporate costs to be prudent but inefficient.

5.8.10 Assessment of Reported Expenditure

Seqwater has reported annual forecast operating expenditure of $60.951 million (real 2014 terms) over the period from 2014-15 to 2027-28 for corporate related activities. As a result of the assessment outlined above, CH2M HILL has identified adjustments to corporate costs allocated as 'Other Materials and Services' and 'Contract Services'. CH2M HILL's recommended adjustments are presented in Table 5-20 and Table 5-45 of this review.

6 Capital Expenditure

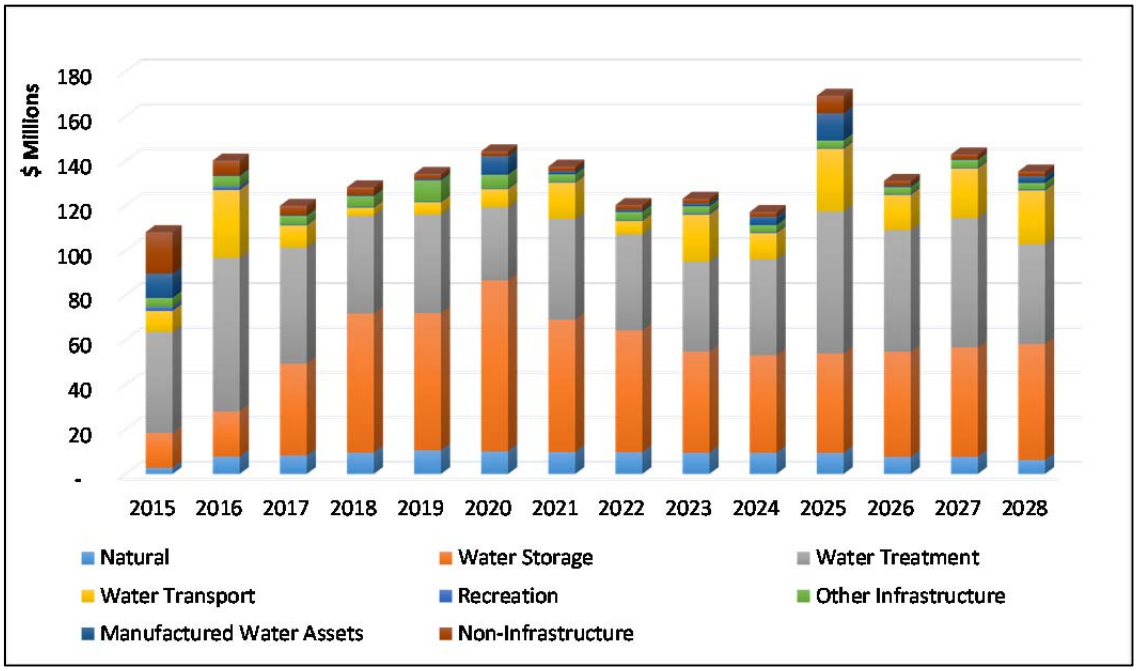
This section outlines CH2M HILL's detailed review of the prudency and efficiency of Seqwater's forecast capital expenditure over the period from 2014-15 to 2027-28. This section details the following areas of investigation:

- Overview of Seqwater's forecast capital expenditure
- CH2M HILL's sample of capital projects
- Review of Seqwater's proposed capital expenditure escalation factors
- Overview of prudency and efficiency review
- Detailed prudency and efficiency reviews of the sample capital projects
- Summary observations and findings

6.1 Overview of Capital Expenditure

Seqwater has submitted a total forecast capital expenditure of approximately $1,853 million (real 2014 terms) over the forecast period of 2014-15 to 2027-28. An overview of Seqwater's forecast capital expenditure, by asset class, is presented in Figure 6-1. As can be seen, the dominant areas of expenditure relate to water storage (i.e. dams and weirs) and water treatment (i.e. plants) assets.

Figure 6-1: Seqwater annual forecast capital expenditure by asset class ($M, real 2014)

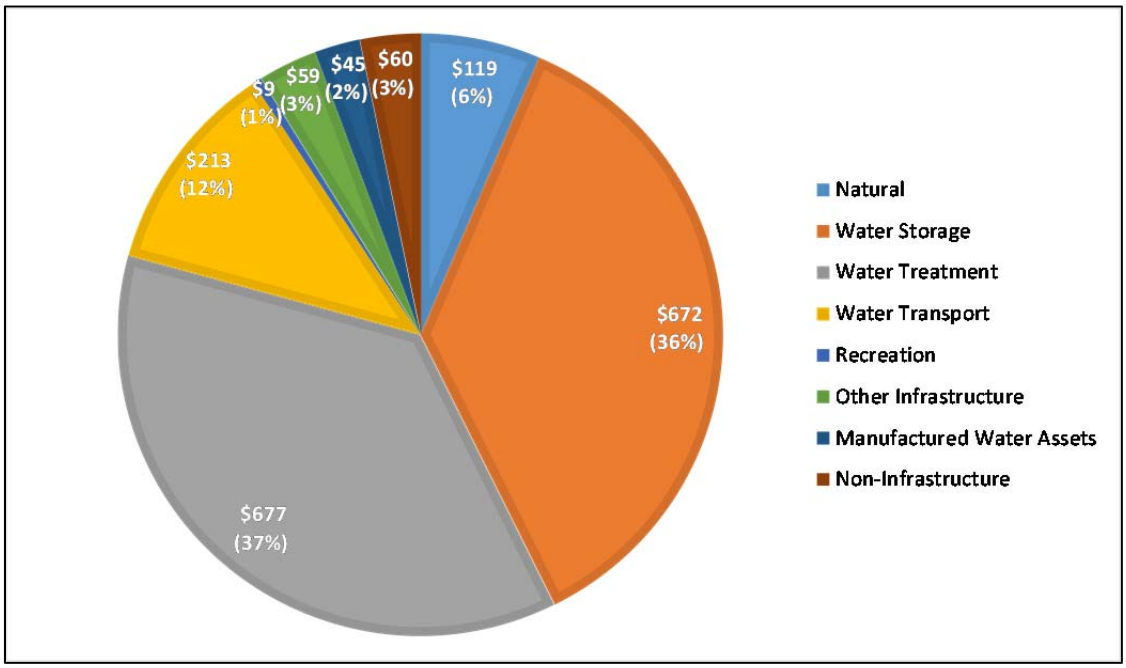


Source: Seqwater, Capital Program for 2014 Bulk Price Review 2014-09-26 No efficiencies.xlsx

Seqwater's forecast capital expenditure is expected to increase in 2015-16 and then remain relatively stable until 2023-24, before increasing significantly in 2024-25 primarily due to significant assets in the portfolio reaching their demand capacity and requiring upgrade. Seqwater's forecast expenditure is expected decrease back to trend levels over the remaining

three years of the forecast period. A breakdown of Seqwater's total forecast capital expenditure by asset class, over the period from 2014-15 to 2027-28, is provided in Figure 6-2. It can be seen that expenditure on water storage, water treatment and water transport assets accounts for approximately 85 percent of Seqwater's total forecast capital expenditure.

Figure 6-2: Total forecast capital expenditure by asset class ($M, real 2014)

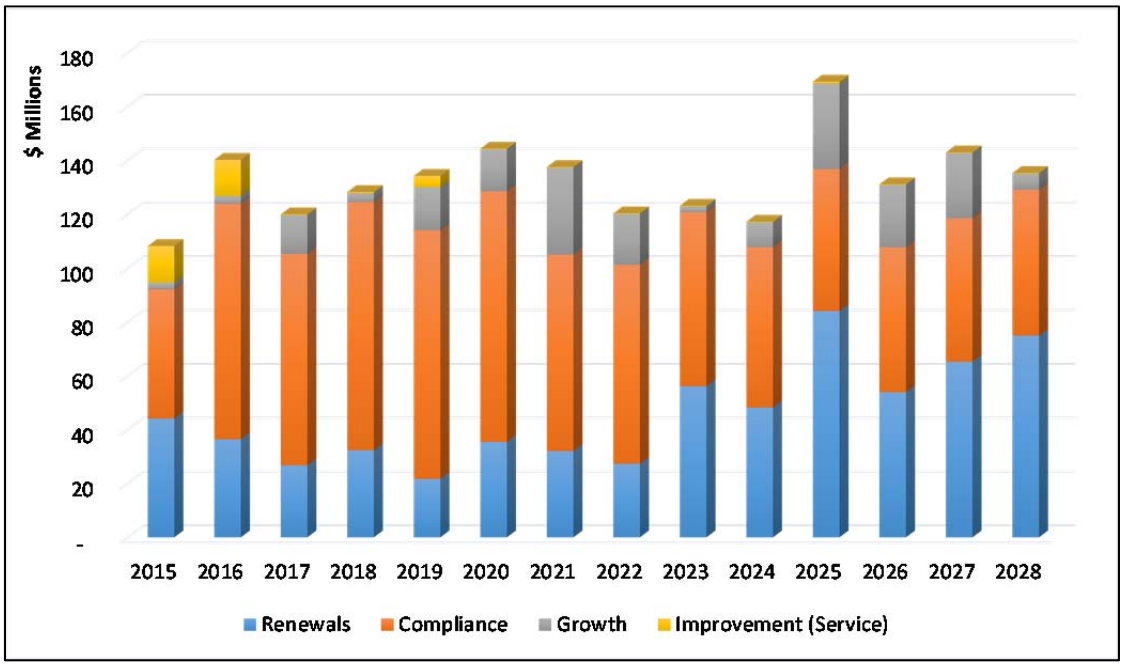


Source: Seqwater, Capital Program for 2014 Bulk Price Review 2014-09-26 No efficiencies.xlsx

A breakdown of Seqwater's forecast capital expenditure by the nominated cost driver is provided in Figure 6-3 and Figure 6-4. The dominant driver for Seqwater's forecast capital expenditure is 'Compliance', which accounts for approximately $977 million, or 53 percent, of Seqwater's total capital expenditure. The next most significant cost driver is 'Renewals' which accounts for $639 million, or 34 percent, of total forecast capital expenditure. Overall, approximately 87 percent ($1,615 million) of Seqwater's forecast capital expenditure is related to 'Compliance' and 'Renewals'.

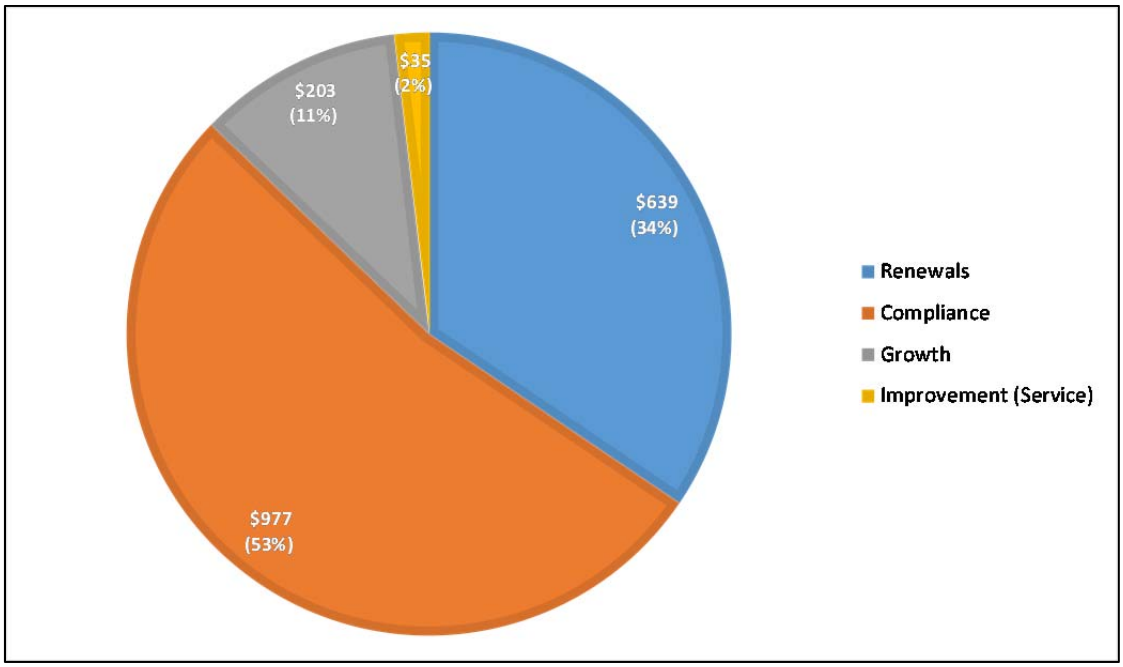
The capital expenditure profile presented above is typical of an asset portfolio with a high proportion of assets that are late in their life-cycle. CH2H HILL would expect to see a relative increase in the level of renewals until the older assets have been replaced for either end-of-life or capacity upgrade reasons.

Figure 6-3: Seqwater annual forecast capital expenditure by driver ($M, real 2014)



Source: Seqwater, Capital Program for 2014 Bulk Price Review 2014-09-26 No efficiencies.xlsx

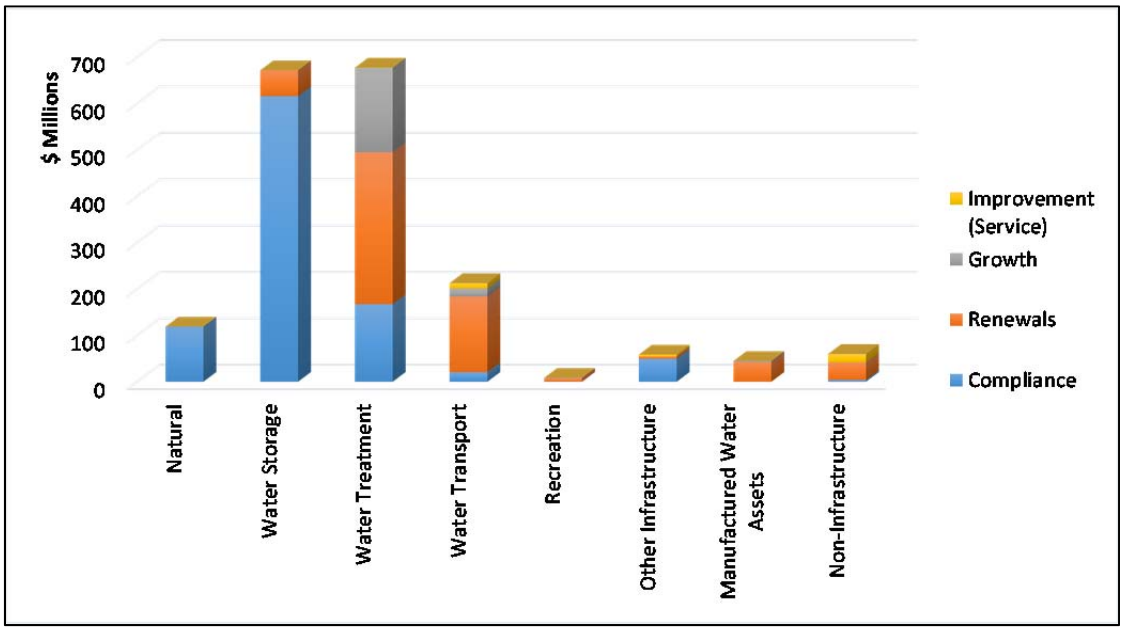
Figure 6-4: Total forecast capital expenditure by driver ($M, real 2014)



Source: Seqwater, Capital Program for 2014 Bulk Price Review 2014-09-26 No efficiencies.xlsx

Further analysis of Seqwater's forecast capital expenditure results in the breakdown of total expenditure by asset class for each cost driver, as shown in Figure 6-5.

Figure 6-5: Total forecast capital expenditure by asset class and driver ($M, real 2014)



Source: Seqwater, Capital Program for 2014 Bulk Price Review 2014-09-26 No efficiencies.xlsx

As can be seen in Figure 6-5 above, the overwhelming majority of capital expenditure associated with water storage assets is being driven by compliance requirements. Expenditure on water treatment assets is being driven mostly by renewals, however, compliance and growth are also key drivers. Renewals is the major cost driver for forecast expenditure on water transport assets.

6.2 Sample projects

To enable the assessment of Seqwater's actual and forecast capital expenditure that contribute to the total costs to be recovered by bulk water prices, CH2M HILL undertook a detailed examination of the prudency and efficiency of a representative sample of ten capital projects that are underway or have forecast capital expenditure over the period from 2014-15 to 2027-28. The projects identified for detailed review are outlined in Table 6-1.

The representative sample projects were initially identified by the QCA on the basis of project value. In consultation with the QCA, the sample was revised to ensure it provided adequate coverage of the range of asset classes (dams, treatment and transport) to improve the materiality, robustness and appropriateness of the assessment. By asset class, CH2M HILL has reviewed four dams, five water treatment plants and one water transport (pipeline) asset.

The total forecast value of the sample projects reviewed by CH2M HILL is approximately $555.205 million. When compared to Seqwater's total forecast capital expenditure for the period from 2014-15 to 2027-28, the sampled projects represent approximately 30 percent of the capital program by value. This is in-line with the QCA' preferred threshold for the review of capital expenditure.

Table 6-1: Capital projects sampled for detailed prudency and efficiency review ($M, real 2014)

Project	Asset Type	Primary Driver	Planning & Asset Management Stage	Forecast Expenditure (million)[1]
North Pine Dam – Saddle Dam 1 filter buttress, dam parapet wall and bridge raise	Dam	Compliance	System Master Planning & Investment	$102.525
Mount Crosby West Bank WTP – Capacity Upgrade	WTP	Growth	System Master Planning & Investment	$77.381
Somerset Dam – Dam Stabilisation Design	Dam	Compliance	System Master Planning & Investment	$72.000
Lake MacDonald Dam – New Dam	Dam	Compliance	Validation, Planning & Investment Commitment	$63.889
Leslie Harrison Dam – Stage 1 Filter buttress / crest reconstruction	Dam	Compliance	System Master Planning & Investment	$57.756
North Pine WTP Renewals Program	WTP	Renewals	System Master Planning & Investment	$43.802
Mount Crosby to Green Hill Pipeline	Pipeline	Renewals	System Master Planning & Investment	$42.951
Mount Crosby East bank WTP – Filtration Improvements	WTP	Compliance	Validation, Planning & Investment Commitment	$36.540
Mount Crosby West Bank WTP Renewals Program	WTP	Renewals	System Master Planning & Investment	$40.539
Kilcoy WTP Upgrade[2]	WTP	Compliance	Implementation	$17.822
Total Sample (10 Projects)				**$555.205**
Percentage of total forecast capital expenditure				**30%**

Note:
1 Forecast expenditure to be incurred over the regulatory period from 2014-15 to 2027-28
2 Project is programmed to be commissioned in 2014-15, forecast expenditure includes total expenditure incurred to date plus forecast expenditure in 2014-15.

6.3 Overview of Prudency and Efficiency Review

6.3.1 Sample findings

A sample of ten projects were identified and assessed as a representative sample of the capital expenditure program for Seqwater. CH2M HILL has undertaken a detailed prudency and efficiency assessment of these projects. Specifically, this has involved a review of identified project driver(s) and decision making processes supporting the proposed project (prudency) and a review of the proposed scope of works, the standard of works and estimated project costs (efficiency).

CH2M HILL's assessment of the prudency and efficiency the sample capital projects highlighted a variable, but generally adequate level of justification of project prudency. That is, most projects reviewed were able to be substantiated on the grounds of the following cost drivers:

- Legal / Regulatory obligation;
- Growth; or
- Infrastructure Replacement.

A range of concerns were raised however, in CH2M HILL's assessment of the efficiency of the capital projects reviewed. These concerns were centred on the clarity and transparency of project cost substantiation and in-particular:

- The basis / origin of unit rates applied in project estimates;
- The alignment of project cost estimates and the stated scope / standard of work;
- The alignment of project costs with relevant capital program budgets.

As a result of these concerns, CH2M HILL has assessed a number of the projects reviewed as inefficient and recommended adjustments to the reported capital expenditure accordingly.

Specific issues identified by CH2M HILL are presented below:

Project Drivers

Overall, an appropriate primary cost driver for expenditure was typically identified by Seqwater, particularly with respect to those projects being driven by compliance and growth requirements, such as dam safety upgrades and water treatment capacity upgrades. For example, dam safety upgrade projects were typically supported by detailed investigations, such the Dam Portfolio Risk Assessment (PRA) or standalone AFC assessments, which demonstrated the projects were justified on the grounds of legislative and regulatory compliance.

CH2M HILL noted however, that improvements are required in more appropriately identifying the cost drivers being funded under renewals programs. These programs are generally driven by investigations at the asset class level that apply good industry practice techniques to the identification of future investment needs and their corresponding budgets. CH2M HILL found however, that the Business Cases put up for funding under these budgets were in many cases, tenuously linked to these studies, from both a cost driver and an activity perspective. For example, CH2M HILL identified a number of projects identified for funding under the North Pine WTP Renewals Program did not have a renewal cost driver.

Decision-making Process

The majority of sample projects reviewed by CH2M HILL were at the System Master Planning and Investment Profile Stage of Seqwater's Capital Planning life-cycle. Overall, Seqwater demonstrated that an adequate decision-making process had been followed for the majority of these projects, with supporting evidence provided by Asset Management Plans, Long Term Planning Reports and other investigative reports that would typically be considered at the 'master planning' stage of capital investment.

There are opportunities for Seqwater to significantly improve the clarity and transparency of project documentation as it relates to investment decision-making. This is particularly relevant where project options have been presented. CH2M HILL found limited cases where Business Cases were in compliance with Seqwater's three options Policy.

Where three or more options were considered, many of the options were just sub-components of one of the other options. In addition, the preferred option was not always readily apparent or was the subject of more detailed investigation, which undermined the robustness of the estimates provided. More generally, details of any project staging were generally not provided in the Business Cases and post works operational cost implications of the options was generally not well considered.

From a decision-making perspective, the approval process for renewals program budgets and the projects funded under these budgets appear quite distinct, with limited referential connectivity between the Business Cases and the supporting program investigation documentation. This risk of this disconnect is that projects could be approved for funding under program budgets that are out of scope or poorly aligned with program objectives and therefore inefficient.

Project Scope of Works

Traditional capital projects reviewed by CH2M HILL were generally adequately scoped and in-line with industry good practice. CH2M HILL believes more substantiation should have been provided on the rationale for targeting 100% AFC for dam improvements where the DEWS regulatory compliance requirement is 75%.

Scoping for renewals program projects was generally of a low standard, with limited options considered and very little information provided on the performance criteria for the proposed renewals/replacement works. Even with like-for-like asset replacements, opportunities may be missed to investigate new options or technologies that may yield operational efficiencies. A variable, but generally low, level of detail was also provided on ancillary works required to facilitate renewal/replacement, which may result cost implications in delivery.

Project Costs

CH2M HILL identified a range of systemic issues related to Seqwater's approach to reporting documenting and substantiating project costs, resulting in some projects being assessed as inefficient. These include: limited clarity on how project costs have been developed and on what basis unit rates and estimates have been used; poor alignment between the project cost and the stated scope of works and standard of works; and alignment of project costs with macro budgets presented in relevant capital program documents, such as FAMPs and the Dams PRA.

With respect to dam safety upgrade projects, CH2M HILL observed a lack of clarity and consistency between reported project cost estimates by Seqwater in its 2015-18 Submission and supporting project documentation. This has led to some uncertainty as what scope works

is included in some projects. For example, for both North Pine Dam and Leslie Harrison Dam projects no standalone project cost breakdown has been provided. Rather, indicative concept-level program cost estimates incorporating multiple staged projects for each dam were provided. This resulted in uncertainty in terms of how individual project cost estimates were developed, on what basis they were developed, and what scope of works had been costed on an individual project basis.

Cost justification within renewal project Business Cases was also found to be lacking and the the level of justification did not scale with the level of investment sought (as is required by Seqwater project justification policy/procedures). Either limited cost breakdown detail was provided or estimates were referenced that were not included as an appendix to the Business Case. These references were also not provided separately by Seqwater to support the review.

Of particular concern to CH2M HILL is the funding profile of Seqwater's renewals programs which present a significant increase in expenditure in forecast out years. All renewals programs assessed by CH2M HILL as part of this Review experience major step increases in funding from about 2022-23 with no supporting justification or substantiation. Such a funding profile is inherently inconsistent with the objective of a renewals program to smooth out funding commitments over the medium to longer term. CH2M HILL considers that there is a strong case to be made for perpetuation of the funding levels currently established and justified within the existing regulatory period (i.e. up to 2018) in the absence of any such justification.

Recommendations

In the course of reviewing the sample capital projects, CH2M HILL has identified a number of recommendations which may improve future assessments of prudency and efficiency as follows:

Decision-making Process

CH2M HILL recommends that the level of certainty of project options and staging around the preferred option be clarified in future capital project Business Cases.

Where long-term capital investment decisions have been made at a program level, it is recommended that Seqwater appropriately document the planned investment activities, and the approval of such activities, on an individual asset basis (i.e. at a water treatment plant, dam or pipeline etc.). Such an approach should be undertaken for FAMPs, the Dams and Weirs Capital Works Program and other relevant program documentation, with specific references carried-through to Business cases.

Scope of Work

CH2M HILL recommends that renewals-based Business Cases provide sufficient details of the existing asset being replaced or refurbished, such as: model numbers and performance characteristics along with details of ancillary works that may be required to facilitate the replacement. Furthermore, in instances where the replacement / refurbishment cost is established on a unit-cost basis, it is recommended that the Business Case provide details of the relevant measurements required (as opposed to lump sum figures).

CH2M HILL recommends that reinstatement specification be clearly stated in the individual project Business Cases for renewals projects, including an assessment of expected design life post-renewal. This approach would ensure that these requirements are transferred into the

contract documentation set at the time of procurement for both quality assurance and warranty purposes.

Project Costs

CH2M HILL recommends that Seqwater more clearly and transparently document project-specific cost estimates, including the justification and basis for those cost estimates, resulting from concept or detailed-level options assessments in future. Such an approach would provide greater clarity and transparency than the current method whereby project costs are based on program estimates with little to no supporting detail or justification.

Business Cases for Capital Renewal Programs

The Business Cases for projects funded under capital renewal programs should be closely linked to the program investigation documentation in terms of program benefits/outcomes (drivers) and scope of work. Seqwater may consider moving to a more traditional program management approach and eliminate individual project business cases in favour of a robust benefits realisation process. This approach could achieve appropriate governance, approval and cost reporting requirements in a more resource effective manner.

CH2M HILL's prudency and efficiency assessment of each sampled capital project is summarised in Table 6-2.

Table 6-2: Summary of prudency and efficiency assessment of sample capital projects ($M, real 2014)

Project Name	Assessment			Forecast Capital Expenditure (million)		
	Prudent	Efficient	Comment	Seqwater Proposed	Adjustment	CH2M HILL Recommended
North Pine Dam – Saddle Dam 1 filter buttress, dam parapet wall and bridge raise	Prudent	Efficient	Primary driver has been demonstrated, and the project is supported by an adequate decision-making process. Proposed scope of works appears reasonable and standard of works are in line with industry good practice. Cost estimate is supported by sufficient evidence and appears reasonable.	$102.525	-	$102.525
Mount Crosby West Bank WTP – Capacity Upgrade	Prudent	Inefficient	The primary driver of compliance has been demonstrated, and the project is supported by an adequate decision-making process to date. However, due to uncertainty in existing cost estimates, the complexity of upgrading the site, and requirement for further detailed investigation, CH2M HILL considers that the lower current cost estimate of $35 million should be included in Seqwater's proposed forecast capital expenditure for the purposes of establishing an appropriate price path.	$77.381	-$ 42.381	$35.000

Project Name	Assessment			Forecast Capital Expenditure (million)		
	Prudent	Efficient	Comment	Seqwater Proposed	Adjustment	CH2M HILL Recommended
Somerset Dam – Dam Stabilisation Design	Prudent	Inefficient	The primary driver has been demonstrated, and the project is supported by a clear, consistent and transparent decision-making process to date. Proposed scope of works appears reasonable and standard of works are in line with industry good practice. However, sufficient evidence with supporting substantiation has been provided to demonstrate that the cost estimate for this project should be reduced from $72 million to $33.815 million.	$72.000	-$ 38.185	$33.815
Lake MacDonald Dam – New Dam	Prudent	Efficient	Primary driver has been demonstrated, and the project is supported by a clear, consistent and transparent decision-making process. Proposed scope of works appears reasonable and standard of works are in line with industry good practice. Cost estimate appears reasonable and is based on a 30 percent detailed design.	$63.889	-	$63.889
Leslie Harrison Dam – Stage 1 Filter buttress / crest reconstruction	Prudent	Efficient	Primary driver has been demonstrated and the project is supported by an adequate decision-making process. Proposed scope of works appears reasonable and standard of works are in line with industry good practice. Cost estimate is supported by sufficient evidence and appears reasonable.	$57.756	-	$57.756

Project Name	Assessment			Forecast Capital Expenditure (million)		
	Prudent	Efficient	Comment	Seqwater Proposed	Adjustment	CH2M HILL Recommended
North Pine WTP Renewals Program	Partial	Partial	Primary drivers have been demonstrated in eight of the nine projects reviewed and the projects are supported by decision-making processes that have some room for improvement. Proposed scopes of work are generally reasonable, but the standards of work are not well articulated. Cost estimates also appear reasonable, but are supported by variable levels of evidence and the level or rigour applied in cost build-up is generally insufficient for larger projects. A significant jump in capital expenditures has been noted beyond the planning horizon of the documents reviewed which cannot be explained.	$43.802	-$0.068	$43.734
Mount Crosby to Green Hill Pipeline	Prudent	Inefficient	The cost drivers for the programs have been demonstrated, and part of the program is supported by an adequate decision-making process. Proposed scope of works for the cathodic protection sub-program appears reasonable and standards of work are in line with industry good practice. However, CH2M HILL notes that insufficient evidence has been provided to support the cost estimate of $42.951 million.	$42.951	-$42.951	-

Project Name	Assessment			Forecast Capital Expenditure (million)		
	Prudent	Efficient	Comment	Seqwater Proposed	Adjustment	CH2M HILL Recommended
Mount Crosby East bank WTP – Filtration Improvements	Prudent	Efficient	Primary driver has been demonstrated, and the project is supported by a clear, consistent and transparent decision-making process. Proposed scope of works appears reasonable and standard of works are in line with industry good practice. Cost estimate is supported by sufficient evidence and appears reasonable.	$36.540	-	$36.540
Mount Crosby West Bank WTP Renewals Program			Primary drivers have been demonstrated for all seven projects reviewed and the projects are supported by decision-making process where there is some room for improvement. Proposed scopes of work are reasonable, but the standards of work could be better articulated. Cost estimates also appear reasonable for the levels of expenditure being sought. A significant jump in capital renewal expenditures was noted beyond the planning horizon of the documents reviewed which cannot be explained.	$40.539	-	$40.539
Kilcoy WTP Upgrade[2]	Prudent	Efficient	Primary driver has been demonstrated, and the project is supported by an adequate decision-making process. Proposed scope of work appears reasonable and standard of works are in line with industry good practice. A change management process was in place and project appears to be delivered within the revised *Post Market Budget Review* cost estimate.	$17.822	-	$17.822

6.3.2 Portfolio implications of findings

CH2M HILL has assessed the prudency and efficiency of approximately 30 percent of Seqwater's proposed capital expenditure over the forecast period from 2014/15 to 2027/28. CH2M HILL has considered the validity of applying further adjustments to un-sampled capital expenditure based on the assessment and findings of sampled capital expenditure. For the purposes of this Review, however, CH2M HILL is of the view that this is not appropriate.

Benchmarking can inform whether there is an argument in applying further efficiency savings across Seqwater's remaining capital expenditure program. However, effective cost benchmarking requires a robust understanding of the cost structures of a range of comparative water businesses, which, in turn, requires a detailed understanding of the governance arrangements and business processes of those comparative organisations. Information on output costs, input costs and environmental factors would also be required. Given the lack of any robust and dependable benchmarking data to inform such an analysis, extrapolating efficiency savings on the basis of any benchmarking would not be appropriate in this instance.

Seqwater's governance arrangements and capital planning processes are improving, however, output documents that support capital investment and underpin good governance are at an early stage of maturity. Consequently, CH2M HILL has observed that, both at the program and individual project level, Seqwater's processes are being applied on an inconsistent basis. Despite the intermittent quality and consistency with which processes have been adhered to, CH2M HILL has not observed a systemic non-compliance of Seqwater's governance arrangements and processes.

CH2M HILL considers that business efficiencies will be realised as business processes become more mature and therefore, more integrated and streamlined. It is difficult to quantify the value of these efficiencies in terms of future cost savings however, given the recent transition of Seqwater to a single entity and the absence of an established and robust cost baseline. Therefore, CH2M HILL does not consider that it has identified any systemic capital expenditure inefficiencies that would justify a portfolio or sub-portfolio adjustment either for 2014/15 or for the balance of the forecast period.

Review of Escalation Factors

For the purposes of its 2015-18 Submission, in developing its capital expenditure forecasts Seqwater has applied the escalation factors outlined in Table 6-3.

Table 6-3: Proposed capital expenditure escalation factors

Financial Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024 - 2028
Rate (nom. %)	4.34	5.24	4.80	4.75	4.67	4.65	4.70	4.92	5.01	4.88	2.50

Source: *Seqwater Bulk Water Prices 2015 to 2018 - Submission to QCA*, p. 118.

Seqwater engaged PwC to analyse historical price movements and other relevant information (including Government and industry forecasts) and recommend capital expenditure escalation factors for the purposes of its 2015-2018 Submission. Seqwater has adopted PwC's recommended escalation factors for capital expenditure as follows:

- The Australian Construction Industry Forum's (ACIF) engineering construction price index for the period from 2013-14 to 2022-23
- Consumer Price Index based on current forecasts published by the Reserve Bank of Australia for the period from 2023-24 to 2027-28.

A review of the appropriateness of the capital expenditure escalation factors adopted by Seqwater in its 2015-18 Submission is outlined below.

Review of ACIF engineering construction price index

A review of recent south east Queensland price monitoring reviews by the QCA indicate that some water businesses have escalated capital expenditure based on ACIF engineering construction price index forecasts. CH2M HILL notes that the QCA has raised some issues regarding the use of the index, in particular the extent to which the index includes factors not directly relevant to water businesses in south east Queensland. For example, the QCA acknowledged that the engineering construction price index is based on data from seven construction sectors (i.e. is not specific to the water sector) and eight Australian states and territories. However, CH2M HILL notes that the QCA has accepted the use of the ACIF engineering construction price index for escalating capital expenditure forecasts in the past.

It is recognised by CH2M HILL that regulators in New South Wales and Victoria have adopted CPI when escalating capital expenditure. The justification for this approach is, while there are short term deviations between inflation and construction costs, it is recognised that over the medium to longer term the averages between CPI and escalation rates in capital expenditure are similar.

CH2M HILL notes that the ACIF index has been developed based on ABS construction data, which incorporates macroeconomic forecasts. Furthermore, the engineering construction price index forecasts are regularly reviewed by the ACIF Construction Forecasting Council to reflect changes and developments across the construction industry. Given that the QCA has previously accepted the use of the ACIF index, CH2M HILL considers that it provides a reasonable escalation factor for the purpose of escalating capital expenditure over the forecast period.

As such, CH2M HILL considers that Seqwater's proposed approach to escalate capital expenditure in line ACIF engineering construction price index forecasts, which have been adjusted by CPI to convert to nominal values[19], is reasonable. CH2M HILL notes that it has not reviewed the most recent ACIF release (May 2014).

Review of general inflation forecasts

Seqwater's proposed escalation factors for capital expenditure for the period from 2023-24 to 2027-28 are based on the mid-point of the RBA inflation target (2 to 3 per cent). Given the level of uncertainty of capital cost inflation over the longer term, CH2M HILL considers Seqwater's proposed approach to adopt the mid-point of the RBA inflation target (2 to 3 percent) appropriate.

[19] ACIF data is provided in real terms.

Summary findings

CH2M HILL considers that Seqwater's proposed approach to escalate capital expenditure over the period from 2013-14 to 2022-23 in line with ACIF engineering construction price index forecasts is appropriate. CH2M HILL also considers Seqwater's proposed approach to adopt the mid-point of the RBA inflation target (2 to 3 percent) over the longer term to be appropriate.

It should be noted that CH2M HILL has not reviewed the most recent ACIF release (May 2014). Any revisions to the engineering construction price index by the ACIF Construction Forecasting Council should be incorporated into Seqwater's proposed escalation factors for capital expenditure.

Based on the above analysis, CH2M HILL recommends that Seqwater's Chemical costs be escalated based on the factors outlined in Table 6-4.

Table 6-4: Recommended escalation factors for capital expenditure

Financial Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024 - 2028
Seqwater proposed rate (%)	4.34	5.24	4.80	4.75	4.67	4.65	4.70	4.92	5.01	4.88	2.50
CH2M HILL recommended rate (%)	4.34	5.24	4.80	4.75	4.67	4.65	4.70	4.92	5.01	4.88	2.50
Difference	-	-	-	-	-	-	-	-	-	-	-

Note: The above rates are in expressed in nominal terms.

6.4 North Pine Dam – Saddle Dam 1 filter buttress, dam parapet wall and bridge raise (North Pine Dam Upgrade)

6.4.1 Project description

North Pine Dam is located approximately 10 kilometres north west of Strathpine. The dam was built in 1976 to form Lake Samsonvale, which provides water supply to the City of Brisbane and the districts of Pine Rivers, Redcliffe and Caboolture. The dam is a composite dam comprising a mass concrete gravity section with homogenous earthfill embankments connecting the abutments, with three homogenous saddle dams also constructed to the south-west of the main dam. In 1999, filter buttresses and filter trenches were constructed on the right abutment embankment and saddle dams 2 and 3 to address piping concerns. In 2005, a filter buttress and filter trench were constructed for a partial length on the left abutment embankment.

As part of a dedicated Acceptable Flood Capacity (AFC) assessment and completion of Seqwater's subsequent Dams Portfolio Risk Assessment (PRA), North Pine Dam has been identified as not meeting current AFC requirements as prescribed by the *Guidelines on Acceptable Flood Capacity for Dams (2007, current issue is February 2013)*. The North Pine Dam was found, with current spillway arrangement and gate operations, to pass approximately 63 percent of the Probable Maximum Flood (PMF) before overtopping occurs. Furthermore, while the societal risk of the dam plots within the Australian National

Committee of Large Dams (ANCOLD) Limits of Tolerability, the risk of dam failure increase significantly if there were to be a spillway gate malfunction.

The *North Pine Dam – Saddle Dam 1 filter buttress, dam parapet wall and bridge* raise (the *North Pine Dam Upgrade*) project is for the capital works expenditure for the Saddle Dam 1 filter works and construction of a parapet wall and new spillway bridge structure at North Pine Dam. The proposed capital works will ensure the dam achieves 100 percent PMF and comply with DEWS and ANCOLD requirements with respect to AFC.

Project development stage

This project is at the *System Master Planning and Investment Profile* Stage of Seqwater's Capital Planning life-cycle (Gate 1 of the investment planning approval process), and as such has not progressed beyond a conceptual options assessment. The *North Pine Dam Upgrade* project is scheduled for commissioning in 2022.[20]

6.4.2 Proposed capital expenditure

As outlined in Seqwater's 2015-18 Submission, the proposed capital cost for this project is $102.525 million (real 2014 terms). However, this is inconsistent with the estimated capital cost provided in the PRA which provided an indicative high-level cost estimate of $220 million (nominal). The reported capital expenditure for the *North Pine Dam Upgrade* project is outlined in Table 6-5.

Table 6-5: North Pine Dam Upgrade, reported expenditure ($M, real 2014)

Project component	2019-20	2020-21	2021-22	2022-23	TOTAL
Detailed design	$1.010	$0.505			$1.515
Project delivery			$50.505	$50.505	$101.010
TOTAL	**$1.010**	**$0.505**	**$50.505**	**$50.505**	**$102.525**

Source: Capital Program for 2014 Bulk Price Review 2014-09-26 No efficiencies.xlsx

Further discussion of the reported capital expenditure for the *North Pine Dam Upgrade* project is provided in Section 6.4.5.

6.4.3 Provided documentation

Documentation reviewed in respect of the *North Pine Dam – Saddle Dam 1 filter buttress, dam parapet wall and bridge* raise (the *North Pine Dam Upgrade*) project included:

- North Pine Dam – Amended Dam Safety Conditions, February 2009
- Seqwater, Referable Dams Portfolio Risk Assessment – Business Case, December 2011
- URS, North Pine Dam – Acceptable Flood Capacity (AFC) Report, February 2012
- Seqwater, Dam Safety Instigations Program – Business Case, November 2013
- URS, Seqwater Dams Portfolio Risk Assessment – Dam Safety Risk Management Strategy, November 2013

[20] *Seqwater, 2014. Seqwater Bulk Water Prices 2015-18 – Submission to the QCA, p.132.*

- URS, Dams and Weirs Capital Works Program, May 2014
- Seqwater, Asset Portfolio Master Plan 2014-28, 2014.

6.4.4 Prudency

A review of the prudency of Seqwater's proposed *North Pine Dam Upgrade* project is outlined below; specifically this includes a review of identified the project driver(s) and the decision making process supporting the proposed project.

Project drivers

The primary driver identified by Seqwater for this project is compliance.

The North Pine Dam is a referable dam under the regulation of the Department of Energy and Water Supply (DEWS). In 2009, DEWS issued and imposed dam safety conditions on North Pine Dam under the *Water Supply (Safety and Reliability) Act 2008*.

In 2012, Seqwater engaged URS to undertake an AFC assessment of North Pine Dam. Based on the AFC assessment and subsequent risk assessment undertaken in 2013, it has been determined that North Pine Dam does not satisfy the requirements of the DEWS *Acceptable Flood Capacity Guidelines* (2013). Specifically, it was determined that North Pine Dam had a 63 percent compliance with AFC requirements (as determined by PMF) and upgrade works were required by 2025 to provide a minimum flood discharge capacity of 75 percent of the AFC.[21]

Based on a review of available information, CH2M HILL considers that the cost driver for this project has been appropriately identified.

Decision making process

The *North Pine Dam Upgrade* project is supported by documented investigation, condition assessments and risk assessments, and high-level options identification including conceptual design drawing.

As outlined above, the AFC assessment undertaken by URS in 2012 identified the dam as having a 63 percent compliance with AFC (as determined by PMF), with works required by 2025 to provide a minimum flood discharge capacity of 75 percent. As part of the AFC assessment, a range of conceptual upgrade options were assessed to estimate the key dimensions and arrangements for potential upgrade works to pass 100% of the PMF. These options included:

- Lowering the full supply level (it was noted that this option would not achieve 100% PMF)
- Modification of the existing main spillway arrangement to increase hydraulic capacity
- Addition of an auxiliary spillway with no or limited modification to the existing main spillway arrangement
- Dam raise / parapet wall
- Combinations of the dam raising and spillway modifications.

[21] *URS, 2012. North Pine Dam – Acceptable Flood Capacity (AFC) Report, p. ix.*

Drawing in the outcomes of the AFC assessment, Seqwater engaged URS to undertaken a risk assessment of the North Pine Dam as part of the Seqwater PRA. The risk assessment was completed in accordance with the ANCOLD *Guidelines on Risk Assessment* (2003) and involved:[22]

- Assessment of the existing risk of the structure, including
    - Review of background information for each dam
    - Site visit to each structure
    - Conduct six separate workshops to identify possible failure modes and assign conditional probabilities
    - Assess dam failure consequences – societal, individual, economic and environmental
    - Documentation of existing risks and presentation of results to expert panel
    - Dam Safety Risk Reduction Strategy
- Development of a dam safety risk reduction strategy, including:
    - Develop a prioritized list of structures that meet ANCOLD and DEWS guidelines
    - Develop risk reduction measures to an initial concept level, recognizing that further investigation and development of such concepts with be required
    - Development of indicative budget planning level cost estimates based on engineering concepts
    - Assessment of the potential societal risk reduction benefits
    - Discussion of dam safety risk reduction concept options with an expert panel.

For the purposes of the PRA, five potential options were assessed:

- Option 1 (non-structural) – reservoir restriction at North Pine Dam by changing the operation of the radial gates
- Option 2 (structural) – replace wind bracing on gate superstructure
- Option 3 (structural) – construction of filter buttresses at Saddle Dam 1
- Option 4 (structural) – combination of Option 2 and Option 3
- Option 5 (structural) – combination of Option 4 with additional works to achieve AFC.

Of these options, it was determined that Option 5 was the only option which addressed the risk reduction requirements and provided for 100% AFC capacity. CH2M HILL notes that Option 5 simply consolidates all of the other options and therefore only one feasible solution has been provided for the risks assessed. This contravenes Seqwater policy for Business Case / Options Analysis. In addition, CH2M HILL questions why a 75% AFC Option –compliant with DEWS Guidelines was not considered as an option.

As a result of the PRA, a range of recommended dam safety risk management actions, including their corresponding level of urgency and timing, were identified for North Pine Dam. These are outlined in Table 6-6 below.

[22] *URS, 2013. Seqwater Dams Portfolio Risk Assessment – Dam Safety Risk Management Strategy, p.1.*

Table 6-6: Recommended dam safety risk management actions for North Pine Dam

Urgency	Timing of Action (years)	Recommendation Action
Level 2	1	Confirm structural adequacy of gate superstructure up to Dam Crest Flood (DCF)
Level 2	1	Update risk based on analysis outcomes
Level 2	2	Design bridge upgrade
Level 3	3	Construct bridge upgrade
Level 3	4	Design AFC upgrade and Saddle Dam Filter Buttress
Level 4	10	Construct AFC upgrade and Saddle Dam Filter Buttress

Source: URS, 2013. *Seqwater Dams Portfolio Risk Assessment – Dam Safety Risk Management Strategy*, p. 295.

Recognising that the *North Pine Dam Upgrade* project is still at the *System Master Planning and Investment Profile* Stage of Seqwater's Capital Planning life-cycle and further detailed analysis is required before the project is progressed to Gate 2, CH2M HILL considers that a clear, consistent and transparent decision-making process has been followed to date with respect to this project.

6.4.5 Efficiency

A review of the efficiency of Seqwater's proposed *North Pine Dam Upgrade* project is outlined below; specifically this includes a review of the proposed scope of works, the standard of works and estimated project costs.

Scope of works

The *North Pine Dam Upgrade* project is currently at the strategic options assessment stage of project planning and further detailed investigation is required before the project is progressed. The AFC assessment did not seek to identify a preferred or optimal upgrade option, rather the assessment was limited to the identification of conceptual options that could potentially achieve flood capacity for 100 percent of the PMF. In presenting and discussing the range of potential options at the concept level, CH2M HILL considers that the scope of works for each option was appropriately defined.

Consistent with AFC assessment, the risk assessment conducted as part of the Dams PRA outlined the scope of works for each of five options considered. For example, for the purposes of the PRA the scope of works for Option 5 consists of:

- Replacement of wind bracing on gate superstructure and angle braces with tube braces
- Full height single stage filter buttress – Saddle Dam 1
- 1.5m parapet wall on main dam:
    - Limited access (gantry crane)
    - Remove top of kerb (450mm thick)

- Keep existing reinforcement in kerb
- Construct a new 1.5m tall parapet wall (300mm) on kerb
- Dowel into concrete section of bridge deck

- Parapet wall on main embankment:
  - Right and left-hand side of main embankment
  - Saddle numbers 1, 2, and 3
  - Construct on upstream side of roads
- Larger gates on spillway:
  - Lower ogee crest
  - New bridge superstructure
  - Larger radial gates
  - Stilling basin modification
  - Tailwater control structure.

CH2M HILL notes that there conceptual engineering sketches accompanying the scope of works outlined in the North Pine Dam risk assessment.

Based on the concept-level of investigation done to date, CH2M HILL considers that the proposed scope of works for the project appears reasonable.

Standard of works

CH2M HILL notes that the North Pine Dam risk assessment undertaken as part of the Seqwater Dams PRA was completed in consultation with an expert panel and carried out in accordance with the requirements of the ANCOLD *Guidelines on Risk Assessment* (2003).

Based on the information and documentation reviewed for this project CH2M HILL considers that the standard of works adopted is appropriate and in-line with industry good practice.

Project cost

The reported expenditure for the *North Pine Dam Upgrade* project is $102.525 million (real 2014 terms), for which CH2M HILL has not been provided with a stand-alone indicative cost breakdown.

CH2M HILL notes however, that an indicative concept-level project cost estimate for the complete upgrade of North Pine Dam to meet 100 percent of AFC requirements. This cost estimate relates to the scope of works for Option 5 in the Dams PRA (outlined above).

The project cost estimate for Option 5 for upgrade works for North Pine Dam is approximately $211.707 million ($2013), and includes a contingency of 35 percent and an accuracy of -30 percent to +50 percent. A breakdown of the project estimate for Option 5 is provided in Table 6-7.

Table 6-7: North Pine Dam Upgrade cost breakdown ($2013)

Item	Description	Unit	Quantity	Rate	Amount ($)
A	**Preliminary and general**	LS		15% of items B, C and D	**$14,926,515**
B	**Replace wind bracing**	Item	1	$500,000	**$500,000**
C	**Filter Buttress – Saddle Dam 1**				
C1	Site Clearing and Preparation	Sqm	200	$5	$1,000
C2	Excavation for toe drain	m^3	560	$25	$14,000
C3	Filter Sand	m^3	5,600	$35	$672,000
C4	Earthfill	m^3	8,960	$5,000	$313,600
C5	Outlet Structure	Item	1		$5,000
	Sub-total				**$1,005,600**
D	**AFC Upgrades**				
D1	Temporary works	LS	1	$7,210,000	$7,210,000
D2	Demolition	LS	1	$5,047,000	$5,047,000
D3	Foundation Preparation	LS	1	$257,500	$257,500
D4	Concrete Works	LS	1	$72,100,000	$72,100,000
D5	New Gate and Bridge Installation	LS	1	12,360,000	12,360,000
D6	Upgrade to Local Infrastructure	LS	1	$1,030,000	$1,030,000
	Sub-total				**$98,004,500**
	TOTAL DIRECT COST ESTIMATE				**$114,436,615**
	Contractors off-site O/H and profit			25%	$28,609,154
	CONSTRUCTION CONTRACT COST				**$143,045,769**
E	**Other Owner Provisions**				
E1	Design	LS	1	5%	$7,152,288
E2	Site Supervision	LS	1	5%	$7,152,288
E3	Project Management	LS	1	3%	$4,291,373
E4	Contingency on Construction Direct Cost	LS	1	35%	$50,066,019
	Sub-total				**$68,661,968**
	TOTAL PROJECT COST ESTIMATE				**$211,707,738**

Source: URS, 2013. *Dams Portfolio Risk Assessment – Dam Safety Risk Management Strategy*

The above concept-level project cost estimate was developed by URS for budget planning purposes as part of the AFC assessment and carried forward as part of the Dams PRA.

CH2M HILL sought feedback from Seqwater as to how the indicative cost estimate for Option 5 as outlined in the Dams PRA is reconciled against the reported capital expenditure for the *North Pine Dam Upgrade* project. Seqwater provided the following response:[23]

> *"The $211.7M referred to on page 523* [of the Dams PRA] *only references "Option 5". In the risk reduction actions developed for the dams, Action NOR-ACT6 was to upgrade the flood capacity of North Pine dam. In Table 23-6 for Option 5 the full AFC upgrade and other recommended upgrades is given a best estimate cost of $220M with a range from a low estimate of $150 to $320M.*
>
> *These estimates have been updated based on information from the Seqwater Dams Capital Works Program report (DNP 19). URS were engaged to assist in updating and refining the capital works program from the PRA.*
>
> *In this report, the upgrade of North Pine Dam was split into three phased projects to address the highest risks first. For all years, these projects are projected to have a total cost of $259.3M, which is within the range set out in Table 23-6 in the PRA.* ***For all years****, when rebased to 2014 dollars, the cost of the three projects combined is $261.8M.*
>
> *The costs for the following projects have been included in the submission (i.e. forecast to FY28) and have been rebased to 2014 dollars:*
>
> - *North Pine Strengthening of the Spillway Bridge (completion date 2017) - $2.25M*
> - *North Pine Saddle Dam filter buttress, dam parapet wall and spillway bridge raise (completion date 2022) $102.5M*
> - *North Pine Spillway upgrade (completion date 2032) – costs of $35.8M*
>
> *For the project North Pine Spillway upgrade including new radial gates, dissipater upgrade, new gantry crane and baulk gate, only the costs that fall within the regulatory period have been included. When rebased to 2014 dollars, the total project cost is $157.1M, however, only $35.8M falls within the regulatory period."*

Seqwater has submitted a total budgeted capital expenditure for the complete program of upgrade works for North Pine Dam over the forecast regulatory period of $140.634 million. Based on information provided by Seqwater, the complete program of upgrade works for North Pine Dam is estimated at 261.85 million. CH2M HILL notes that this is approximately 24 percent greater than the estimate for Option 5. However, CH2M HILL considers Seqwater's total cost estimate of $261.85 million for the entire suite of upgrade works for North Pine Dam is within the quoted level of accuracy developed as part of the PRA (i.e. -30 percent to +50 percent).

The project is in concept development phase, and has not progressed past Gate 1 of Seqwater's capital planning life-cycle process. CH2M HILL also notes that there is a clear need for further detailed investigation and design. As such, CH2M HILL considers that the proposed capital expenditure of $102.525 million for the *North Pine Dam Upgrade* project is sufficiently defined in the cost estimate for the complete upgrade of North Pine Dam as detailed in Table 6-7 above, and outlined in the Seqwater Dams PRA.

CH2M HILL considers the project costs to be reasonable given the project development stage, and notes that the cost will be further refined and market tested during the design and

[23] Seqwater response provide via email dated Wednesday, 1 October 2014.

construct phases. Furthermore, key assumptions and limitations involved in the project cost estimate are clearly stated.

6.4.6 Efficiency gains

No efficiency gains have been identified by Seqwater for this project.

6.4.7 Assessment of Prudency and Efficiency

The *North Pine Dam Upgrade* project is currently at the *System Master Planning and Investment Profile* Stage of Seqwater's Capital Planning life-cycle. Based on a review of existing documentation, it has been assessed as prudent. The primary driver of compliance has been demonstrated, and the project is supported by an adequate decision-making process to date. CH2M HILL, however, has identified an opportunity for Seqwater to improve the transparency of its decision-making processes with respect to its dam safety program (see Section 4.3.1).

Based on the concept-level of investigation done to date, which are supported by concept-level engineering sketches, CH2M HILL considers that the proposed scope of works for the project appear reasonable. CH2M HILL notes that investigation done to date has been undertaken in consultation with an expert panel and carried out in accordance with the requirements of the ANCOLD *Guidelines on Risk Assessment* (2003) and the DEWS *Acceptable Flood Capacity Guidelines for Water Dams* (current version 2013). As such, CH2M HILL considers that the standard of works adopted is appropriate and in-line with industry good practice.

Recognising that this project is scheduled for commissioning in 2022, CH2M HILL notes that sufficient evidence has been provided to demonstrate how Seqwater's proposed cost estimate of $102.525 million has been developed. CH2M HILL considers the project costs to be reasonable and will be further refined and market tested during the design and construct phases.

CH2M HILL finds the *North Pine Dam Upgrade* project to be prudent and efficient.

6.4.8 Assessment of reported expenditure

Seqwater has identified proposed capital expenditure of $102.525million (real 2014 terms) over the period from 2019-20 to 2022-23 for the *North Pine Dam Upgrade* project. Table 6-8 below identifies the recommended capital expenditure for this project.

Table 6-8: *North Pine Dam upgrade* recommended capital expenditure (M, real 2014)

Project Expenditure Profile	2019-20	2020-21	2021-22	2022-23	Total Forecast
Seqwater Forecast Expenditure	$1.010	$0.505	$50.505	$50.505	$102.525
Proposed Adjustment	-	-	-	-	-
CH2M HILL Recommended Expenditure Profile	**$1.010**	**$0.505**	**$50.505**	**$50.505**	**$102.525**

On the basis of the assessment outlined above, it is recommended that Seqwater's forecast capital expenditure remain unchanged as outlined in Table 6-8.

6.4.9 Extrapolation to other projects

Given the above findings and the fact that no systemic issue has been identified with the processes applied by Seqwater in relation to this project, CH2M HILL does not consider that the findings from this project can be extrapolated to other projects.

6.5 Mount Crosby West Bank WTP - Capacity Upgrade

6.5.1 Project description

The Mount Crosby Water Treatment Plants (WTPs) – both Westbank WTP and Eastbank WTP – supply approximately 40 percent of the total water produced from the Seqwater's WTP portfolio. The Mt Crosby WTPs therefore, are of critical significance to the operation of the south-east Queensland bulk supply network. The main water source for these treatment plants is Wivenhoe Dam via the Brisbane River. The treatment plants are of a conventional design, with flocculation, sedimentation, filtration, chlorine disinfection and fluoridation. Westbank WTP has an additional secondary solids removal process, being a dissolved air flotation (DAF) system.

Based on forecast growth in the greater Brisbane region over the regulatory period, Seqwater has assessed that an additional 100 ML/day of output from Mt Crosby is required by 2027, based on mean day maximum month (MDMM). The required output from Mt Crosby is forecast to be 850 ML/day by 2027, compared to the current capacity of 750 ML/day.

The *Mount Crosby West Bank WTP – Capacity Upgrade* project involves supplementing the existing processes at Westbank WTP with a membrane filtration facility sized at 350 ML/day. The facility would operate in series to the existing infrastructure in order to reduce potential fouling on the membranes, with some augmentation required to the existing infrastructure involving additional flocculation area and additional raw water pumps.

Project development stage

This project is at the *System Master Planning and Investment Profile* Stage of Seqwater's Capital Planning life-cycle (Gate 1 of the investment planning approval process), and as such has not progressed beyond a conceptual options assessment. The *Mount Crosby West Bank WTP – Capacity Upgrade* project is scheduled for commissioning in 2027.[24]

6.5.2 Proposed capital expenditure

As outlined in Seqwater's 2015-18 Submission, the proposed capital cost for this project is $77.381 million (real 2014 terms). The reported capital expenditure for the *Mount Crosby West Bank WTP – Capacity Upgrade* project is outlined in Table 6-9.

Table 6-9: Mount Crosby West Bank WTP – Capacity Upgrade reported expenditure (M, real 2014)

Project component	2023-24	2024-25	2025-26	2026-27	TOTAL
Project design and delivery	$7.738	$23.214	$23.214	$23.214	$77.381
TOTAL	**$7.738**	**$23.214**	**$23.214**	**$23.214**	**$77.381**

6.5.3 Provided documentation

Documentation reviewed in respect of the *Mount Crosby West Bank WTP – Capacity Upgrade* project included:

- Seqwater, Mt Crosby Short-term Critical Process Improvements – Needs Analysis, September 2012
- Seqwater, Executive Leadership Team (ELT) Paper - Mt Crosby WTP Critical Process Improvements: Feasibility and Design, September 2012
- Seqwater, Mt Crosby Critical Process Improvements Need Analysis – ELT Approval, September 2012
- Seqwater, Bulk Water Supply System Interim Operating Strategy 2014-2029, July 2014
- SMK, Mt Crosby Water Treatment Plants: Critical Process Improvements – Feasibility and Preliminary Design, July 2014
- Seqwater, Mt Crosby Water Treatment Plants Future Asset Improvement Investments – Needs Analysis, August 2014
- Seqwater, Mt Crosby Water Treatment Plants Future Asset Improvement Investments – Options Analysis, August 2014
- Seqwater, Mt Crosby (Eastbank and Westbank) Water Treatment Plants – Long Term Planning Executive Summary Report, August 2014
- Seqwater, D14/114353 Mt Crosby costs to increase production by 100 ML/d to 850 ML/d, September 2014.

[24] Seqwater, 2014. *Seqwater Bulk Water Prices 2015-18 – Submission to the QCA*, p.133.

6.5.4 Prudency

A review of the prudency of Seqwater's proposed *Mount Crosby West Bank WTP – Capacity Upgrade* project is outlined below; specifically this includes a review of identified the project driver(s) and the decision making process supporting the proposed project.

Project driver

The primary driver identified by Seqwater for this project is demand/growth.

As identified in the *Mt Crosby Water Treatment Plants Future Asset Improvement Investments – Needs Analysis* (the *Mt Crosby Needs Analysis*), forecast growth in the greater Brisbane region will require additional output from Mt Crosby in the near future. The required output from Mt Crosby is forecast to be 850 ML/day by 2027 (based on mean day maximum month, MDMM) – an increase of 100 ML/day from the current capacity of the site.

CH2M HILL notes that Seqwater's needs analysis is based on an adopted "most-likely" demand scenario of 285L/person/day[25] (consistent with the *Bulk Water Supply System Interim Operating Strategy 2014-2029*), current seasonal peaking factors and current capability and risk assessments. As a result of this needs analysis, Seqwater has identified that the two Mt Crosby WTPs will be required to reliably and continuously deliver 750 ML/day (MDMM) under normal water quality conditions by 2020 and an additional treatment capacity of 100 ML/day will be required in 2025.[26] This was confirmed as part of the *Mt Crosby Water Treatment Plants Future Asset Improvement Investments – Options Analysis* (the *Mt Crosby Options Analysis)*.[27]

Further analysis conducted by Seqwater for the purposes of the *Mt Crosby (Eastbank and Westbank) Water Treatment Plants – Long Term Planning Report (*the *Mt Crosby Long Term Planning Report*) confirmed the above requirements, however, revised the timelines to 2019 for the reliability upgrade (at the current 750 ML/day) and 2027 for the increase in capacity of 100 ML/day.[28]

Based on a review of available information, CH2M HILL considers that the cost driver for this project has been appropriately identified.

Decision making process

The *Mount Crosby West Bank WTP – Capacity Upgrade* project is supported by a range of documented investigations, planning studies, a needs analysis and options assessment. Key documents relevant to the decision making process of this project include:

- Mt Crosby Water Treatment Plants Future Asset Improvement Investments – Needs Analysis, August 2014
- Mt Crosby Water Treatment Plants Future Asset Improvement Investments – Options Analysis, August 2014
- Mt Crosby (Eastbank and Westbank) Water Treatment Plants – Long Term Planning Executive Summary Report, August 2014.

[25] As part of the Terms of Reference of this Review, CH2M HILL has been directed to accept Seqwater's demand forecasts.
[26] Seqwater, 2014. *Mt Crosby Water Treatment Plants Future Asset Improvement Investments – Options Analysis*, p. 6.
[27] Seqwater, 2014. *Mt Crosby Water Treatment Plants Future Asset Improvement Investments – Options Analysis*, p. 2.
[28] Seqwater, 2014. *Mt Crosby (Eastbank and Westbank) Water Treatment Plants – Long Term Planning Executive Summary Report, p. 9.*

As outlined above, it had been determined by Seqwater that additional treatment capacity of 100 ML/day will be required by 2027 at the two Mt Crosby WTPs.

The *Mt Crosby Options Analysis* (completed and signed on 26 August 2014) assessed a range of potential options that could meet the requirements of increasing the reliable production of the Mt Crosby site to 750 ML/day by 2020 and increasing capacity by a further 100 ML/day by 2025.

With respect to increasing capacity to 850 ML/day, it was found that a parallel augmentation at the West Bank WTP was likely to be very costly, would not utilise the existing capacity of both sites (Westbank and Eastbank) and was therefore deemed to be not feasible.[29]

With respect to achieving the increase in capacity of 100 ML/day, as part of the recommended option[30] to meet the reliability and capacity requirements of the Mt Crosby site, it was recommended that the Eastbank WTP be upgraded to 600 ML/day (from 500 ML/day).[31] The capacity upgrade could be achieved by installing four new filter cells adjacent to the existing stage 3 and 4 filter banks, achieving the additional required capacity at low risk. The cost estimate for the capacity increase via the installation of new filters was $35 million (compared to the cost estimate of $77.381 million for the capacity upgrade to the Westbank WTP outlined in Seqwater's 2015-18 Submission).

As outlined in the *Mt Crosby Options Analysis*, the preference for upgrading Eastbank WTP was based on the Westbank WTP upgrade being significantly more expensive, and potentially more technically and operationally challenging.[32]

The *Mt Crosby Long Term Planning Report* (signed 27 August 2014) confirms the planned capacity upgrade for the Mt Crosby site. CH2M HILL notes however, that in contrast to the above findings from the *Mt Crosby Options Analysis*, the *Mt Crosby Long Term Planning Report* states there is a need to confirm the most efficient solution for the provision of an additional 100 ML/day.

As noted in the *Mt Crosby Long Term Planning Report*:[33]

> *"The timing* [of the planned capacity increased] *allows for further assessment of the options to increase capacity which is either to increase the throughput at Westbank to 350 ML/day by providing membrane filtration in series to the existing process or by adding additional filter area at Eastbank."*

Furthermore, a key recommended action (immediate action number 7) outlined in the *Mt Crosby Long Term Planning Report* is to confirm the most efficient solution for the provision of an additional 100 ML/day at the Mt Crosby site.[34] This is inconsistent with Seqwater's 2015-18 Submission (submitted to the QCA in July 2014) which proposes to upgrade the Westbank WTP to 350 ML/day (from 250 ML/day) to meet the required capacity upgrade of the Mt Crosby.

[29] Seqwater, 2014. *Mt Crosby Water Treatment Plants Future Asset Improvement Investments – Options Analysis*, p. 10, 12.

[30] The recommended option was 'Eastbank and Westbank Lamella and Filtration upgrades plus alternate raw water source'. This was referred to as 'Option 3' in the executive summary, and 'Option 2 in' the main report body. The reason for the inconsistency was the treatment of the base case; the base case was referred to as 'Option 1' in the executive summary, and 'Option 0' in the main report body.

[31] Seqwater, 2014. *Mt Crosby Water Treatment Plants Future Asset Improvement Investments – Options Analysis*, p. 2.

[32] *Seqwater, 2014. Mt Crosby Water Treatment Plants Future Asset Improvement Investments – Options Analysis*, p. 12.

[33] Seqwater, 2014. *Mt Crosby (Eastbank and Westbank) Water Treatment Plants – Long Term Planning Executive Summary Report*, p. 10-11.

[34] Seqwater, 2014. *Mt Crosby (Eastbank and Westbank) Water Treatment Plants – Long Term Planning Executive Summary Report*, p. 12.

As supporting evidence for the decision to upgrade the Westabnk WTP, Seqwater provided an accompanying brief Memorandum (*D14/114353 Mt Crosby costs to increase production by 100 ML/d to 850 ML/d*) as part of this Review. The Memorandum states there is uncertainty regarding the longer term suitability for capacity expansion at Eastbank, and references a SKM options study from 2012 (document number D14/45298).

CH2M HILL notes that there is significant uncertainty regarding the preferred site for the capacity upgrade to Mt Crosby, and recognises that the proposed capacity upgrade to the WTPs is technically complex. This uncertainty and complexity is also recognised by Seqwater[35]:

> "Seqwater agrees that there is a level of uncertainty at this stage of planning regarding the most efficient option to increase the capacity of the Mt Crosby WTPs complex. It will commence more detailed planning into the most efficient solution in 2017. Commencing these investigative works in 2017 will provide five years of planning related activities to confirm the design, prior to seeking Business Case approval in 2022 such that a five year program of detailed design and construction activities can commence for completion by 2027.
>
> Two options to increase capacity are being considered in detail, with one at Westbank and one at Eastbank."

CH2M HILL understands that the *Mount Crosby West Bank WTP – Capacity Upgrade* project is still at the *System Master Planning and Investment Profile* Stage of Seqwater's Capital Planning life-cycle. CH2M HILL considers that Seqwater has sufficiently demonstrated a forecast capacity shortfall in treatment capacity in the bulk water system in 2027 and that a capacity of upgrade of the Mt Crosby WTPs would be the most appropriate means of meeting this need. It is also recognised that further detailed analysis and investigation is required before the project is progressed to Gate 2 of Seqwater's investment planning approval process. As such, CH2M HILL has assessed the *Mount Crosby West Bank WTP – Capacity Upgrade* project as prudent.

6.5.5 Efficiency

A review of the efficiency of Seqwater's proposed *Mount Crosby West Bank WTP – Capacity Upgrade* project is outlined below; specifically this includes a review of the proposed scope of works, the standard of works and estimated project costs.

Scope of works

The *Mount Crosby West Bank WTP – Capacity Upgrade* project is still at the conceptual options assessment stage of project planning and further detailed investigation is required before the project is progressed.

As noted above, Seqwater is currently reviewing strategic options to increase the treatment capacity at the Mt Crosby WTPS – these being Westbank or Eastbank. For the purposes of developing high-level cost estimates, sufficiently detailed preliminary scopes of works have been developed for each site.

With respect to the potential upgrade of the Westbank site, this would involve supplementing the existing processes with a membrane filtration facility sized at 350 ML/day.

[35] Seqwater 2014, *APDD response to CH2 Draft October 8 report version 2 FINAL*, p. 13.

This facility would operate in series to the existing infrastructure in order to reduce potential fouling on the membranes. CH2M HILL notes that this option would require some augmentation of existing infrastructure with additional flocculation area and additional raw water pumps.

Based on the concept-level of investigation done to date, and considering the planned commissioning of the works in 2027, CH2M HILL considers that the proposed scope of works for the project appears reasonable at this point in time of the project planning lifecycle.

Standard of works

CH2M HILL notes that supporting investigations and options assessments undertaken to date clearly sets out the relevant design criteria and assumptions used and has provided an adequate level of works sequencing. Based on the information and documentation reviewed for this project CH2M HILL considers that the standards of work adopted are appropriate and in-line with industry good practice.

Project cost

The reported expenditure for the *Mount Crosby West Bank WTP – Capacity Upgrade* project is $77.381 million (real 2014 terms), and is based on the cost estimate outlined in Table 6-10 below.

Table 6-10: Cost estimate for Westbank, membrane and capacity augmentation to 350 ML/day ($2012)

Item	Cost	Derivation	Basis
250 ML/day membrane racks	$6250,000	50,000 * 250 * 50%	Based on standard membrane cost vs output scales
250 ML/day peripherals	$41,666,667	(50,000 * 250) / (100% - 70%)	70% of total project cost
Membrane only – 250 ML/day	$6,250,000	50,000 * 250 * 50%	Based on standard membrane cost vs output scales
Capacity upgrade 100 ML/day membrane racks	$2,500,000	50,000 * 100 * 50%	Assumed costs would be locked in based on total of 350 ML/day
Capacity upgrade peripherals	$16,666,667	(50,000 * 100) / (100% - 70%)	70% of total project cost
Capacity upgrade membrane – 100 ML/day	$2,500,000	50,000 * 100 * 50%	Based on standard membrane cost vs output scales
Total	$75,833,333		

Source: Seqwater, 2014. D14 114353 Mt Crosby costs to increase production by 100 ML d to 850 ML d memo.pdf

The above cost estimate was developed in 2012, and when escalated to 2014 dollars is approximately $77.381 million.

Of concern to CH2M HILL is the high-degree of uncertainty regarding the optimal option for upgrading capacity at Mt Crosby WTPs. Of particular concern to CH2M HILL is the fact that Seqwater has put forward an option as part of its 2015-28 Submission that is 120 percent[37] more expensive than the preferred option identified by its own analysis. No documented justification of the rationale for this decision has been provided.

As outlined in the *Mt Crosby Options Analysis* report, an upgrade of the Eastbank WTP from 500 ML/day to 600 ML/day could be achieved by the installation of four new filter cells adjacent to the existing stage 3 and 4 filter banks, achieving the additional required capacity at low risk. The cost estimate for upgrading the capacity of Eastbank WTP was $35 million. CH2M HILL notes that additional works at the Eastbank site would be likely include the expansion of a sludge facility which had not been included in the $35 million cost estimate.

As noted above, CH2M HILL considers that upgrade in treatment capacity at the Mt Crosby WTPs to be prudent. However, recognising the uncertainty in cost estimates for the respective upgrades to Westbank and Eastbank WTPs provided by Seqwater, the complexity of upgrading the site, and the requirement for further detailed investigation and assessment, CH2M HILL considers that the lower current cost estimate of $35 million should be included in Seqwater's proposed forecast capital expenditure for the purposes of establishing an appropriate price path.

CH2M HILL notes that the project is in concept development phase, and has not progressed past Gate 1 of Seqwater's capital planning life-cycle process. Based on a review of provided information, CH2M HILL recommends reducing the reported expenditure for this project from $77.381 million to $35 million.

6.5.6 Efficiency gains

No efficiency gains have been identified by Seqwater for this project.

6.5.7 Assessment of Prudency and Efficiency

Based on a review of existing documentation, the *Mount Crosby West Bank WTP – Capacity Upgrade* project has been assessed as prudent. The project is currently at the *System Master Planning and Investment Profile* Stage of Seqwater's Capital Planning life-cycle. The primary driver of compliance has been demonstrated, and the project is supported by an adequate decision-making process to date. It is noted by Seqwater that significantly more detailed investigation is required before a preferred option is identified.

Based on the high-level investigation done to date, and considering the planned commissioning of the works in 2027, CH2M HILL considers that the proposed scope of works for the project appears reasonable at this point in time of the project planning lifecycle. CH2M HILL notes that supporting investigations and options assessments undertaken to date clearly sets out the relevant assumptions and as such CH2M HILL considers that the standard of works adopted are appropriate and in-line with industry good practice.

However, for the purposes of this Review the proposed expenditure for the *Mount Crosby West Bank WTP – Capacity Upgrade* has been assessed as inefficient. Recognising the uncertainty in cost estimates for the respective upgrades to Westbank and Eastbank WTPs provided by Seqwater, the complexity of upgrading the site, and the requirement for further detailed investigation and assessment, CH2M HILL considers that the lower current cost

[37] The recommended option of upgrading Eastbank WTP was estimated at $35 million compared to estimated cost of $77 million to upgrade Westbank WTP.

estimate of $35 million should be included in Seqwater's proposed forecast capital expenditure for the purposes of establishing an appropriate price path.

CH2M HILL has assessed the *Mount Crosby West Bank WTP – Capacity Upgrade* project to be prudent but inefficient.

6.5.8 Assessment of reported expenditure

Based on the above assessment, CH2M HILL recommends removing $42.381 million from the proposed $77.381 million for the *Mount Crosby West Bank WTP – Capacity Upgrade* project.

Table 6-11 below identifies the recommended capital expenditure for the *Mount Crosby West Bank WTP – Capacity Upgrade* project.

Table 6-11: Mount Crosby West Bank WTP – Capacity Upgrade recommended capital expenditure (M)

Project Expenditure Profile	2023-24	2024-25	2025-26	2026-27	TOTAL
Seqwater Forecast Expenditure	$7.738	$23.214	$23.214	$23.214	$77.381
Proposed Adjustment	**-$7.738**	**-$23.214**	**-$ 8.214**	**-$3.214**	**-$ 42.381**
CH2M HILL Recommended Expenditure Profile	-	-	**$15.000**	**$20.000**	**$35.000**

On the basis of the assessment outlined above, it is recommended that Seqwater's forecast capital expenditure be adjusted as outlined in Table 6-11.

6.5.9 Extrapolation to other projects

Given the above findings, the unique nature of the project and the fact that no systemic issue has been identified with the processes applied by Seqwater in relation to this project, CH2M HILL does not consider that the findings from this project can be extrapolated to other projects.

6.6 Somerset Dam – Dam Stabilisation Design

6.6.1 Project description

Somerset Dam is located on the Stanley River in the upper limit of the Wivenhoe Dam storage, near the township of Esk in Southeast Queensland. Seqwater took over ownership of Somerset Dam from the SEQ Water Corporation on 1 July 2009. Somerset Dam is classified as a referable dam having a Category 2 failure impact rating with an Extreme Incremental Flood Hazard Category (IFHC).

The Somerset Dam has been identified as having insufficient capacity to safely pass the AFC requirements prescribed by the DEWS *Guidelines on Acceptable Flood Capacity for Dams*. The current spillway arrangements at Somerset Dam was assessed as having insufficient capacity to safely pass AFC requirements and were found to pass approximately 60 percent of the Probable Maximum Flood (PMF) before overtopping occurs. Previous studies have also identified that the stability conditions of the dam body and abutments due to overtopping loads caused by PMF event need to be investigated.

The scope of the *Somerset Dam – Dam Stabilisation Design* project comprises post-tensioned anchor upgrade works to increase the stability of the dam in a PMF event and earthquake.

Project development stage

This project is at the *System Master Planning and Investment Profile* Stage of Seqwater's Capital Planning life-cycle (Gate 1 of the investment planning approval process) and as such has not progressed beyond a conceptual options assessment. The *Somerset Dam – Dam Stabilisation Design* project is scheduled for commissioning in 2027.[38] CH2M HILL notes that Seqwater has recently commissioned a *Somerset Dam – Flood Upgrade Options Feasibility Study* that is under development.

6.6.2 Proposed capital expenditure

As outlined in Seqwater's 2015-18 Submission, the proposed capital cost for this project is $72 million (real 2014 terms). The reported capital expenditure for the *Somerset Dam – Dam Stabilisation Design* project is outlined in Table 6-12.

Table 6-12: Somerset Dam – Dam Stabilisation Design, reported expenditure (M, real 2014)

Project component	2024-25	2025-26	2026-27	TOTAL
Detailed design	$2.000			$2.000
Project delivery		$30.000	$40.000	$70.000
TOTAL	**$2.000**	**$30.000**	**$40.000**	**$72.000**

Further discussion of the reported capital expenditure for the *Somerset Dam – Dam Stabilisation Design* project is provided in Section 6.6.5.

6.6.3 Provided documentation

Documentation reviewed in respect of the *Somerset Dam – Dam Stabilisation Design* project included:

- Somerset Dam – Amended Dam Safety Conditions, May 2009
- Entura, Somerset Dam – Acceptable Flood Capacity and Concept Design Report, December 2011
- Seqwater, Dam Safety Investigations Program – Business Case, November 2013
- URS, Seqwater Dams Portfolio Risk Assessment – Dam Safety Risk Management Strategy, November 2013
- URS, Somerset Dam Safety Review, March 2014
- DEWS, Wivenhoe and Somerset Dams Optimisation Study, March 2014.
- URS, Dams and Weirs Capital Works Program, May 2014
- Seqwater, Asset Portfolio Master Plan 2014-28, 2014
- Seqwater, Scope of Works: Somerset Dam – Flood Upgrade Options Feasibility Study – Brief, June 2014

[38] Seqwater, 2014. *Seqwater Bulk Water Prices 2015-18 – Submission to the QCA*, p.133.

- Seqwater, Lake Somerset – Risk Information Memorandum, September 2014
- GHD, Somerset Dam Flood Upgrade Options Feasibility Study, Draft Interim Report, September 2014 (provided 17/10/2014).

6.6.4 Prudency

A review of the prudency of Seqwater's proposed *Somerset Dam – Dam Stabilisation Design* project is outlined below; specifically this includes a review of identified the project driver(s) and the decision making process supporting the proposed project.

Project driver

The primary driver identified by Seqwater for this project is compliance.

Somerset Dam is an extreme hazard dam and is required to safely pass the Probable Maximum Flood (PMF), in accordance with DEWS *Guidelines on Acceptable Flood Capacity for Water Dams*. In 2009, DEWS issued and imposed dam safety conditions on Somerset Dam under the *Water Supply (Safety and Reliability) Act 2008*.

In 2011, Seqwater engaged Entura to undertake an AFC assessment of Somerset Dam in which it was determined that Somerset Dam had a 60 percent compliance with AFC requirements (as determined by PMF) and upgrade works were required by 2025 to provide a minimum flood discharge capacity of 75 percent of the AFC.[39] It was also noted that the Somerset Dam would not be stable in a PMF event and may also suffer distress during an earthquake. A concept design was therefore undertaken to increase the stability of Somerset Dam by the installation of post-tensioned anchors as part of the assessment.

Further investigation undertaken by Seqwater in 2014[40] identified that Somerset Dam had a 71 percent compliance with AFC requirements (as determined by PMF). As such, current estimates of the extreme flood capacity of Somerset Dam under existing operations were found to exceed the minimum AFC requirement of 65 percent within the current timeframes set in Queensland's dam spillway upgrade program (it is noted, however, that the dam does not meet the long-term requirement of 100 percent of AFC). Consequently, it was noted in the *Wivenhoe-Somerset Dam Optimisation Study* (DEWS, 2014) that dam safety upgrades would be required for Somerset Dam by 2035. It was also noted that because of the magnitude of consequences of failure for the dam that the timing of these upgrades would need to be periodically reviewed.[41]

CH2M HILL notes that options for upgrading Somerset Dam to be able to pass 100 percent of the AFC (as determined by PMF) require further detailed investigations to understand both the engineering feasibility and whether they have implications for developments (e.g. facilities, infrastructure and property), and flood risk management downstream.

In 2013, URS were engaged by Seqwater to undertake the *Somerset Dam Safety Review*, which included a review and update of the risk probabilities and failures modes outlined in the PRA. As a result of this review, the risk probabilities for the failure modes SOM-F5 (erosion of abutments) and SOM-F6 (cascade failure of Somerset and Wivenhoe Dams) were increased as a result of the assessed increased erosion potential of the rock foundations

[39] Entura, 2011. *Somerset Dam - Acceptable Flood Capacity and Concept Design Report*, p. 10.
[40] Seqwater undertook this investigation as part of the *Wivenhoe-Somerset Dam Optimisation Study - Simulation of alternative flood operations options* study. This individual study has not been made available to CH2M HILL at the time of the Draft Report, however results from the study were referenced in the *Wivenhoe-Somerset Dam Optimisation Study* undertaken by DEWS.
[41] DEWS, 2014. *Wivenhoe-Somerset Dam Optimisation Study*, p.143.

when flows start to pass over the non-overflow sections of the dam. However, the risk probabilities related to dam stability analysis remained relatively consistent with those presented in the PRA. Overall, the risk assessment completed as part of the *Somerset Dam Safety Review* assessed the Somerset Dam as not meeting the ANCOLD Limit of Tolerability.[42]

While the recent AFC assessment identified the need for dam safety upgrades for Somerset Dam by 2035, the updated risk assessment carried out as part of the *Somerset Dam Safety Review* identified the Somerset Dam as not meeting the ANCOLD Limit of Tolerability. Based on a review of available information, CH2M HILL considers that the cost driver for this project has been appropriately identified.

Decision making process

The *Somerset Dam – Dam Stabilisation Design* project is supported by a range of AFC assessments, risk assessments, investigations and high-level conceptual options.

As noted above, as part of the AFC assessment Entura were engaged to develop a concept design to increase the stability of Somerset Dam by the installation of post-tensioned anchors as part of the assessment. As a result of the concept design, it was confirmed that under earthquake loading the dam would meet the stability requirements for seismic loading if it was upgraded to pass the PMF.[43]

In 2013, Seqwater engaged URS to undertaken a risk assessment of the Somerset Dam as part of the Seqwater PRA. The risk assessment was completed in accordance with the ANCOLD *Guidelines on Risk Assessment* (2003).

As a result of the PRA, a range of recommended dam safety risk management actions, including their corresponding level of urgency and timing, were identified for Somerset Dam. These are outlined in Table 6-13 below. No specific recommendations for upgrading Somerset Dam were made over the review period (2014-15 to 2027-28) although necessary investigations and approximate timeframes were identified.

[42] URS, 2014. *Somerset Dam Safety Review*, p. 155.
[43] Entura, 2011. *Somerset Dam - Acceptable Flood Capacity and Concept Design Report*, p. 38.

Table 6-13: Recommended dam safety risk management actions for Somerset Dam

Urgency	Timing of Action (years)	Recommendation Action
Level 3	5	A stability analysis of the apron slab should be undertaken to confirm that the apron slab would protect the toe of the dam due to erosion
Level 3	5	A review of the rock mechanics at the abutment as part of the next dam safety review to confirm tensile stresses in the foundation and provide a more accurate assessment of the probabilities for this failure mode
Level 4	10	Review risk with removal of gates
Level 5	15	Design upgrade – post tensioned anchors and abutment concrete works
Level 6	25	Construct upgrade

Source: URS, 2013. *Seqwater Dams Portfolio Risk Assessment – Dam Safety Risk Management Strategy*, p. 339.

As noted above, Seqwater engaged URS to undertake the *Somerset Dam Safety Review*. As a result of the further investigation and risk assessment undertaken as part of the review, it was identified that the societal risk for Somerset Dam was greater than identified during the PRA and not meeting the ANCOLD Limit of Tolerability. As such, the timeline for undertaking works to reduce risks at the dam is required to be brought forward to within 5 years (Recommendation 36).[44] CH2M HILL understands that this is the dominant driver for the associated *Somerset Dam – Abutment concrete aprons* project.

Further investigation of Somerset Dam was undertaken as part of the *Wivenhoe-Somerset Dam Optimisation Study* (DEWS, 2014). As outlined in the study, there remain a range of uncertainties relating to:

- Resistance of abutment and downstream foundations to impact erosion by dam overtopping flows
- Stability of the upper parts of the dam under dam crest flood loads
- Structural adequacy and reliability of the spillway gates and supports – also under flood loads.

As such, it was concluded in the *Wivenhoe-Somerset Dam Optimisation Study* that further detailed investigations were required to determine the most appropriate dam safety upgrade measures and timeframes for Somerset Dam.[45] Furthermore, it was recommended that additional detailed surveys, analysis of structural and foundation issues and development of upgrade options to meet 100 percent AFC be undertaken in the future.

Following on from the *Wivenhoe-Somerset Dam Optimisation Study*, Seqwater engaged GHD in August 2014 to undertake the *Somerset Dam Flood Upgrade Options Feasibility Study*. The objective of the study is to develop high-level concepts and a range of upper bound cost estimates for upgrade works to Somerset Dam, including dam stabilising works, in order for

[44] URS, 2014. *Somerset Dam Safety Review*, p. vi, 155.
[45] DEWS, 2014. *Wivenhoe-Somerset Dam Optimisation Study*, p. 150.

the dam to safely withstand extreme lake levels and to safely pass extreme floods up to the PMF, as required by the Department of Energy and Water Supply (DEWS) *Guidelines on Acceptable Flood Capacity for Water Dams*.

CH2M HILL understands that the *Somerset Dam – Dam Stabilisation Design* project is still at the *System Master Planning and Investment Profile* Stage of Seqwater's Capital Planning life-cycle. Given that further detailed analysis and investigation is required before the project is progressed to Gate 2 of Seqwater's investment planning approval process, CH2M HILL considers that a clear, consistent and transparent decision-making process has been followed to date with respect to this project.

6.6.5 Efficiency

A review of the efficiency of Seqwater's proposed *Somerset Dam – Dam Stabilisation Design* project is outlined below; specifically this includes a review of the proposed scope of works, the standard of works and estimated project costs.

Scope of works

The *Somerset Dam – Dam Stabilisation Design* project is still at the conceptual options assessment stage of project planning and further detailed investigation is required before the project is progressed.

As part of the most recent *Somerset Dam Flood Upgrade Options Feasibility Study*, GHD has developed a concept design for the dam stabilising works, which principally involves dam wall structure anchoring works. The concept design is supported by concept engineering drawings and computation fluid dynamic (CFD) simulations. The concept design considers the following parameters:

- Drilling of anchor head and strand holes
- Supply of anchors
- Assembly of anchors
- Installation of anchors
- Grouting of anchors and installation of concrete pad
- Site rehabilitation.

Based on the concept-level of investigation done to date, and considering the planned commissioning of the works in 2027, CH2M HILL considers that the proposed scope of works for the project appears reasonable at this point in time of the project planning lifecycle. CH2M HILL would expect that a number of alternative options will be considered and documented for this project in the next project planning phase.

Standard of works

CH2M HILL notes that AFC assessments and risk assessments of the Somerset Dam were carried out in accordance with the requirements of the DEWS *Acceptable Flood Capacity Guidelines for Water Dams* (2013) and ANCOLD *Guidelines on Risk Assessment* (2003). Seqwater and its consultancy partners also consulted with an expert panel in the course of the investigations.

The concept design undertaken by both Entura and, more recently, GHD to increase the stability of Somerset Dam by the installation of post-tensioned anchors was done in

accordance with the ANCOLD *Guidelines for Design of Dams for Earthquake* (1998), *Concrete Gravity Dam Guidelines* (current version 2013) and *Guidelines on Acceptable Flood Capacity for Water Dams*.

Based on the information and documentation reviewed for this project CH2M HILL considers that the standard of works adopted as part of the investigative and risk assessments undertaken to date are appropriate and in-line with industry good practice.

Project cost

As noted above, the reported expenditure for this project is $72 million occurring over the period from 2024-25 to 2026-27. Of this, CH2M HILL notes that $2 million of this figure is for detailed design and $70 million for project delivery.

A 'Class 4' level cost estimate (i.e. -30 to +50 percent) was developed as part of the *Somerset Dam Flood Upgrade Options Feasibility Study* (Interim Draft Report) prepared by GHD. CH2M HILL notes that the cost-estimate was developed from extrapolation of recent similar project pricing, budget quotes for equipment items, industry unit rates and typical rates developed by specialist cost estimator. Indirect project costs were estimated as percentages of the contractor's direct costs as follows:

- Engineering design and investigations – 5 percent
- Environmental, planning and heritage approvals – 4 percent
- Project management and construction phase services – 5 percent
- Contingency allowance – 30 percent.

The cost estimate developed by GHD for the dam stabilising works was approximately $33.815 million (2014) and a breakdown of the project estimate is provided in Figure 6-6[46]. The cost estimate selected by Seqwater is based on a design lake level of EL 113.50m AHD, which correlates to an intermediate extreme lake level with bridge deck overtopping.

[46] GHD, 2014. *Somerset Dam Flood Upgrade Options Feasibility Study – Draft Interim Study*, p. 188.

Figure 6-6: Somerset Dam – Dam Stabilisation Design cost breakdown ($2014)

Item No.	Description	UoM	Quantity						Rate ($)	Amount ($)					
			FSL	EL 109.70	EL 110.80	EL 112.34	EL 113.50	EL 115.00		FSL	EL 109.70	EL 110.80	EL 112.34	EL 113.50	EL 115.00
	SECTION 1 – PRELIMINARIES														
1.1	**Fixed and Time Related Charges**[1]														
	Environmental Management	Item	1	1	1	1	1	1	100,000	100,000	100,000	100,000	100,000	100,000	100,000
	Traffic Management	Item	1	1	1	1	1	1	10,000	10,000	10,000	10,000	10,000	10,000	10,000
	Work as executed Drawings	Item	1	1	1	1	1	1	12,000	12,000	12,000	12,000	12,000	12,000	12,000
	Subtotal									**122,000**	**122,000**	**122,000**	**122,000**	**122,000**	**122,000**
	SECTION 2 – ANCHOR WORKS														
2.1	**Drilling**														
	Supply containments for drilling	Item	1	1	1	1	1	1	150,000	150,000	150,000	150,000	150,000	150,000	150,000
	Drill anchor head holes	No	40	64	72	88	98	102	4,000	160,000	256,000	288,000	352,000	392,000	408,000
	Drill anchor strand holes > 100 m	m	4,570	5,970	5,970	7,341	8,255	8,733	450	2,056,500	2,686,500	2,686,500	3,303,450	3,714,750	3,929,625
	Drill anchor strand holes 60-100 m	m	0	671	671	671	671	671	300	0	201,300	201,300	201,300	201,300	201,300
	Drill anchor strand holes < 60 m	m	0	232	585	665	679	679	200	0	46,400	116,900	132,900	135,800	135,800
	Disposal of drilling waste materials	m3	450	580	600	770	900	950	400	180,000	232,000	240,000	308,000	360,000	380,000
2.2	**Supply**														
	Long anchors > 100 m	No	40	52	52	64	72	76	42,000	1,680,000	2,184,000	2,184,000	2,688,000	3,024,000	3,192,000
	Medium anchors 60-100 m	No	0	8	8	8	8	8	25,000	0	200,000	200,000	200,000	200,000	200,000
	Short anchors < 60 m	No	0	4	12	16	18	18	15,000	0	60,000	180,000	240,000	270,000	270,000
2.3	**Assemble anchors**														
	Long anchors > 100 m	No	40	52	52	64	72	76	30,000	1,200,000	1,560,000	1,560,000	1,920,000	2,160,000	2,280,000
	Medium anchors 60-100 m	No	0	8	8	8	8	8	15,000	0	120,000	120,000	120,000	120,000	120,000
	Short anchors < 60 m	No	0	4	12	16	18	18	8,000	0	32,000	96,000	128,000	144,000	144,000
2.4	**Install anchors**														
	Mobilise/demobilise tower crane	Item	1	1	1	1	1	1	100,000	100,000	100,000	100,000	100,000	100,000	100,000
	Long anchors > 100 m	No	40	52	52	64	72	76	30,000	1,200,000	1,560,000	1,560,000	1,920,000	2,160,000	2,280,000
	Medium anchors 60-100 m	No	0	8	8	8	8	8	15,000	0	120,000	120,000	120,000	120,000	120,000
	Short anchors < 60 m	No	0	4	12	16	18	18	8,000	0	32,000	96,000	128,000	144,000	144,000
2.5	**Grout**														
	Long anchors > 100 m	No	40	52	52	64	72	76	30,000	1,200,000	1,560,000	1,560,000	1,920,000	2,160,000	2,280,000
	Medium anchors 60-100 m	No	0	8	8	8	8	8	15,000	0	120,000	120,000	120,000	120,000	120,000
	Short anchors < 60 m	No	0	4	12	16	18	18	8,000	0	32,000	96,000	128,000	144,000	144,000
	Install concrete pad,anchorage, plate & stress	No	40	64	72	88	98	102	6,000	240,000	384,000	432,000	528,000	588,000	612,000
	Concrete to anulus	No	40	64	72	88	98	102	1,000	40,000	64,000	72,000	88,000	98,000	102,000
	Steel plate cover	No	40	64	72	88	98	102	500	20,000	32,000	36,000	44,000	49,000	51,000
	Subtotal									**8,226,500**	**11,732,200**	**12,214,700**	**14,839,650**	**16,554,850**	**17,363,725**
	SECTION 3 – MISCELLANEOUS														
3.1	**Site rehabilitation**	Item	1	1	1	1	1	1	100,000	100,000	100,000	100,000	100,000	100,000	100,000
3.2	**Bulkhead doors for monolith G, H, Q, R**	Item	0	4	4	4	4	4	20,000	0	80,000	80,000	80,000	80,000	80,000
3.3	**Minor miscellaneous items not measured**	Item	2%	2%	2%	2%	2%	2%		168,970	239,084	248,734	301,233	335,537	351,715
	Subtotal									**268,970**	**419,084**	**428,734**	**481,233**	**515,537**	**531,715**
	SECTION 4 – GENERAL														
	Total Direct Cost									8,617,470	12,273,284	12,765,434	15,442,883	17,192,387	18,017,440
	Contractor's Supervision and Site Overhead		18%							1,551,145	2,209,191	2,297,778	2,779,719	3,094,630	3,243,139
	Contractor's Margin		10%							861,747	1,227,328	1,276,543	1,544,288	1,719,239	1,801,744
	TOTAL CONSTRUCTION COST ESTIMATE														
	Construction Cost Estimate (excl contingency)									11,030,362	15,709,804	16,339,756	19,766,890	22,006,255	23,062,323
	Contingency allowance		30%							3,309,108	4,712,941	4,901,927	5,930,067	6,601,877	6,918,697
	Indicative Construction Cost Estimate (excl. GST)									**14,339,470**	**20,422,745**	**21,241,682**	**25,696,957**	**28,608,132**	**29,981,019**
	OTHER INDIRECT COSTS														
	Engineering design and investigations		5%							716,974	1,021,137	1,062,084	1,284,848	1,430,407	1,499,051
	Environmental, planning and heritage approvals		4%							573,579	816,910	849,667	1,027,878	1,144,325	1,199,241
	Project management and construction phase services		5%							716,974	1,021,137	1,062,084	1,284,848	1,430,407	1,499,051
	Other Indirect Costs (excl contingency)									**2,007,526**	**2,859,184**	**2,973,836**	**3,597,574**	**4,005,138**	**4,197,343**
	Contingency allowance		30%							602,258	857,755	892,151	1,079,272	1,201,542	1,259,203
	Indicative Other Indirect Costs (excl. GST)									**2,609,784**	**3,716,940**	**3,865,986**	**4,676,846**	**5,206,680**	**5,456,546**
	TOTAL PROJECT ESTIMATE														
	Indicative Contractor's Estimate (excl. GST)									14,339,470	20,422,745	21,241,682	25,696,957	28,608,132	29,981,019
	Indicative Other Indirect Cost (excl. GST)									2,609,784	3,716,940	3,865,986	4,676,846	5,206,680	5,456,546
	Total Indicative Cost Estimate (excl. GST)									**16,949,254**	**24,139,684**	**25,107,668**	**30,373,804**	**33,814,812**	**35,437,565**

In its response to CH2M HILL's Draft Report, Seqwater noted that the *Somerset Dam – Dam Stabilisation Design* project needed to be considered in conjunction with the *Somerset Dam Concrete Abatement Aprons* project. Seqwater has stated that the total cost of the two upgrade projects to Somerset Dam is estimated at $58.77 million (based on an EL 113.50m AHD). This is outlined in Figure 6-7[47].

[47] GHD, 2014. *Somerset Dam Flood Upgrade Options Feasibility Study – Draft Interim Study*, p. 101.

Figure 6-7: Summary of Somerset Dam upgrade works cost estimates ($2014)

Dam component	Total indicative cost estimate ($ million) (excl. GST) for various lake levels					
	FSL	EL 109.70	EL 110.80	EL 112.34	EL 113.50	EL 115.00
Abutment Protection	No upgrade	*6.58**	*6.94**	7.69	9.18	10.63
Dam Wall Anchoring	16.95	24.14	25.11	30.37	33.81	35.44
Stilling Basin Strengthening	No upgrade	6.81	6.82	6.88	6.95	7.25
Sluiceways	No upgrade	No upgrade	No upgrade	No upgrade	No upgrade	No upgrade
Outlet Regulators	No upgrade	No upgrade	No upgrade	No upgrade	No upgrade	No upgrade
Spillway Radial Gates	No upgrade	No upgrade	8.14	8.83	8.83	8.83
Bridge Deck	No upgrade	No upgrade	No upgrade	No upgrade	No upgrade	2.90
Total (incl. Abutment Protection for EL 109.7 & 110.8 m AHD flood cases)	**16.95**	**37.53**	**47.01**	**53.77**	**58.77**	**65.05**
Total (excl. Abutment Protection for EL 109.7 & 110.8 m AHD flood cases)	**16.95**	**30.95**	**40.07**	**53.77**	**58.77**	**65.05**

As part of its response to CH2M HILL's Draft Report, Seqwater noted that the total cost of the Somerset Dam upgrade is staged as follows:

- *Somerset Dam – Dam Stabilisation Design* project - $12.8 million
- *Somerset Dam – Concrete Abutment Aprons* - $46 million.

This information provided by Seqwater is inconsistent with the information and data outlined in GHD's recent *Somerset Dam Flood Upgrade Options Feasibility Study*. CH2M HILL has not reviewed the abutment protection project or scope of works as part this assessment.

CH2M HILL notes that the cost of estimate of $72 million for this project, outlined in Seqwater's 2015-18 Submission, was based on available information at the time of submission, and has been revised. However, based on a review of information provided, CH2M HILL considers that an appropriate and reasonable level of substantiation has been provided to demonstrate a project cost estimate of $33.815 million for the *Somerset Dam – Dam Stabilisation Design* project.

The review of this project highlights that there has been some inconsistency between Seqwater and its consultancies with respect to how projects are labelled or referred to. This has led to some uncertainty as what works is actually included in some projects. For example, Seqwater has identified the *Somerset Dam – Dam Stabilisation Design* project as a distinct project as part of a broader program of dam safety upgrade works. However, no reference to this project has been made by GHD in its latest study. Rather, the works relate to the broader program of upgrade works. As such, there is some inconsistency between cost estimates provided by Seqwater and its consultancies. In making its assessment, CH2M HILL has based its decision on the level of justification and substantiation available; in this instance that is the information available in the *Somerset Dam Flood Upgrade Options Feasibility Study*.

CH2M HILL notes that the project is in concept development phase, and has not progressed past Gate 1 of Seqwater's capital planning life-cycle process. Based on a review of provided information, CH2M HILL recommends reducing the reported expenditure for this project from $72 million to $38.815 million.

6.6.6 Efficiency gains

No efficiency gains have been identified by Seqwater for this project.

6.6.7 Assessment of Prudency and Efficiency

Based on a review of existing documentation, the *Somerset Dam – Dam Stabilisation Design* project it has been assessed as prudent. The project is currently at the *System Master Planning and Investment Profile* Stage of Seqwater's Capital Planning life-cycle. The primary driver of compliance has been demonstrated, and the project is supported by an adequate decision-making process to date.

Based on the concept-level of investigation done to date, CH2M HILL considers the proposed scope of works for the project to be reasonable. CH2M HILL notes that investigations to-date have been undertaken in consultation with an expert panel and carried out in accordance with the requirements of the ANCOLD *Guidelines on Risk Assessment* (2003), *Guidelines for Design of Dams for Earthquake* (1998) and *Concrete Gravity Dam Guidelines* (current version 2013). As such, CH2M HILL considers that the standards of work adopted are appropriate and in-line with industry good practice.

The *Somerset Dam – Dam Stabilisation Design* project has been assessed as inefficient. CH2M HILL considers that sufficient evidence with supporting substantiation has been provided to demonstrate that the cost estimate for this project should be reduced from $72 million to $33.815 million. This reduced cost estimate is supported by sufficiently defined scope of works and appropriate standard of works which are in-line with industry good practice and compliant with regulatory requirements. CH2M HILL considers the reduced project cost estimate of $33.815 million to be reasonable and based on a Class 4 estimate, supported by a concept level design and unit rates and quantities.

CH2M HILL finds the *Somerset Dam – Dam Stabilisation Design* project to be prudent but inefficient.

6.6.8 Assessment of reported expenditure

CH2M HILL recommends removing $33.185 million from the proposed $72 million for the *Somerset Dam – Dam Stabilisation Design* project. Table 6-14 below identifies the recommended capital expenditure for the *Somerset Dam – Dam Stabilisation Design* project.

Table 6-14: *Somerset Dam – Dam Stabilisation Design* recommended capital expenditure (M)

Project Expenditure Profile	2024-25	2025-26	2026-27	Total Forecast
Seqwater Forecast Expenditure	$2.000	$30.000	$40.000	$72.000
Proposed Adjustment		-$15.000	-$23.185	-$38.185
CH2M HILL Recommended Expenditure Profile	**$2.000**	**$15.000**	**$16.815**	**$33.815**

On the basis of the assessment outlined above, it is recommended that Seqwater's forecast capital expenditure be adjusted as outlined in Table 6-14.

6.6.9 Extrapolation to other projects

Given the above findings, the unique nature of the project and the fact that no systemic issue has been identified with the processes applied by Seqwater in relation to this project, CH2M HILL does not consider that the findings from this project can be extrapolated to other projects.

6.7 Lake Macdonald Dam – New dam

6.7.1 Project description

Lake MacDonald Dam is located in the Noosa Hinterland on Six Mile Creek and is one of two principal raw water sources which supply potable water to the residents of the previously designated Noosa Shire area. The dam was constructed in the early 1960s and was raised to create the current storage. The Dam is a referable dam and is regulated by the Department of Energy and Water Supply (DEWS).

As part of Seqwater's recent Dams Portfolio Risk Assessment (PRA) and subsequent risk investigations, Lake MacDonald Dam has been identified as not meeting the Australian National Committee of Large Dams (ANCOLD) Limit of Tolerability and as such represents an unacceptable societal risk. Furthermore, the dam is a key supply source for the Noosa WTP, which in-turn plays a critical role in the Sunshine Coast region's water supply.

The *Lake MacDonald Dam – New Dam* project involves the construction of a new dam upstream of the existing dam with a concrete labyrinth spillway constructed across the main river channel with zoned earth and rockfill 'wing embankments' at the abutments. Seqwater is planning for the current reservoir to remain active during the construction of the new dam, and as such the project will also involve a flow diversion strategy. The flow diversion strategy will include construction of a cofferdam upstream of the new dam and a flow diversion channel to divert low flows away from the construction works. Finally, the project will also involve the removal and rehabilitation of the existing dam structure.

Project development stage

This project is at the Validation, Planning and Investment Commitment Stage of the Seqwater Capital Planning life-cycle. A Business Case has been developed and approved (Gate 3 of the investment planning approval process). The project is programmed for commissioning in 2018.

6.7.2 Proposed capital expenditure

As outlined in Seqwater's 2015-18 Submission, the proposed capital cost for this project is $63.889 million (real 2014 terms). The reported capital expenditure for the *Lake MacDonald Dam – New Dam* is outlined in Table 6-15.

Table 6-15: Lake MacDonald Dam – New Dam, reported expenditure ($M, real 2014)

Project component	2014-15	2015-16	2016-17	2017-18	TOTAL
Detailed design and approvals	$1.010	$2.273			$3.283
Project Delivery			$30.303	$30.303	$60.606
TOTAL	**$1.010**	**$2.273**	**$30.303**	**$30.303**	**$63.889**

Source: Capital Program for 2014 Bulk Price Review 2014-09-26 No efficiencies.xlsx

CH2M HILL notes that $1.744 million (real 2014) of capital expenditure was incurred prior to 2014-15 as part of the detailed design and approvals component of the project. This is not included in the above expenditure profile.

6.7.3 Provided documentation

Documentation reviewed in respect of the *Lake MacDonald Dam – New Dam* project included:

- URS, Lake Macdonald Safety Upgrade – Detailed Concept Design Business Case, 2012
- URS, Seqwater Dams Portfolio Risk Assessment – Dam Safety Risk Management Strategy, November 2013
- URS, Lake Macdonald Option Selection Report, February 2014
- URS, Lake Macdonald Concept Design Report, February 2014
- URS, Lake Macdonald Dam: Safety Upgrade Option Selection and Concept Design Project – Options Review Report, February 2014
- URS, Dams and Weirs Capital Works Program, May 2014
- Seqwater, Lake Macdonald Dam Upgrade – Business Case, May 2014

6.7.4 Prudency

A review of the prudency of Seqwater's proposed *Lake MacDonald Dam – New Dam* project is outlined below; specifically this includes a review of identified the project driver(s) and the decision making process supporting the proposed project.

Project drivers

The primary driver identified by Seqwater for this project is compliance. A secondary driver identified is growth/demand. CH2M HILL questions whether growth is secondary driver in this instance, as cost of water delivery – rather than shortage of supply – appears to be the main issue.

As identified in the *Lake Macdonald Dam Upgrade – Business Case*, dam safety conditions have been issued and imposed on Lake MacDonald Dam (a referable dam) by DEWS under the *Water Supply (Safety and Reliability) Act 2008*. The Dam Safety Conditions for Lake MacDonald state (under Condition DS – General):[48]

[48] *Seqwater, 2014. Lake MacDonald Dam Upgrade – Business Case, p.19.*

The dam is to be kept safe, be maintained and operated in accordance with the following guidelines issued in Queensland under the Water Supply (Safety and Reliability) Act 2008 (where specifically referred to in this dam safety condition schedule):

- Queensland Dam Safety Management Guidelines (current issue is February 2002
- Guidelines for Failure Impact Assessment of Water Dams (current issue is April 2002
- Guidelines on Acceptable Flood Capacity for Dams (current issue is February 2013).

Based on detailed site and risk investigations by Seqwater and its specialist consultant, URS, it has been determined that Lake MacDonald Dam does not satisfy the requirements of the DEWS *Acceptable Flood Capacity Guidelines* (2013) or the *Queensland Dam Safety Management Guidelines* (2002). It has further been established by Seqwater that the dam does not satisfy the requirements of various ANCOLD Guidelines, including *Acceptable Flood Capacity*, *Design for Earthquake* and *Risk Assessment*. These findings are supported by a range of technical and supporting documentation.

Based on the above assessments it was determined that the total annual probability of failure for Lake MacDonald Dam is estimated to be between 1 in 800 and 1 in 400, equivalent to a 12 percent to 22 percent probability of failure over a 100-year period.[49] Furthermore, it was identified that there is a critical risk that one of the 120 spillway floor slabs will fail during a flood event, providing no warning until the failure was well progressed and no opportunity to respond at the dam. It has been estimated that the consequence of failure during a major flood event would:[50]

- Impact upon approximately 100 houses
- Result in up to 10 people being killed (depending on time of day etc)
- Result in economic damages of approximately $100 million and financial damages of approximately $40 million
- Result in environmental impacts on 20 endangered species, regional ecosystems and referable wetlands.

In addition to the above compliance driver, Lake MacDonald Dam is a key supply source for the Noosa WTP, which is in-turn a critical component of the Sunshine Coast region's water supply. Lake MacDonald Dam is the preferred source for Noosa WTP due to lower pumping and treatment costs. Seqwater has stated that decommissioning the Lake MacDonald Dam would impair the ability of the Noosa WTP to meet its strategic function within the Sunshine Coast regional network.[51]

Based on a review of available information, the cost drivers for this project have been appropriately identified.

Decision making process

The *Lake MacDonald Dam – New Dam* project is supported by documented investigations, risk assessments, concept design and options identification reports, and a business case. Key investigations and studies to support the project are summarised as follows:[52]

[49] *Seqwater, 2014. Lake MacDonald Dam Upgrade – Business Case, p.3.*
[50] *Seqwater, 2014. Lake MacDonald Dam Upgrade – Business Case, p.3.*
[51] *Seqwater, 2014. Lake MacDonald Dam Upgrade – Business Case, p.2-3.*
[52] *Seqwater, 2014. Lake MacDonald Dam Upgrade – Business Case, p.13-14.*

- In 2005, a Dam Safety Review was undertaken by SunWater for Noosa Shire Council, which concluded that an upgrade was required to provide appropriate flood capacity for the dam
- In 2008, following transfer of the dam to Seqwater, an internal review was undertaken as part of the annual dams' inspection program, which noted that the flood capacity did not comply with requirements
- In June 2010, URS was engaged to undertake a high-level assessment of identified issues are prepared a preliminary risk assessment, which identified potential paths to failure and an initial assessment of risk of failure
- In 2011, URS was engaged to investigate identified issues in further detail and develop initial upgrade options for the flood security of the dam
- In February 2012, based on the outcomes of this further investigation, the Seqwater Major Projects Task Force endorsed that additional investigations be carried out and detailed concept design be commenced to enable the project scope and budget to be progressed. A business case was approved for this project in November 2012
- In 2013, as proposed in the 2012 business case, URS was engaged via external tender to undertake a final, detailed assessment of the upgrade options and undertake a concept design for the preferred option to approximately 30 percent detailed design level
- In 2012, URS was engaged to prepare a Portfolio Risk Assessment (PRA) of dams to quantify the risk posed by all of the identified risk safety deficiencies and ensure a consistent assessment methodology across all of Seqwater's referable dams. The PRA reconfirmed that an upgrade to Lake MacDonald Dam should be a key priority within Seqwater's overall Dam Improvement Program
- In November 2013, the Investment and Procurement Committee was briefed on the outcomes of the PRA and endorsed the recommended program of investigations
- In February 2014, URS completed its options selection and concept design reports, identifying the preferred upgrade option to progress to business case stage
- In May 2014, drawing on the outcomes of previous investigations undertaken by URS, Seqwater completed the Lake MacDonald Dam Upgrade – Business Case. This was approved by the Seqwater Board on 18 June 2014.

A detailed options assessment was undertaken by URS (*Lake Macdonald Dam: Safety Upgrade Option Selection and Concept Design Project – Options Review Report*, February 2014). As a result of that investigation, the following project options were short-listed and considered at the business case stage of project planning included:

- Option 1 – Do nothing
- Option 2 – Lower the reservoir
- Option 3 – Decommission the existing dam, including dewatering and demolition of the existing structure
- Option 4 – Staged upgrade of the existing dam, including construction of a new spillway slab system, strengthening the spillway training water and buttressing of the existing dam wall with a weighting beam and installation of a filter (13 sub-options for Option 4 were considered)

- Option 5 – Construction of a new dam (9 sub-options were considered for Option 5).

Each of the options were assessed against cost (NPC), technical performance, project delivery risks, approval requirements, environmental impacts, social and community impacts, and implications for Seqwater's business operations. After consideration of the above performance criteria, Seqwater ranked the options from most to least preferred as follows:

1. Option 5 (construct a new dam – **preferred**) was identified as the preferred option because it addressed all the identified dam safety risks and complied with relevant design standards. Seqwater noted that Option 5 also allowed for future development downstream, did not increase operational risks and continued to provide the same level of service and water security to the water supply network

2. Option 3 (decommission the existing dam) was considered to be the second-preferred option because it eliminated all of the identified dam safety risks, however it introduced additional flood risk to the downstream community, increased operational risks for Seqwater and decreased water supply security without additional capital expenditure to augment the water supply system

3. Option 4 (staged upgrade of the existing dam) was not considered to be favourable because it had the highest NPC of all options investigated and did not adequately address the identified dam safety risks adequately resulting in significant residual risk

4. Option 2 (lower the reservoir) was also considered to be unacceptable because it did not materially reduce the dam safety risks and was also considered to introduce operational and water security risks

5. Option 1 (do-nothing) was considered to be unacceptable because it did not address the identified intolerable risks associated with dam failure which will increase over time.

CH2M HILL considers that an appropriate options assessment and evaluation process has been undertaken, and that a clear, consistent and transparent decision-making process was followed for the *Lake MacDonald Dam – New Dam* project.

6.7.5 Efficiency

A review of the efficiency of Seqwater's proposed *Lake MacDonald Dam – New Dam* project is outlined below; specifically this includes a review of the proposed scope of works, the standard of works and estimated project costs.

Scope of works

The proposed scope of works outlined in the business case includes the detailed design of the new dam, the construction of the new dam and the removal and rehabilitation of the existing dame structure. The scope of works is outlined in Table 6-16:

Table 6-16: Lake MacDonald Dam – New Dam scope of works

Component	Scope of works

Foundation:	• Spillway foundation redesigned to extend full width of alluvium (estimated at 150m wide at the proposed upstream dam location)
	• Secant piles:
	  • Secant pile walls around full perimeter of the spillway with internal secant pile shear walls at 20m spacing and individual piles in a 5m grid
	  • Piles founded in a slightly weathered rock foundation
	  • Alluvium contained within the secant pile wall cells with foundations design assuming complete liquefaction of the alluvium

Spillway:	• Labyrinth design, with lower (2 cycles; elevation 95.3m AHD) and upper (5 cycles; elevation 97.0m AHD) overflow sections • 150m wide spillway • Energy dissipation and downstream erosion protection
Embankment:	• 'Wing' zoned embankments on both abutments with extent defined by the minimum spillway footprint (linked to the extents of alluvium) • Embankment crest level of 100.0m AHD (0.5m higher than existing) • Foundation in the residual soil strata • Central earthfill core with rockfill shoulders • Vertical downstream dual chimney and blanket filter • Single upstream chimney and blanket filter • Rip-rap on the upstream
Outlet works:	• Outlet tower (including pipework and valves) on the left side of the spillway
Existing dam structure	• Removal and rehabilitation

Source: Seqwater, 2014. Lake MacDonald Dam Upgrade – Business Case, p.28

It is further noted in the business case that the spillway foundations for the new dam will comprise either a piled foundation incorporating upstream and downstream secant pile cut offs or mass concrete-pile / steel sheet pile cells. It was noted by Seqwater that pile options were considered to provide a lower construction cost and lower risk foundation than bulk excavation options. Seqwater further notes that a decision on the preferred arrangement will be made following further geotechnical investigations as part of the detailed design stage. CH2M HILL considers this approach to be reasonable.

Based on the stage of investigation done to date (30% detailed design for business case purposes), the proposed scope of works for the project appears reasonable.

Standard of works

The performance and design criteria adopted for the assessment of the Lake MacDonald Dam and development of dam upgrade options have been developed adopting the approach prescribed in the *Acceptable Flood Capacity Guidelines for Water Dams* (DEWS, 2013). The performance and design criteria adopted for the purposes of this project included:

- Hydrologic design criteria – based on fall method prescribed in the *Acceptable Flood Capacity Guidelines for Water Dams* (DEWS, 2013)
- Hydraulic design criteria – developed in consideration of the U.S. Bureau of Reclamation (USBR) ACEW technical Memorandum No. 2, Freeboard Criteria and Guidelines for Computing Freeboard Allowances for Storage Dams (USBR, 1992) and the NSW Dam Safety Committee (DSC, 2010)
- Risk-based assessment of existing dam configuration – risk assessment was undertaken consistent with the requirements of ANCOLD and included convening an expert engineering panel to identify potential failure modes and asses the annual probability of failure for key failure modes
- Construction design criteria – Seqwater engaged DEWS to confirm the acceptable level of flood risk during construction
- Dam design criteria – Seqwater has stated that all new and upgrade options have been designed in accordance with current ANCOLD Guidelines and industry standard dam engineering practices.

CH2M HILL notes that the development of the concept design completed as part of the options assessment stage of the project planning phase was undertaken in accordance with current ANCOLD guidelines and industry standard dam engineering practice, including:[53]

- Dam Safety Management:
  - Guidelines on Dam Safety Management, ANCOLD, 2003
- Spillway – Hydraulic Design:
  - Hydraulic design of labyrinth weirs, H. Falvey, 2003
  - Guidelines on Selection of Acceptable Flood Capacity for Dams, ANCOLD, 2000
  - Guidelines on Acceptable Flood Capacity for Water Dames, DEWS, 2013
- Spillway – Foundation Design:
  - Guidelines in Design Criteria for Concrete Gravity Dams, ANCOLD, 2013
  - Guidelines for Design of Dams for Earthquake, ANCOLD, 1998
  - Stability Analysis of Concrete Structures EM 111 0-2-21 00, 2005
  - Concrete Structures, AS 3600, 2009
  - Piling – Design and Installation, AS 2159, 2009
- Embankment Design:
  - Guidelines for Design of Dams for Earthquake, ANCOLD, 1998

Based on the information and documentation reviewed for this project CH2M HILL considers that the standard of works adopted is appropriate and in-line with industry good practice.

[53] *Seqwater, 2014. Lake MacDonald Dam Upgrade – Business Case, p.21.*

Project cost

The proposed capital expenditure for this project is $63.889 million, which includes $3.283 million for detail design and related investigation and $60.606 million for construction and project delivery.

The *Lake Macdonald Dam Upgrade – Business Case* (Option 5 – New Dam Option Costs, p. 49) provides a robust and detailed cost-breakdown of the preferred option for $60.553 million. The quoted figure excludes detailed design and associated fees. This cost estimate is based on a detailed design and 30 percent estimate, supported by explicit unit rates and quantities. CH2M HILL considers the cost estimate to be reasonable and substantiated with appropriate supporting documentation, including reasonable unit rates.

It is unclear as to what the cause of the discrepancy between the $60.606 million submitted by Seqwater and the $60.553 million documented in *Lake Macdonald Dam Upgrade – Business Case*. CH2M HILL, however, notes that the discrepancy of $53,000 is not material relative to the total estimated project cost.

The proposed design costs of $3.382 million are equivalent to 5.6 percent of project delivery costs. CH2M HILL considers these costs to be in-line with typical dam construction projects and appear reasonable. Overall, CH2M HILL considers the cost estimate to be reasonable.

6.7.6 Efficiency gains

Seqwater has not identified any efficiency gains for this project.

6.7.7 Assessment of Prudency and Efficiency

The *Lake MacDonald Dam – New Dam* project has been assessed as prudent. The primary driver of compliance has been demonstrated, the project is supported by an appropriate options assessment and evaluation process and a clear, consistent and transparent decision-making process has been followed. The preferred option was selected through a detailed option selection process which has evaluated a range of construction options as well as a decommissioning (regional supply) option. There is sufficient evidence to support that key risks were evaluated and where appropriate additional investigations undertaken during this process.

The *Lake MacDonald Dam – New Dam* project has been assessed as efficient. Based on the stage of investigation done to date (30% detailed design for business case purposes), the proposed scope of works are well-defined and appear reasonable and the standard of works adopted are appropriate, in-line with industry good practice and compliant with regulatory requirements. CH2M HILL considers the project cost estimate to be reasonable and notes that it is based on a 30 percent detailed design and supported by explicit unit rates and quantities.

CH2M HILL finds the *Lake MacDonald Dam – New Dam* project to be prudent and efficient.

6.7.8 Assessment of reported expenditure

Seqwater has identified proposed capital expenditure of $63.889 million (real 2014 terms) over the period from 2014-15 to 2017-18 for the *Lake MacDonald Dam – New Dam* project. Table 6-17 below identifies the recommended capital expenditure for this project.

Table 6-17: *Lake MacDonald Dam – New Dam* recommended capital expenditure (M, nominal)

Project Expenditure Profile	2014-15	2015-16	2016-17	2017-18	Total Forecast
Seqwater Forecast Expenditure	$1.010	$2.273	$30.303	$30.303	$63.889
Proposed Adjustment	-	-	-	-	-
CH2M HILL Recommended Expenditure Profile	**$1.010**	**$2.273**	**$30.303**	**$30.303**	**$63.889**

On the basis of the assessment outlined above, it is recommended that Seqwater's forecast capital expenditure remain unchanged as outlined in Table 6-18.

6.7.9 Extrapolation to other projects

Given the unique nature of dam safety upgrades, and the fact that no systemic issue has been identified with the processes applied by Seqwater in relation to this project, CH2M HILL does not consider that the findings from this project can be extrapolated to other projects.

6.8 Leslie Harrison Dam – Stage 1 Filter buttress / crest reconstruction

6.8.1 Project description

The Leslie Harrison Dam is located on the Tingalpa Creek in Brisbane between the suburbs of Capalaba, Chandler and Burbank. The dam is owned and operated by Seqwater and contributes 20 percent of the total water to the Redland Shire. The dam was designed and constructed in two stages with Stage 1 completed in the 1960's and Stage 2, which involved the installation of spillway gates to raise the full supply level, was completed in 1984.

As part of a dedicated Acceptable Flood Capacity (AFC) assessment Leslie Harrison Dam has been identified as not meeting current AFC requirements as prescribed by the *Guidelines on Acceptable Flood Capacity for Dams (2007, current issue is February 2013)*. The Leslie Harrison Dam was found, with current spillway arrangement and gate operations, to pass approximately 62.5 percent of AFC. Furthermore, as part of Seqwater's Dams PRA Leslie Harrison Dam has been identified as exceeding the ANCOLD Limit of Tolerability and as such represents an unacceptable societal risk.

The *Leslie Harrison Dam – Stage 1 Filter buttress / crest reconstruction* project is for the first stage of planned dam upgrade works required to reduce the societal risk below the ANCOLD Limit of Tolerability and ensure it complies with the DEWS *Guidelines on Acceptable Flood Capacity for Dams*.

Project development stage

This project is at the *System Master Planning and Investment Profile* Stage of Seqwater's Capital Planning life-cycle (Gate 1 of the investment planning approval process), and as such has not progressed beyond a conceptual options assessment. The *Leslie Harrison Dam – Stage 1* project is scheduled for commissioning in 2020.[54] CH2M HILL notes that Seqwater has

[54] Seqwater, 2014. *Seqwater Bulk Water Prices 2015-18 – Submission to the QCA*, p.132.

recently commissioned a dam safety review of Leslie Harrison Dam which will inform the future project.

6.8.2 Proposed capital expenditure

Seqwater's proposed capital cost for this project is $57.756 million (real 2014 terms). The reported capital expenditure for the *Leslie Harrison Dam – Stage 1* project is outlined in Table 6-18 below.

Table 6-18: Leslie Harrison Dam – Stage 1, reported expenditure (M, real 2014)

Project Component	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	TOTAL
Detailed design	$1.000	$1.000		$0.200			$2.200
Project delivery					$30.303	$25.253	$55.556
TOTAL	**$1.000**	**$1.000**		**$0.200**	**$30.303**	**$25.253**	**$57.756**

Source: Capital Program for 2014 Bulk Price Review 2014-09-26 No efficiencies.xlsx

Further discussion of the reported capital expenditure for the *Leslie Harrison Dam – Stage 1* project is provided in Section 6.8.5.

6.8.3 Provided documentation

Documentation reviewed in respect of the *Leslie Harrison Dam – Stage 1* project included:

- Leslie Harrison Dam – Amended Dam Safety Conditions, February 2009
- GHD, Report for Leslie Harrison Dam - Acceptable Flood Capacity Study, October 2011
- URS, Seqwater Dams Portfolio Risk Assessment – Leslie Harrison Dam, November 2013
- URS, Seqwater Dams Portfolio Risk Assessment – Dam Safety Risk Management Strategy, November 2013
- Seqwater, Dam Safety Investigations Program – Business Case, November 2013
- URS, Dams and Weirs Capital Works Program, May 2014
- Seqwater, Asset Portfolio Master Plan 2014-28, 2014
- Seqwater, Capital Program for 2014 Bulk Price Review 2014-09-26 No Efficiencies.xlsx, September 2014.

6.8.4 Prudency

A review of the prudency of Seqwater's proposed *Leslie Harrison Dam – Stage 1* project is outlined below; specifically this includes a review of the identified project driver and the decision making process supporting the proposed project.

Project driver

The primary driver identified by Seqwater for this project is compliance.

The Leslie Harrison Dam is a referable dam under the regulation of the Department of Energy and Water Supply (DEWS). In 2009, DEWS issued and imposed dam safety conditions on North Pine Dam under the *Water Supply (Safety and Reliability) Act 2008*.

In 2011, Seqwater engaged GHD to undertake an AFC assessment of Leslie Harrison Dam. Based on the AFC assessment it was determined that Leslie Harrison Dam does not satisfy the requirements of the DEWS *Acceptable Flood Capacity Guidelines* (2013), specifically, it was determined that it had a 62.5 percent compliance with AFC requirements (as determined by PMF) and upgrade works were required by 2025 to provide a minimum flood discharge capacity of 75 percent of the AFC, and 100 percent of AFC by 2035.[55]

In 2013, Seqwater engaged URS to undertake a risk assessment of Leslie Harrison Dam as part of the Dams PRA. As a result of the risk assessment, it was determined that the societal risk of the dam plots approximately one and a half order of magnitude above the ANCOLD Limit of Tolerability and as such represents an unacceptable societal risk.

Based on a review of available information, CH2M HILL considers that the cost driver for this project has been appropriately identified.

Decision making process

The *Leslie Harrison Dam – Stage 1* project is supported by a range of AFC assessments, risk assessments, investigations and high-level conceptual options.

As outlined above, the AFC assessment undertaken by GHD in 2011 identified the dam as having a 62.5 percent compliance with AFC (as determined by PMF), with works required by 2025 to provide a minimum flood discharge capacity of 75 percent. As part of the AFC assessment, a range of conceptual upgrade options were assessed to estimate the key dimensions and arrangements for potential upgrade works to pass 75 and 100 percent of the PMF. These options included:[56]

- Embankment raising, including existing spillway, side walls, piers and gates raised to prevent overtopping
- Spillway widening with additional vertical lift gates on left of spillway
- Spillway widening with hydroplus fusegate crest structure on left of spillway
- Combinations of spillway widening and dam crest raising
- Embankment overtopping (RCC protection of embankment)
- Lowering of current spillway crest (although not considered further this option resulted in no significant benefit).

Drawing in the outcomes of the AFC assessment, Seqwater engaged URS to undertaken a risk assessment of the Leslie Harrison Dam as part of the Seqwater Dams PRA. CH2M HILL notes that the risk assessment was completed in accordance with the ANCOLD *Guidelines on Risk Assessment* (2003) and involved:[57]

[55] GHD, 2011. *Leslie Harrison Dam – Acceptable Flood Capacity (AFC) Study*, p. 1.
[56] GHD, 2011. *Leslie Harrison Dam – Acceptable Flood Capacity (AFC) Study*, p. 65.
[57] URS, 2013. *Seqwater Dams Portfolio Risk Assessment – Dam Safety Risk Management Strategy*, p.1.

- Assessment of the existing risk of the structure, including
    - Review of background information for each dam
    - Site visit to each structure
    - Conduct six separate workshops to identify possible failure modes and assign conditional probabilities
    - Assess dam failure consequences – societal, individual, economic and environmental
    - Documentation of existing risks and presentation of results to expert panel
    - Dam Safety Risk Reduction Strategy
- Development of a dam safety risk reduction strategy, including:
    - Develop a prioritized list of structures that meet ANCOLD and DEWS guidelines
    - Develop risk reduction measures to an initial concept level, recognizing that further investigation and development of such concepts with be required
    - Development of indicative budget planning level cost estimates based on engineering concepts
    - Assessment of the potential societal risk reduction benefits
    - Discussion of dam safety risk reduction concept options with an expert panel.

For the purposes of the PRA, three potential risk reduction options were developed for Leslie Harrison Dam:

- Option 1 (non-structural):
    - Reservoir Restriction of 3m
    - Geotechnical Investigations
- Option 2 (structural):
    - Filter Buttress construction
    - Anchor Ogee Crest
- Option 3 (structural):
    - 2m dam raise
    - Filter Buttress construction
    - Anchor Ogee Crest
    - Raise spillway and chute walls
    - Outlet works modifications

The assessment undertaken by URS identified that Option 1 would only achieve some reduction in risk, and Option 2 would achieve more than two orders of magnitude improvement in risk reduction compared to the existing societal risk plot. Option 3 was found to achieve a slightly larger reduction in societal risk compared to Option 2, while also achieving 100 percent AFC. As with the North Pine Dam upgrade project, CH2M HILL notes that the current DEWS compliance driver is 75 percent of AFC.

As a result of the PRA, a range of recommended dam safety risk management actions, including their corresponding level of urgency and timing, were identified for Leslie Harrison Dam. These are outlined in Table 6-19 below.

Table 6-19: Recommended dam safety risk management actions for Leslie Harrison Dam

Urgency	Action No.	Timing of Action (years)	Recommendation Action
Level 2	LES-Act1	0.1	Investigate benefit reservoir level restriction – open sluice gates
Level 2	LES-Act2	0.5	Investigation of embankment material properties
Level 2	LES-Act3	1	Update risk numbers based on investigations
Level 2	LES-Act4	1	Implement reservoir restriction
Level 2	LES-Act5	1	Design upgrade works – filter buttress and ogee post-tensioning works
Level 2	LES-Act6	2	Start construction upgrade

Source: URS, 2013. *Seqwater Dams Portfolio Risk Assessment – Dam Safety Risk Management Strategy*, p. 211.

The key recommendation action is LES-Act6, the construction of the upgrade works to reduce societal risks and meet AFC requirements. CH2M HILL notes that for works in a Level 2 category non-structural measures should be completed as soon as possible, but generally not longer than 12 months, and structural measures should be completed as soon as possible, but generally not longer than 2 years.

Drawing on the outcomes of the risk assessment, Seqwater has recently commissioned a dam safety review safety of Leslie Harrison Dam to further inform future upgrade works. In interviews with Seqwater, it was noted that as a result of ongoing investigations there was potential for the commissioning of dam upgrades works to be brought forward. Furthermore, Seqwater stated that it is currently developing the preliminary business case to support the project (CH2M HILL has not reviewed the working draft document).[58]

Recognising that the *Leslie Harrison Dam – Stage 1* project is still at the *System Master Planning and Investment Profile* Stage of Seqwater's Capital Planning life-cycle and further detailed analysis is currently being undertaken to support the project progressing to Gate 2, CH2M HILL considers that an adequate decision-making process has been followed to date with respect to this project.

Despite the above finding, a review of the decision-making processes with respect to this project has identified a clear opportunity for improvement. The *Dams and Weirs Capital Works Program* provides a summary of Seqwater's dam safety program and builds off earlier investigations undertaken as part of Seqwater's Dams PRA. However, it does not provide an appropriately detailed outline or discussion of the planned program of works, and the proposed staging of those works, specific to each dam. As such, in some instances it remains unclear as to how Seqwater has progressed from individual findings from the Dams PRA to the *Dams and Weirs Capital Works Program*.

[58] Based on discussions held with Seqwater at its offices on Wednesday, 24 September 2014.

For example, based on the outcomes of the Dams PRA, Seqwater is planning to undertake a staged upgrade of Leslie Harrison Dam. The need for the upgrade is clearly outlined in the Dams PRA. However, the decision to upgrade the dam in three stages (as opposed to in one stage, or two stages etc.) has not been clearly justified or documented in the *Dams and Weirs Capital Works Program*, or in Seqwater's APMP. CH2M HILL considers that the *Dams and Weirs Capital Works Program* to be the appropriate mechanism for the documentation of such decisions.

6.8.5 Efficiency

A review of the efficiency of Seqwater's proposed *Leslie Harrison Dam – Stage 1* project is outlined below; specifically this includes a review of the proposed scope of works, the standard of works and estimated project costs.

Scope of works

The *Leslie Harrison Dam – Stage 1* project is still at the conceptual options assessment stage of project planning and further detailed investigation is required before the project is progressed. The AFC assessment identified a range of potential upgrade conceptual options to enable Leslie Harrison Dam to achieve AFC. In presenting and discussing the range of potential options at the concept level, CH2M HILL considers that the scope of works for each option was appropriately defined in the AFC assessment.

Building on the outcomes of the AFC assessment, three potential risk reduction options were developed for Leslie Harrison Dam as part of the Dams PRA. Option 3 was found to achieve the greatest reduction in societal risk and also achieved 100 percent AFC and forms the basis of the capital expenditure proposed for this project by Seqwater.

For the purposes of the PRA the scope of works for Option 3 consists of:

- 2m dam raise
- Filter Buttress construction
    - Full height
    - Dual filter
    - Extend outlet pipe and concrete plug
    - Raise access shaft
    - Install concrete plug/bulkhead at upstream end of conduit
- Anchor Ogee Crest
- Raise spillway and chute walls
- Outlet works modifications
    - Extend outlet pipe
    - Raise access shaft
    - Install concrete plug/bulkhead at upstream end

Based on the concept-level of investigations done to date – which are supported by concept-level engineering sketches – and considering the planned 2020 timeframe for commissioning of works, CH2M HILL considers that the proposed scope of works for the project is reasonable at this stage of the project planning lifecycle.

Standard of works

CH2M HILL notes that the Leslie Harrison Dam risk assessment undertaken as part of the Seqwater Dams PRA was completed in consultation with an expert panel and carried out in accordance with the requirements of the ANCOLD *Guidelines on Risk Assessment* (2003) and the DEWS *Acceptable Flood Capacity Guidelines for Water Dams* (current version 2013).

Based on the information and documentation reviewed for this project CH2M HILL considers that the standards of work adopted are appropriate and in-line with industry good practice.

Project cost

CH2M HILL has not been provided with a stand-alone, indicative cost breakdown for the proposed cost estimate of $57.756 million for the *Leslie Harrison Dam – Stage 1* project. CH2M HILL notes, however, that an indicative concept-level project cost estimate for the complete upgrade of Leslie Harrison Dam to meet 100 percent of AFC requirements and reduce the societal risk to tolerable levels is outlined in Seqwater's Dams PRA. This cost estimate relates to the scope of works for Option 3 in the Dams PRA (outlined above).

The project cost estimate for Option 3 for upgrade works for Leslie Harrison Dam is $87.7 million ($2013), and includes a contingency of 40 percent and an accuracy of -30 percent to +50 percent. A breakdown of the project estimate for Option 3 is provided in Table 6-20.

Table 6-20: Leslie Harrison Dam - Option 3 cost breakdown ($2013)

Item	Description	Unit	Quantity	Rate	Amount ($)
A	**Preliminary and general**	LS		15% of items B, C, D and E	**$5,983,315**
B	**Site Clearing and Access**	Sqm	43,335	$5	**$216,675**
C	**Dam Raise and Filter Buttress Installation (642m w/ 2m raise)**				
C1	Excavation for Filter Buttress Installation	m^3	28,890	$25	$722,250
C2	Earthfill for 2m Dam Raise	m^3	102,720	$35	$3,595,200
C3	Filter Sand	m^3	44,940	$120	$5,392,800
C4	Transition Filter	m^3	44,940	$120	$5,392,800
C5	Rockfill	m^3	166,920	$100	$16,692,000
C6	Road Base for Dam Crest	m^3	963	$80	$77,040
	Sub-total				**$31,872,090**
D	**Outlet Works Modification (extension, shaft raise, and outlet plug)**				
D1	Outlet Works Extension	LS	1	$200,000	$200,000
D2	Raise Access Shaft	LS	1	$200,000	$200,000
D3	Install Bulkhead at u/s end of outlet	LS	1	$2,000,000	$2,000,000
	Sub-total				**$2,400,000**
E	**Spillway Works – GHD AFC Study**				
E1	Raise approach channel walls to RL24.56	m^3	200	$3,240	$648,000
E2	Pier raising 2m – concrete works	m^3	50	$6,480	$324,000
E3	Raise crane, concrete beams, runways, walkways	LS	1	$540,000	$540,000
E4	Relocate gate operating equipment to higher level	LS	1	$540,000	$540,000
E5	Gate control system upgrade	LS	1	$324,000	$324,000
E6	Disassemble and assemble gantry crane	LS	1	$108,000	$108,000
E7	Post tensioning of ogee crest block	LS	1	$1,296,000	$1,296,000
E8	Stilling basin wall anchoring	LS	1	$1,080,000	$1,080,000
E9	Stilling basin wall raising	LS	1	$270,000	$270,000
E10	Allowance for construction flood risk	LS	1	$270,000	$270,000
	Sub-total				**$5,400,000**
	TOTAL DIRECT COST ESTIMATE				**$45,872,080**
	Contractors off-site O/H and profit			25%	$11,468,020
	CONSTRUCTION CONTRACT COST				**$57,340,100**
F	**Other Owner Provisions**				
F1	Design	LS	1	5%	$2,867,005
F2	Site Supervision	LS	1	5%	$2,867,005
F3	Project Management	LS	1	3%	$1,720,203
F4	Contingency on Construction Direct Cost	LS	1	40%	$22,936,040
	Sub-total				**$30,390,253**
	TOTAL PROJECT COST ESTIMATE				**$87,730,353**

Source: URS, 2013. *Seqwater Dams Portfolio Risk Assessment – Dam Safety Risk Management Strategy*, p.476

CH2M HILL notes that Seqwater has developed a three-staged program of works to upgrade the Leslie Harrison Dam based on the findings of the PRA, involving:

- Stage 1 – Filter Buttress/crest reconstruction (this project), $57.756 million
- Stage 2 – Anchor ogee to be commissioned in 2021, $4.240 million
- Stage 3 - AFC upgrade including a 2m dam raise, outlet works modification and spillway works to be commissioned in 2025, $29.283 million.

Seqwater has submitted a total budgeted capital expenditure for the complete program of upgrade works for Leslie Harrison Dam of $91.279 million to the QCA. CH2M HILL notes that this is approximately 4 percent greater than the estimate for Option 3. However, CH2M HILL considers the submitted cost estimate of $91.279 is within level of accuracy range developed as part of the PRA (i.e. -30 percent to +50 percent).

The project is in concept development phase, and has not progressed past Gate 1 of Seqwater's capital planning life-cycle process. CH2M HILL also notes that there is a clear need for further detailed investigation and design. As such, CH2M HILL considers that the proposed capital expenditure of $57.756 for the *Leslie Harrison Dam – Stage 1* project is sufficiently defined in the cost estimate for the complete upgrade of Leslie Harrison Dam as detailed in Table 6-21 above, and outlined in the Seqwater Dams PRA.

CH2M HILL considers the project costs to be reasonable given the project development stage, and notes that the cost will be further refined and market tested during the design and construct phases.

6.8.6 Efficiency gains

No efficiency gains have been identified for this project.

6.8.7 Assessment of Prudency and Efficiency

The *Leslie Harrison Dam – Stage 1* project it has been assessed as prudent. CH2M HILL considers that the cost driver for this project has been appropriately identified. Recognising the project is still at the *System Master Planning and Investment Profile* Stage of Seqwater's Capital Planning life-cycle, CH2M HILL considers that the primary driver of compliance has been demonstrated and the project is supported by an adequate decision-making process to-date. CH2M HILL has however, identified an opportunity for Seqwater to improve the transparency of its decision-making processes with respect to its dam safety program (see Section 6.8.4).

Based on the concept-level of investigation done to date, which are supported by concept-level engineering sketches, CH2M HILL considers that the proposed scope of works for the project appear reasonable. CH2M HILL notes that investigations done to-date have been undertaken in consultation with an expert panel and carried out in accordance with the requirements of the ANCOLD *Guidelines on Risk Assessment* (2003) and the DEWS *Acceptable Flood Capacity Guidelines for Water Dams* (current version 2013). As such, CH2M HILL considers that the standard of works adopted is appropriate and in-line with industry good practice.

Recognising that this project is scheduled for commissioning in 2020, CH2M HILL notes that sufficient evidence has been provided to demonstrate how Seqwater's proposed cost estimate of $57.756 million has been developed. CH2M HILL considers the project costs to be

reasonable and will be further refined and market tested during the design and construct phases.

CH2M HILL finds the *Leslie Harrison Dam – Stage 1* project to be prudent and efficient.

6.8.8 Assessment of reported expenditure

Seqwater has identified proposed capital expenditure of $57.756 million (real 2014 terms) over the period from 2014-15 to 2019-20 for the *Leslie Harrison Dam – Stage 1* project. Table 6-21 below identifies the recommended capital expenditure for this project.

Table 6-21: *Leslie Harrison Dam – Stage 1* recommended capital expenditure (M)

Project Expenditure Profile	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	TOTAL
Seqwater Forecast Expenditure	$1.000	$1.000		$0.200	$30.303	$25.253	$57.756
Proposed Adjustment	-	-	-	-	-	-	-
CH2M HILL Recommended Expenditure Profile	**$1.000**	**$1.000**		**$0.200**	**$30.303**	**$25.253**	**$57.756**

On the basis of the assessment outlined above, it is recommended that Seqwater's forecast capital expenditure remain unchanged as outlined in Table 6-21.

6.8.9 Extrapolation to other projects

Given the above findings, the unique nature of dam safety upgrades and the fact that no systemic issue has been identified with the processes applied by Seqwater in relation to this project, CH2M HILL does not consider that the findings from this project can be extrapolated to other projects.

6.9 North Pine WTP – Renewals

6.9.1 Project description

North Pine WTP is located approximately 10 kilometres north-west of Strathpine, adjacent to and downstream of the southern abutment of the North Pine Dam. The treatment plant was originally built in 1976 and provides water supply to the City of Brisbane and the districts of Pine Rivers, Redcliffe and Caboolture. It has undergone a number of process modifications and upgrades and has a current nominal design capacity of 250ML/day. It is a traditional physical/chemical plant comprising the principal water treatment processes of sedimentation, filtration and disinfection.

The North Pine WTP renewals program consists of a range of projects which have been identified through the North Pine WTP Facilities Asset Management Plan (FAMP). The North Pine WTP FAMP employs an asset criticality and condition assessment approach to the identification of programmed activities which is transparent and robust. While a number of projects have been identified through the FAMP for inclusion in the Seqwater Capital Programme Budget, only those for which a Business Case Report has been prepared were submitted for review. A total of nine Business Cases have been reviewed.

All projects reviewed are in the Validation, Planning and investment stage of Seqwater's Capital Planning life-cycle (Gate 3 of the investment planning approval process).

6.9.2 Proposed capital expenditure

The nine submitted projects vary in proposed expenditure from $18,000 to $470,000. The total combined proposed capital expenditure of the nine projects is $1,719,000. Specific details of the projects are provided in Table 6-22 below:

Table 6-22: *North Pine WTP – Renew*als, reported expenditure (real $2014/15)

Project	Driver	Commission Yr.	Expenditure
Modify Sedimentation Basins 1 & 2 Travelling Bridge	Efficiency / Renewal	13/14	$470,000
Repair to Flocculation Chambers and Mixing Chambers	Renewal	13/14	$400,000
Sludge Thickening Tank Concrete Repair	Renewal	14/15	$160,000
Replace Backup Generator	Renewal / Compliance	14/15	$207,000
Sump Pump Upgrade	Reliability	13/14	$50,000
Replace Fluoride Hopper	Compliance / Service	14/15	$18,000
Repair Administration Building Roof	Compliance / Renewal	14/15	$220,000
Replace PLC 101 and 102	Renewal	14/15	$144,000
Install Fall Arrest Systems to Buildings	Compliance	14/15	$50,000

Source: Individual Project Business Cases.

6.9.3 Provided documentation

The following documentation has been provided:

- Facility Asset Management Plan for North Pine WTP
- Capital Program for 2014 Bulk Price Review 2014-09-26 No Efficiencies spreadsheet
- North Pine WTP Renewals V1.4 spreadsheet
- Business Cases (Minor Project) for the following projects:
  - Modify Sedimentation Basins 1 & 2 Travelling Bridge
  - Repair to Flocculation and Mixing Chambers
  - Sludge Thickening Tank Concrete Repair
  - Replacement of Standby Generator
  - Sump Pump Upgrade

- Replacement of Fluoride Hopper
- Replacement of Roof Sheets at Administration Building
- Replace PLC 101 and 102
- Install Fall Arrest Systems on Building Roofs

6.9.4 Prudency

A review of the prudency of Seqwater's proposed projects under the North Pine WTP Renewals Program is outlined below; specifically this includes a review of identified the project driver(s) and the decision making process supporting the proposed projects.

Project drivers

The *Facility Asset Management Plan* is the primary tool for large facility renewals budget determination at Seqwater. It employs a robust condition / criticality approach to identification and prioritisation of both asset renewal/refurbishment investment and preventative maintenance. This document should be considered the first 'gate' in determining the appropriateness of funding a project through the facility renewals budget. It follows that with limited exceptions; each project put up for funding in a Business Case should have already been identified in the 10-Year Renewal and Refurbishment Program presented in Appendix A of the FAMP.

Of the projects where Business Cases have been provided for review: four can be readily identified in the FAMP Renewal and Refurbishment Program; three are ambiguous; and three are not on the program. The three projects not in the schedule are:

1. The Fall Arrest System project;
2. The Fluoride Hopper Replacement Project; and
3. The Sludge Thickening Tank Concrete Repair Project.

The fall arrest system should not be funded under the Renewals/Refurbishment program as it is a capital improvement project.

The hopper replacement is technically a renewal, but one carried-out: due to the current asset not being fit for purpose; and well before a reasonable design life has been achieved. CH2M HILL understands that Seqwater specified Grade Stainless Steel for the hopper and the Contractor supplied Grade 304 steel, which is not fit for purpose and is the primary cause of early failure. Under these circumstances, it is CH2M HILL's opinion that the Contractor should cover both supply and installation costs related to replacement of the hopper under standard industry defect liability arrangements.

The sludge thickening tank project is clearly in-scope of the FAMP and adequately substantiated in the Business Case.

The readily identified projects in the FAMP are summarised in Table 6-23 below:

Table 6-23: *North Pine WTP – Renew*als, Project criticality and cost comparison

Project	Condition	Criticality	FAMP Cost	BC Cost
Modify Sedimentation Basins 1 & 2 Travelling Bridge	3	1	Not Quantified	$470,000
Repair to Flocculation Chambers and Mixing Chambers	3	1	Not Quantified	$400,000
Sump Pump Upgrade	2	1/2	$40,000	$50,000
Replace PLC 101 and 102	2	4	$160,000	$144,000

CH2M HILL notes that a number of the assets put forward for renewal were at a serviceable standard at the time of FAMP assessment. It is recommended that Seqwater consider more frequent assessment of assets once they reach a defined serviceability threshold and that these more recent assessments be included in the Business Cases for proposed renewals.

The remaining projects: Replacement of Standby Generator; and Replacement of Roof Sheets for the Administration Building could not be attributed to FAMP schedule items with any certainty. This level of certainty is impacted by:

- The high-level and inconsistent manner that some schedule items are described;
- The lack of a consistent asset reference / identifier in the schedule item description ;

CH2M HILL believes that the Standby Generator replacement may align with the *Services – Power System – Diesel Generator* schedule item, which has a condition score of 5 and a criticality score of 1. The $50,000 allocated in the schedule however, is significantly less than the $207,000 identified in the Business Case.

The nominated drivers for the projects presented in the Business Cases, based on the criteria defined in the *Guideline for Capital Expenditure Projects Budget FY15,* are as presented in Table 6-24 below:

Table 6-24: *North Pine WTP – Renew*als, Cost Drivers from Project Business Cases

Project	Driver 1	Driver 2
Modify Sedimentation Basins 1 & 2 Travelling Bridge	Efficiency Gain	Renewals
Repair to Flocculation and Mixing Chambers	Renewals	
Sludge Thickening Tank Concrete Repair	Renewals	
Replacement of Standby Generator	Renewals	
Sump Pump Upgrade	Reliability	
Replacement of Fluoride Hopper	Compliance	Service
Replacement of Roof Sheets at Administration Building	Compliance	Renewals
Replace PLC 101 and 102	Renewals	
Install Fall Arrest Systems on Building Roofs	Compliance	

Based on a review of available information, CH2M HILL considers that the cost driver for the Fall Arrest System is not appropriate for funding under the North Pine WTP renewals program. The cost driver for the sump pump upgrade is also tenuous given the current good condition and low criticality of the assets. A case can be made for their replacement however, on the basis of them not meeting their service requirements and therefore having consumed their economic life.

For the remaining projects, the cost drivers have been appropriately identified, but it is recommended that future project business cases consider more deeply, the requirements and constraints of the programs from which funding is sought.

Decision Making Process

CH2M HILL's review highlighted that the renewals program decision-making process comprises two main components:

1. The FAMP process, which informs the level of budget that is laid-in to meet anticipated future renewal, refurbishment and preventative maintenance funding demands; and
2. The development of Business Cases to justify commitment of expenditure of individual projects to be funded under the renewals program budget.

It is understood that that each FAMP is presented to the Seqwater Board for approval, but CH2M HILL has not sighted documentary evidence to demonstrate these approvals. On this point, it is noted that approval transparency could be improved simply by including a document / action authorisation box at the front of FAMP documents.

CH2M HILL notes that two of the larger projects in the renewals and refurbishment program, notably the Sedimentation Basin Travelling Bridge and Flocculation/Mixing Chamber Repair

projects have no budget allocation associated with them in the FAMP and that the comments column of the 10-Year Renewal and Refurbishment Program says 'Report Required'. CH2M HILL has interpreted this to signify the need for further documentation / justification prior to approval and budget allocation. Some of this documentation for the Flocculation/Mixing Camber Repair has been provided to CH2M HILL, but not in the standard Business Case format. It is clear that these two projects cannot be funded with currently approved budgets.

Business Cases supporting projects under the FAMP Renewal and Refurbishment program are subject to the project approval process which is standardised across Seqwater and supported by policy, processes, templates and governance arrangements. All Business Cases reviewed by CH2M HILL have been approved by appropriate Seqwater managers.

CH2M HILL notes that the Business Case reports have been prepared using a template which is consistent regardless of the scale of expenditure and that differs from the templates provided in support of the Component 1 (Policy and Procedure) of this review.

An options analysis has been included in each of the Business Cases. Table 6-25 below indicates the number of options considered for each project:

Table 6-25: *North Pine WTP – Renew*als, Options considered in Project Business Cases

Project	Do-Nothing	Option 1	Option 2
Modify Sedimentation Basins 1 & 2 Travelling Bridge	Y	Y	Y
Repair to Flocculation and Mixing Chambers	Y	Y	N
Sludge Thickening Tank Concrete Repair	Y	Y	N
Replacement of Standby Generator	Y	Y	Y
Sump Pump Upgrade	Y	Y	N
Replacement of Flouride Hopper	Y	Y	N
Replacement of Roof Sheets at Administration Building	Y	Y	N
Replace PLC 101 and 102	Y	Y	N
Install Fall Arrest Systems on Building Roofs	Y	Y	N

As can be noted above, only two projects have considered more than one option. For these two options, one has been ranked on the basis of cost (Replacement of Standby Generator) and the second has been ranked based on one option being deemed to not adequately resolve the problem.

Seqwater policy requires that a minimum of three options are considered in Business Cases comprising a do-nothing option, a capital option and a non-capital option. None of these projects have considered a non-capital option and therefore, do not comply with Seqwater

policy. Non-compliance with Seqwater policy notwithstanding, there is a risk in not considering more than two options that an optimal option is not identified, in terms of potential replacements. Furthermore and in-general, more information needs to be provided on what the risks of the 'do nothing' option are, in terms of operational continuity, structural integrity and risk to health and safety. Typically, the FAMPs do not provide detail on these risks.

6.9.5 Efficiency

A review of the efficiency of Seqwater's proposed *North Pine WTP – Renewals* program is outlined below; specifically this includes a review of the proposed scope of works, the standard of works and estimated project costs.

Scope of the Works

The scope of individual projects has been provided in the project Business Cases. The Business Cases provide a variable, but generally low level of detail on the scope of works and in all cases, insufficient detail to enable a robust cost build-up for accurate estimation purposes. This is particularly the case for more complex or high expenditure items funded under the program.

CH2M HILL would expect to see details of the existing asset being replaced or refurbished, such as: model numbers and performance characteristics along with details of ancillary works that may be required to facilitate the replacement. Where there is potential for the ancillary works to be ambiguous, battery limits should be documented to ensure clarity of scope. In instances where the replacement / refurbishment cost is established on a unit-cost basis, the Business Case should provide details of the relevant measurements required.

The Business Cases provided would indicate that Seqwater often relies on vendor / service-provider quotes to establish the appropriate scope of works. This passive approach can potentially limit the level of optimisation achieved by the asset / service offered by the vendor, if the vendor does not have a full appreciation of the operational environment.

Standard of works

No information has been provided on the standard of works that the individual projects will conform to. It is however, expected that the works will be required to comply with technical, design, construction and legislative requirements as a minimum. CH2M HILL recommends that the reinstatement specification be clearly stated in the individual project Business Cases, including an assessment of expected design life post-renewal. This approach would ensure that these requirements are transferred into the contract documentation set at the time of procurement for both quality assurance and warranty purposes.

Program cost

Project costs for the submitted projects generally appear to lack adequate substantiation. The exception in the program under review is the project to replace the Fluoride Hopper, where a vendor letter has been attached stating that the replacement hopper would be provided at zero cost.

Of the remaining projects, three are stated to be based on previous procurements or contractor quotations; however these quotes are not attached as an appendix to the business cases. Projects where it has been stated that quotations have been sought are: the

modification to the Sedimentation Basins (value $470,000); the sump pump upgrade (value $50,000); and the fall arrest systems (value $50,000).

The remaining project prices are based on Seqwater estimates prepared by the Asset Engineer in consideration of costs from similar projects. No detail is provided in the Business Cases where this is the case, to substantiate the costs supporting the estimate. CH2M HILL notes that for the replacement of the generator, the scope of works used to develop the cost estimate is more representative of a greenfield installation, rather than one associated with generator replacement.

The North Pine WTP FAMP renewal program does not include an allocation for the two largest projects in the program – the Travelling Bridge and Chamber Repair projects - and implies that more investigation is required to establish the costs for these projects. Given that no more detail is provided in the Business Cases for these projects than any of the others, CH2M HILL believes costs for these projects have not been sufficiently defined.

Operational cost considerations have not been documented in any of the Business Cases seeking renewal and refurbishment funding, even though the driver for one of the projects is efficiency. Operating costs should be considered for activities such as inspection and certification of the fall arrest systems, differing maintenance costs between the sedimentation bridge replacement options, and the like. It is accepted that based on the nature of these projects, not all of the projects will significantly influence operations costs, but these should be clearly identified by exception to comply with Seqwater policy.

Policy and Procedures

Seqwater's Procurement procedure, *PRO-01336 Corporate Procurement*, provides a guide to procurement sourcing options based on the project risk rating and capital cost (including contingency). For the submitted projects, the stated procurement methodology appears to be based on a standard text and has not been reviewed against or aligned to the procurement procedures.

As all of the projects have been assessed in the Business Cases to have a 'High' risk rating, which is not always aligned with the condition and criticality ratings in the FAMP. For all high risk projects, the contracting strategy should be advised by Seqwater's Strategic Procurement Services. Even when not allowing for the risk rating, the procurement methodology proposed in the business cases does not align with *PRO-01336*.

Table 6-26 below summarises the recommended procurement methodology from the Business Case documents and the market approach suggested by *PRO-01336* for projects with a low or medium risk rating where no arrangement is in place.

Table 6-26: *North Pine WTP – Renew*als, Comparison of Business Case procurement approach against Seqwater Policy

Project	Procurement Approach from Business Case	Risk Rating from Business Case	Contract Value from Business Case	Procurement Approach from PRO001336 Guidelines
Modify Sedimentation Basins 1 & 2 Travelling Bridge	3 Quotes	High	$470,000	To be assessed by Strategic Procurement Services
Repair to Flocculation and Mixing Chambers	3 Quotes	High	$400,000	To be assessed by Strategic Procurement Services
Sludge Thickening Tank Concrete Repair	3 Quotes	High	$160,000	To be assessed by Strategic Procurement Services
Replacement of Standby Generator	3 Quotes	High	$207,000	To be assessed by Strategic Procurement Services
Sump Pump Upgrade	3 Quotes	High	$50,000	Seek minimum of 3 quotes
Replacement of Fluoride Hopper	Replacement by vendor	High	$18,000	Not applicable
Replacement of Roof Sheets at Administration Building	3 Quotes	High	$220,000	To be assessed by Strategic Procurement Services
Replace PLC 101 and 102	3 Quotes	High	$144,000	To be assessed by Strategic Procurement Services
Install Fall Arrest Systems on Building Roofs	3 Quotes	High	$50,000	Seek minimum of 3 quotes

It should be noted that the project 'Replacement of Fluoride Hopper' is a replacement of a defective hopper by a vendor, with the replacement equipment provided at no cost. It appears to be inconsistent that a Business Case has been provided for this change to an existing project.

Timing and Delivery

Seqwater has scheduled all projects identified in the Business Cases provided for delivery in 2013/14 and 2014/15. Having reviewed the Seqwater capital program, CH2M HILL believes that projects reviewed will be delivered in the 2014/15 financial year, but cannot verify this because the individual program projects are not separately identified. All of the proposed projects are expected to be delivered well within a calendar year.

CH2M HILL notes that of the projects that can be identified in the FAMP 10-Year Renewal and Refurbishment Program, the PLC Upgrade, Flocculation / Mixing Chamber Repairs and the Travelling Bridge projects have been brought forward from the 2016/17 financial year. The timing of the two latter projects is of concern, considering the FAMP flags the need for further reporting to justify expenditures for these projects.

The Business Cases provided present cost estimates that are +/- 30% accurate and good practice would require a higher level of accuracy for delivery. CH2M HILL found no documentary evidence of a planned review of project estimates prior to tendering the works. Furthermore, given the relative immediacy of the delivery schedule, limited time is available for such reviews to be completed before delivery.

As all projects have been assigned a 'high' risk score in the Business Cases, but in contrast to the FAMP approach, the rationale for these assessments is not well substantiated. In the absence of such a rationale, and considering the misalignment of FAMP / Business Case assessments, the Business Case assessments and therefore, the urgency for delivery, can be called into question. The standby generator replacement is a case in-point: the Business Case notes that the site has been operating for 4 years without an operational standby generator, but the risk has been assessed as high.

6.9.6 Efficiency gains

Some of the individual Business Cases present qualitative statements on the potential efficiency gains that may be delivered by given projects. These include the Travelling Bridge Upgrade, Fluoride Hopper Replacement and Sump Pump Upgrade projects. None of the Business Cases for these projects however, quantify what the potential savings resulting from project investment may be. CH2M HILL recommends that this information is provided in Business Cases for all renewals not related to like-for-like swap-outs.

6.9.7 Assessment of Prudency and Efficiency

The projects reviewed under the *North Pine WTP – Renewals* program are currently at the *Validation, Planning and Investment Commitment* Stage of Seqwater's Capital Planning life-cycle. Based on a review of the documentation provided by Seqwater, seven of the nine projects have been assessed as prudent. The exceptions are:

1. The project to Install Fall Arrest Systems to treatment plant buildings; and
2. The project to Replace the Fluoride Hopper.

The first project, while worthwhile, is out-of-scope for renewals program funding. The second project is for the replacement of an asset component that is well within its expected design life, but has failed due to poor initial specification. The original provider is covering the cost of the materials, and the Business Case is for funding to cover installation costs.

CH2M HILL notes that the primary driver for the projects identified as prudent has not always been recorded as renewal, but in these cases it has been assessed that it is appropriate to

fund the project through the renewals budget. On this point, CH2M HILL has identified an opportunity for Seqwater to improve the transparency of its decision-making processes with respect to facility renewals programs (see Section 6.10.4). It is recommended that all Business Cases for future projects assessing renewals / refurbishment funding be more aligned to the FAMPs, in terms of:

- Project scope / drivers / intent (with due attention to the differentiation between capital improvement and renewals/refurbishment);
- Assessed risk / criticality outcomes;
- Expected project benefits;
- Program to project line-of-sight;

On the latter point, the ability to readily identify all projects put forward in the FAMP renewal / refurbishment program is key. Projects put forward in Business Cases should generally be on the FAMP program and should be consistently referenced in both documents to facilitate an audit trail. CH2M HILL acknowledges that not all projects will be captured in FAMP programs but where this is the case, the other three criteria noted above should be adequately addressed to gain funding approval.

These Business Cases should also provide more substantiation of why a specific cost driver is applicable. At a minimum, current asset age, design life, duty cycle and maintenance reliability history should be recorded to justify renewal. The argument for asset renewal/replacement on the grounds of expired asset life or reduced whole-of-life cost should always be clear and substantiated in these documents to avoid unnecessary investment in economically serviceable assets.

Cost justification within renewal project Business Cases was also found to be lacking and that the level of justification did not scale with the level of investment sought (as is required by Seqwater project justification policy/procedures). Either limited cost breakdown detail was provided or estimates were referenced that were not included as an appendix to the Business Case. These references were also not provided separately by Seqwater to support the review. CH2M HILL notes that the FAMP required further investigation/justification of costs for the $400,000+ Travelling Bridge and Chamber Repair projects. Documentation supporting these further investigations has not been provided.

A summary of our assessment of the prudency and efficiency of each project is provided in Table 6-27 below:

Table 6-27: *North Pine WTP – Renew*als, Summary of Prudency and Efficiency Summary

Project	Prudent?	Efficient?
Modify Sedimentation Basins 1 & 2 Travelling Bridge	Yes	Yes*
Repair to Flocculation and Mixing Chambers	Yes	Yes*
Sludge Thickening Tank Concrete Repair	Yes	Yes
Replacement of Standby Generator	Yes	Yes
Sump Pump Upgrade	Yes	Yes
Replacement of Fluoride Hopper	No	-
Replacement of Roof Sheets at Administration Building	Yes	Yes
Replace PLC 101 and 102	Yes	Yes
Install Fall Arrest Systems on Building Roofs	No	-

*These projects have been assessed as efficient on the basis that: further investigation will be undertaken to refine project scope / cost; and project timing will revert to what was presented in the FAMP program (2016/17)

6.9.8 Assessment of reported expenditure

Seqwater has identified proposed capital expenditure of $43.802 million (real 2014 terms) over the period from 2014-15 to 2027-28 for the *North Pine WTP – Renewals* program. Table 6-28 below identifies the recommended capital expenditure for time horizon of the projects reviewed.

Table 6-28: *North Pine WTP – Renewals,* recommended capital expenditure (M)

Project Expenditure Profile	2014-15	2015-16	2016-17	2017-18	2018-28	TOTAL
Seqwater Forecast Expenditure	$2.056	$0.180	$0.226	$0.020	$41.320	$43.802
Proposed Adjustment	-$0.938	-	$0.870	-	-	-$0.068
CH2M HILL Recommended Expenditure Profile	**$1.118**	**$0.180**	**$1.096**	**$0.020**	**$41.320**	**$43.734**

Source: Seqwater spreadsheet *Capital Program for 2014 Bulk Price Review 2014-09-26 No Efficiencies.xlsx* and CH2M HILL analysis

The very minor expenditure adjustments recommended by CH2M HILL are indicative of the small subset projects from the North Pine Dam Renewals Program reviewed (approximately 3.9%).

CH2M HILL notes that the Seqwater forecasts for renewals expenditure at the North Pine WTP facility increase significantly beyond 2022. The timing for this increase corresponds to the first year beyond the FAMP planning horizon for the plant. Consequently, there is no document that CH2M HILL is aware of that justifies this increase. There is a strong case to be made for perpetuation of the funding levels currently established and justified in the North Pine WTP FAMP, in the absence of any such justification.

6.9.9 Extrapolation to other programs / projects

Seqwater develops its renewals programs on a facility basis, supported by the Facility Asset Management Planning process. In this context, the needs analysis and the proposed projects to meet these needs are unique to each facility. In addition, the very small sample of projects provided to CH2M HILL for review cannot be considered representative, from a statistical viewpoint. It follows that the financial results of the CH2M HILL review of this program cannot be extrapolated to the current North Pine Renewals program or to other programs without further analysis.

CH2M HILL did however; identify a number of systemic issues that may potentially impact investment prudency and efficiency in other facility renewals programs, as detailed in Section 6.9.7. CH2M HILL notes also, that if renewal forecasts for other facilities have the same jump at the 2022/23 year as evident for the North Pine plant, this will materially impact the bulk water price path.

6.10 Mount Crosby to Green Hill Pipeline - Renewal

6.10.1 Project description

The project under review is renewal program for the bulk water pipeline running from Mount Crosby to Green Hill. This 48.2km long pipeline is of mild steel, cement-lined construction and ranges in diameter from 1050mm to 1650mm. The pipeline includes both below and above-ground installation and has a protective coating applied to the above-ground sections.

The Seqwater pipeline renewal program is delivered as a number of schemes, a number of which are often packaged as projects for the purposes of scoping and investment approval. The Mount Crosby to Green Hill pipeline is referenced as scheme S16.

As a result of a broader pipeline condition management initiative, Seqwater identified the retrofitting of cathodic protection equipment to existing metallic pipelines as an effective method of cost-effectively maximising their life. Specific pipelines have been identified as suitable candidates for cathodic protection retrofitting and a program has been initiated to deliver the works. Both Impressed Current Cathodic Protection and Sacrificial Anode Cathodic Protection systems have been planned for delivery, based on the nature and circumstances of each pipeline. Scheme S16 – covering the Mount Crosby to Green Hill Pipeline - has been earmarked for cathodic protection under this program.

In addition to the pipeline cathodic protection program, the pipeline renewals program expenditures include the costs of regular inspection, maintenance and end-of-life renewals.

6.10.2 Proposed capital expenditure

Expenditures related to the Mount Crosby to Green Hill renewal scheme are reported against the reference number X00389 in the capital expenditure spreadsheet provided by Seqwater. As detailed in this spreadsheet, the current capital cost allocated for this project is $42.951 million. CH2M HILL cannot compare this total against the forecast provided in the Project Justification Report, as this report does not disaggregate costs to the scheme level. The reported capital expenditure for the *Mount Crosby to Green Hill Pipeline– Renewal* scheme is outlined in Table 6-29.

Table 6-29: *Mt Crosby to Green Hill Pipeline – Renewal*: reported expenditure (M, real 2014)

Project component	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-28	TOTAL
Project Delivery	0.023	0.023	0.008	0.008	0.038	0.059	42.792	42.951
TOTAL	**0.023**	**0.023**	**0.008**	**0.008**	**0.038**	**0.059**	**42.792**	**42.951**

6.10.3 Provided documentation

The following documentation has been provided in support of the review:

- Capital Program for 2014 Bulk Price Review 2014-09-26 No Efficiencies spreadsheet
- QCA Response Mt Crosby Green Hill spreadsheet summarising capital planning approach
- Mt Crosby-Green Hill-Renewals V 1.2 spreadsheet providing detail on what documents were submitted in response to the CH2M HILL RFI
- Pipeline 30 Year Program and Implementation Plan
- GHD Report supporting the Seqwater general condition management strategy for pipelines
- Seqwater Project Justification Report PJR-13-46 covering eight schemes under the Cathodic Protection Program (including S16)
- Seqwater Project Justification Report PJR-31 covering planned works of 2012/13 under the Cathodic Protection Program (not including S16)
- Pipeline Network Detailed Desktop Study - Tyco Report on the suitability and priority of schemes for cathodic protection roll-out
- Savcor Project Investigation Report for the Mt Crosby to Green Hill and Sparkes Hill to Green Hill Cathodic Protection Projects
- Theiss Services letter detailing S16 project scope and cost
- Theiss Services / Savcor detailed investigation report for S16 project (assumed to be an attachment of the letter above)
- Theiss Services breakdown of S16 project costs (assumed to be an attachment of the letter above)

6.10.4 Prudency

A review of the prudency of Seqwater's proposed capital expenditure under the *Mount Crosby to Green Hill Pipeline – Renewal* scheme is outlined below; specifically this includes a review of identified the project driver(s) and the decision making process supporting the proposed projects.

Project drivers

The primary driver of the *Crosby to Green Hill Pipeline – Renewal* scheme is asset renewal to avoid asset failure, which may impact service continuity and the broader community. "Service", as established in the Project Justification Report relevant to this scheme *PJR-13-46 Trunk Mains – Cathodic Protection Program* is a secondary driver. The project Justification Report defines "Service" to mean prolongation of asset life. For the scheme under review, this means improved resistance to corrosion, which cathodic protection has a well proven history of achieving in metallic pipelines.

Tyco was commissioned by Seqwater in 2011 to assess the probability of failure for all of Seqwater (then Linkwater) pipeline asset. Tyco undertook a desk audit and developed an approach to the determination of individual pipeline link risks, based on probability of failure and the likely consequence. GHD reviewed the Tyco approach in its July 2012 Report: *Report for Pipeline Management Program – Risk Based Prioritisation Criteria Report*. The GHD Report provided more detail on the risk-based approach and aligned the risk approach applied to current risk management practices within Linkwater. GHD also prepared a supplemental reference to provide guidance on pipeline maintenance and condition assessment in March 2012, titled: *Report for Provision of Pipeline Management Program – Guidelines for Maintenance and Phased Condition Assessment*.

The focus of the assessment guidelines is to establish a robust and cost-effective approach to:

- Determining the status of each pipeline asset in terms of its remaining service life and in doing so, minimise risk of failure; and
- Identifying appropriate inspection and maintenance activities to address the factors impacting pipeline serviceability and prolong asset life.

It is understood by CH2M HILL that these documents formalise the processes applied in the development of the Pipeline 30 Year Program and Implementation Plan, produced by GHD in January 2013.

Based on a review of available information, CH2M HILL considers that the cost drivers for this scheme have been appropriately identified.

Decision making process

The risk-based approach to identification and smoothing of renewals expenditures defined in the GHD suite of guidance documentation for the Seqwater pipeline portfolio are relatively transparent and robust. CH2M HILL has received limited evidence of investment approval resulting from the documented approach. The 30-Year Program and Implementation Plan for pipelines provides well documented expenditures, but the financial outputs of this plan bear no resemblance to the forecast figures provided by Seqwater.

Seqwater provided a document in support of the Seqwater capital and operational investment planning process produced by Cardno in January 2012, titled: *LinkWater Capital and Operating Investment Methodology – Application to Reservoir Management Program*. CH2M HILL notes that the methodology applies to another – and completely different – asset class.

Based on the documentation currently provided, CH2M HILL cannot establish the mechanism of approval for all projects under the program of pipeline renewals. An audit trail can be established for both the annual Cathodic Protection sub-program and for individual schemes

under that program through the Project Justification Reports, which are believed to support a Linkwater legacy approval process. The expenditures covered by the Project Justification Reports cover only a small fraction of the total scheme expenditures submitted by Seqwater.

Two Project Justification Reports have been provided for review:

- PJR 13; and
- PJR 13-46.

PJR 13 is a high-level document prepared in 2011 that: provides an overview of the Cathodic Protection program – including linkage to Linkwater strategic objectives; documents the current status of the program; provides an estimate program costs for the next financial year and forecasts future annual funding requirements over a 5-year time horizon.

PJR 13-46 is undated and provides similar information to PJR 13 for the 2013/14 funding year, but in a slightly different format. An option analysis is included in this document with the only options considered being to continue or terminate the program. Failure to continue the program comes with a 'High' risk assessment (Major consequence and possible likelihood), but no substantiation of how the risk was assessed is provided. Furthermore, continuation of the program only reduces the risk to 'Medium'. In contract the Tyco desktop study assessed the Mount Crosby to Green Hill pipeline as have a 'very low' risk rating.

Updated 5-year estimates are provided with a disclaimer as follows:

> *The exact nature of the faults on these schemes has not been determined at this time and therefore the nature and extent of the works required cannot be accurately determined. Works on other schemes have been used as a guide for budgeting purposes but it cannot be determined if this will provide an accurate estimation of the work involved. It is therefore intended to progress through the works scheduled in the Scope statement above and fully utilise the available budget. If there is a surplus of funds this could be utilised to install CP on some of the 11 schemes that currently do not have CP (but potentially could have). If there is a shortfall of funds the program will extend into future years with additional funding.*

Annual expenditures are presented for the program over five years as presented in Table 6-30 below:

Table 6-30: *Mount Crosby to Green Hill Pipeline – Renewal*: Forecast Cathodic Protection expenditures (real 2014)

Project Timeline	2013/14	2014/15	2015/16	2016/17	2017/18	5 Year Program
Project Stage	Retrofit / Commission CP Systems	Retrofit / Commission CP Systems	Retrofit / Commission CP Systems	Retrofit / Commission CP Systems	Retrofit / Commission CP Systems	-
Estimated Base CAPEX (ex GST)	$319,837	$256,250	$256,250	$102,500	$102,500	$1,037,337

Source: Linkwater Project Justification Report – PJR 13-46

Reasonable justification is provided for the 2013/14 figure in the table above.

It is noted that in PJR 13-46, the Mount Crosby to Green Hill pipeline scheme (S16) is planned for delivery under a Framework contract, currently held by Theiss Services. CH2M HILL has

some concerns around this procurement approach for a program where neither costs nor scope have been adequately defined.

An approval box is provided for both PJR documents, but neither of the documents provided have been signed.

Beyond the Linkwater PJR documentation, the onus of scoping and justifying costs for the S16 scheme seems to fall to parties outside Seqwater, notably Theiss Services and it's nominated Sub Contractor Savcor. The following Theiss/Savcor documents were submitted by Seqwater to substantiate S16 expenditures:

- A Cathodic Protection Investigation Report developed by Savcor
- A Theiss Services letter, providing more detail on the proposed scope of works and expenditure build-up;
- A revised works program and cost estimate for the scheme developed by Savcor (Note: cost breakdown not included in file provided)

While the Investigation Report and cost breakdowns appear reasonable in terms of approach and level of substantiation, CH2M HILL has received no documentation that formalises Linkwater/Seqwater commitment to the expenditure presented. Furthermore, is not clear how Seqwater will control Project costs under the Theiss Framework Contract arrangements.

Based on the documentation provided, there is an adequate level of evidence to justify the need for the proposed cathodic protection scheme and to substantiate the expense. CH2M HILL has some concerns about the lack of documentary evidence of Seqwater endorsement of both the proposed approach and the expenditure for this scheme.

It is expected that a similar approach would be taken for the other sub-programs under the over-arching pipeline condition management program, but this cannot be confirmed. CH2M HILL also cannot comment on the decision-making process that may apply to pipeline renewals as they relate to the Mount Crosby to Green Hill pipeline, as the planning documentation supporting determination and approval of pipeline renewals does not present expenditure data at a level of disaggregation that would support such an assessment.

6.10.5 Efficiency

A review of the efficiency of Seqwater's proposed *Mount Crosby to Green Hill Pipeline – Renewal* program is outlined below; specifically this includes a review of the proposed scope of works, the standard of works and estimated project costs.

Scope of works

As indicated in Section 6.10.4, documentation has only been provided that supports adequate determination of scope for the Mount Crosby to Green Hill cathodic protection scheme. Sufficient evidence has been provided to substantiate the scope of works for this scheme at a very high level and not at a sufficient level of detail to support an accurate estimate.

No documentation has been provided at a level of detail sufficient to support determination of the scope of works for the broader renewals program for the Mount Crosby to Green Hill pipeline. In-fact the documentation provided does not provide confidence that the scope of works have been well scoped on the client-side.

Standard of works

CH2M HILL is not aware of any Seqwater standards that apply to the provision of cathodic protection assets and services. It is noted however, that guidance has been sought from an acknowledged industry leader on the approach to take for the Mount Crosby to Green Hill cathodic protection scheme and it is reasonable to assume that any proposed works will be specified to achieve a standard reflective of industry good practice.

Whilst CH2M HILL has not sighted any Seqwater standard pipeline specifications or drawings, these are almost certain to exist and be in-line with industry good practice. With no substantive information provided on the nature, quantity and location of renewal works on the Mount Crosby to Green Hill pipeline, CH2M HILL cannot make an assessment on whether these standards have or will be applied to the proposed pipeline renewals.

Program Costs

Documentation supporting the build-up of costs for the Mount Crosby to Green Hill cathodic protection scheme is provided by Theiss Services, holder of the pipeline Framework Contract and its nominated Sub Contractor Savcor. The cost breakdowns attached to the Investigation Reports are at an appropriate level of detail and the unit rates applied appear reasonable. As indicated earlier, CH2M HILL has no documentary evidence of Seqwater approval of the proposed cathodic protection program expenditure. It is noted that the practical completion date for this program of 30th May 2013, as detailed in the Thiess services scoping letter, has now passed. If this is the case, only the ongoing maintenance expenditures detailed in the Savcor Report are material to this review.

Documentation substantiating costs for renewals other than the cathodic protection program has not been supplied. The only source of information on future renewals costs for the Mount Crosby to Green Hill pipeline is the capital works spreadsheet provided by Seqwater, which provides neither breakdown, nor substantiation of the expenditures presented.

Policy and Procedures

The cathodic protection program was initiated prior to the Seqwater merger and as a result, will have been developed under a slightly different policy and procedure environment than what exists currently. This fact notwithstanding and in recognition that Queensland Government guidance on procurement have no substantially changed for a number of years, CH2M HILL has the following concerns:

1. The Mount Crosby to Green Hills cathodic protection scheme has been sole-sourced to Theiss Services, even though the quantum of work exceeds $1M;
2. Seqwater (then Linkwater) seems to have had limited control over the scope of works prior to the divestment of the works to Thiess Services;
3. There is limited evidence of investment approval through the program life-cycle; and
4. Comments made in one of the Project Justification Reports seem to demonstrate a low level of concern for either scope control or on-time delivery.

6.10.6 Efficiency gains

Investment in the pipeline condition management program is likely to realise significant cost savings over a run-to-failure approach, with a consequential increase in the asset renewal interval for pipeline assets. The efficiency gains inherent in the proposed Seqwater approach

have been documented in qualitative terms in some documentation supporting the cathodic protection program, but not in quantitative terms.

6.10.7 Assessment of Prudency and Efficiency

The documentation provided on the *Mount Crosby to Green Hill cathodic protection scheme* support approval at the *Validation, Planning and Investment Commitment* Stage of Seqwater's Capital Planning life-cycle. It is believed however, that this program may have been completed and that only the ongoing cathodic protection maintenance regime remains in-place. Based on a review of the documentation provided by Seqwater, the cathodic protection scheme has been assessed as prudent.

It is recommended that Seqwater should consider modifying existing internal documentation or implementing new internal documentation to record investment approvals and capture the outputs of decision-support documentation produced by external parties where these are not provided in standard Seqwater formats. It is also recommended that if the Project Justification Reports are not phased-out under the new Seqwater arrangements, then they be substantially improved in terms of the level of detail provided to substantiate positions taken in them.

At a high level, justification of the cathodic protection program has been well documented and is in-line with good industry practice. Whilst a reasonable level of cost-justification has been provided for the Mount Crosby with rates applicable for the activities they cover, this justification has been provided by the beneficiary of the delivery contract in an uncontestable environment. Furthermore, no documentary evidence has been provided of Seqwater's approval of either the scope of work or the final expenditures for the proposed cathodic protection scheme. On this basis, the program has been assessed as inefficient.

CH2M HILL has no documentary basis for an assessment of the prudency and efficiency of the Mount Crosby to Green Hill renewals program beyond the cathodic protection sub-program reviewed.

6.10.8 Assessment of reported expenditure

Seqwater has identified proposed capital expenditure of $42.951 million (real 2014 terms) over the period from 2014-15 to 2027-28 for the *Mount Crosby to Green Hills renewals* program. No documentation has been provided by Seqwater that enable substantiation of the expenditures presented in the Seqwater capital expenditure forecast spreadsheet and in the absence of such substantiation, the expenditure must be assessed as inefficient. Table 6-31 below identifies the recommended capital expenditure for time horizon of the projects reviewed.

Table 6-31: *Mount Crosby to Green Hill – renewals,* recommended capital expenditure (M)

Project Expenditure Profile	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-28	TOTAL
Seqwater Forecast Expenditure	$0.023	$0.023	$0.08	$0.008	$0.038	$0.059	$0	$42.79	$42.951
Proposed Adjustment	-$0.023	-$0.023	-$0.08	-$0.008	-$0.038	-$0.059	-$0	-$42.79	-$442.951
CH2M HILL Recommended Expenditure Profile	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Source: Seqwater spreadsheet *Capital Program for 2014 Bulk Price Review 2014-09-26 No Efficiencies.xlsx* and CH2M HILL analysis

CH2M HILL notes that expenditures for this renewals scheme increase significantly from 2022, which seems to be consistent with observations made on other renewals schemes.

6.10.9 Extrapolation to other programs / projects

On the basis of the results of the review, CH2M HILL does not consider that the findings from this program can be extrapolated to other programs.

6.11 Mount Crosby East Bank WTP – Filtration Improvements

6.11.1 Project description

The Mt Crosby WTPs consists of two plants at Eastbank and Westbank. The water from each WTP enters reservoirs at Cameron's Hill for disinfection and then travels to Holt's Hill for final chlorination prior to entering the distribution network. Supply from the Mt Crosby WTPs often exceeds 450 ML/day and in 2011 the average daily production was 320 ML/day.

A range of studies have been undertaken by Seqwater on Mt Crosby. The long term planning study confirmed that Westbank WTP would be needed for the long term and that Eastbank, in its current form, would be needed for at least 10 to 20 years. At which time, a major refurbishment of Eastbank will be required. In the next 10 years, Westbank will also require a major augmentation for quality as well as quantity. Refer to Section 6.6 of this review for more details of this upgrade.

The long term planning study also recommended that some critical process improvements were needed in the short-term to ensure the WTPs can produce a minimum of 250 ML/day at low risk. The critical process improvement areas that were identified related to upgrading the filters at Eastbank and to improving primary coagulation and disinfection mixing at both Eastbank and Westbank, Cameron's Hill and Holt's Hill.

In summary, there are four key issues which constrain short-term operation, performance and efficiency of the Mt Crosby WTPs:

- Eastbank flow meter reliability
- Chemical Mixing design

- Post pH control and lime buildup in reservoirs
- Eastbank filter design.

The *Mount Crosby West Bank WTP – Filtration Improvements* project involves the refurbishment of the existing filters as East Bank WTP.

Project development stage

This project is at the *Validation, Planning and Investment Commitment* Stage of Seqwater's Capital Planning life-cycle (Gate 2 of the investment planning approval process) and has progressed to the preparation of a preliminary design.

6.11.2 Proposed capital expenditure

As outlined in Seqwater's 2015-18 Submission, there is currently a capital cost allocated for this project of $36.540 million. CH2M HILL notes that the cost estimate outlined in the *East Bank Filter Refurbishment – Preliminary Design Report* suggests a capital cost of $35.5 million. The reported capital expenditure for the *Mount Crosby East bank WTP – Filtration Improvements* project is outlined in Table 6-32.

Table 6-32: Mt Crosby East Bank WTP – Filtration Improvements, reported expenditure (M, real 2014)

Project component	2014-15	2015-16	2016-17	2017-18	TOTAL
Project Delivery	1.440	11.700	11.700	11.700	36.540
TOTAL	**1.440**	**11.700**	**11.700**	**11.700**	**36.540**

Further discussion of the reported capital expenditure for the *Mount Crosby East Bank WTP – Filtration Improvement* project is provided in Section 6.11.5.

6.11.3 Provided documentation

Documentation reviewed in respect of the *Mount Crosby East Bank WTP – Filtration Improvement* project included:

- SKM, Mt Crosby Options Development – Options and Concept Design Report, January 2012
- Seqwater, Needs Analysis – Mt Crosby Short-Term Critical Process Improvements, September 2012
- Seqwater, Mt Crosby WTP Critical Process Improvements: Feasibility and Design (ELT Meeting Briefing Paper), September 2012
- Seqwater, Mt Crosby WTP Critical Process Improvements – Executive Leadership Team Meeting Minutes, September 2014.
- SKM, East Bank Filter Refurbishment – Preliminary Design Report, February 2014
- SKM and Hunter Water Australia, Mt Crosby Water Treatment Plants: Critical Process Improvements – Feasibility and Preliminary Design – Options Analysis Report, July 2014.
- Seqwater, Long Term Planning Executive Summary Report, August 2014

6.11.4 Prudency

A review of the prudency of Seqwater's proposed *Mount Crosby East Bank WTP – Filtration Improvement* project is outlined below; specifically this includes a review of identified the project driver(s) and the decision making process supporting the proposed project.

Project driver

The primary driver identified by Seqwater for this project is compliance.

The Mt Crosby Eastbank WTP is one of the key water treatment plants operated by Seqwater. The *Water Supply (Safety and Reliability) Act 2008* and supporting regulations require that Seqwater ensure that the water supplied meets minimum water quality standards and provides a reliable water supply. The *Drinking Water Quality Improvement Plan* (DWQIP) is regulated and must be acted on by Seqwater. As outlined in the *Needs Analysis – Mt Crosby Short-Term Critical Process Improvements* report developed by Seqwater, the DWQIP states the following works with respect to filtration will be undertaken at Mt Crosby:

- Review filter design and backwash strategy to optimise filter turbidity, reduce residual production and investigate strategies to improve filter ripening
- Review the feasibility of rejecting filtrate at start-up to prevent turbidity spikes.

As a result of the needs analysis, Seqwater identified that the aging infrastructure and the obsolete filter technology (shallow filters, mono-media, no air scour) at Mt Crosby Eastbank WTP have the potential to impact on the reliability of supply and water quality. CH2M HILL notes that the above requirements were confirmed in a subsequent options assessment and preliminary design report.

Based on a review of available information, CH2M HILL considers that the cost driver for this project has been appropriately identified.

Decision making process

In 2012, Seqwater undertook the *Needs Analysis – Mt Crosby Short-Term Critical Process Improvements* to review and confirm the service need and outcome sought at the Mt Crosby WTPs, and identify potential solutions to achieve the required outcomes at the site.

Based on the outcomes of the needs analysis, Seqwater engaged SKM and Hunter Water Australia to undertake a detailed options analysis and developed a concept design. The detailed assessment identified four discrete work packages that were required to be implemented. As outlined in *Mt Crosby Water Treatment Plants: Critical Process Improvements – Feasibility and Preliminary Design – Options Analysis Report* (2014), the four work packages recommended to be progressed were:

- Work Package 1 – Upgrade of the raw water flow meters at East Bank WTP
- Work Package 2 – Improvements to flash mixing and chemical dosing points
- Work Package 3 – Improvements to chemical storage, handling and dosing facilities
- Work Package 4 – Upgrading the Eastbank WTP filters

CH2M HILL notes that Work Package 4 relates to the *Mount Crosby East Bank WTP – Filtration Improvement* project. As a result of the options assessment undertaken by SKM and Hunter Water Australia, it was recommended that a full refurbishment of existing filters at Eastbank WTP be undertaken (this project).

Drawing on the outcomes of the options assessment, the *East Bank Filter Refurbishment – Preliminary Design Report* was prepared by SKM and Hunter Water Australia in 2014 to develop the preferred option for Work Package 4. This report is intended to facilitate the development of a business case for the capital works project.

Based on a review of the existing documentation, and recognising that a business case for this project is under development to enable the project to progress to Gate 3 of Seqwater's Capital Planning life-cycle, CH2M HILL considers that a clear, consistent and transparent decision-making process has been followed to date with respect to this project.

6.11.5 Efficiency

A review of the efficiency of Seqwater's proposed *Mt Crosby East Bank Filter Refurbishment* project is outlined below; specifically this includes a review of the proposed scope of works, the standard of works and estimated project costs.

Scope of works

The *Mount Crosby East bank WTP – Filtration Improvements* project is currently at the preliminary design stage of project planning. As noted above, the options assessment has identified a preferred option of refurbishment of the existing filters, which has been progressed through preliminary design. The scope of works for the preferred option consists of:

- Remove existing launders
- Remove existing media
- Remove existing laterals
- Rendering of exposed aggregate surfaces prior to epoxy coating
- Extend washout wall to suit new raised launders
- Install washout wall support beams back to existing filter pipe gallery wall
- Install new 100 mm NB PVC laterals and support/levelling system
- Concrete encase new laterals
- Install polyethylene filter nozzles
- Install air scour grid and supports (dependent of preferred air scour option)
- Install air scour manifold and soft start system
- Install new washout launders
- Install selected media in accordance with standard procedures
- Install air scour blowers and air scour supply pipeline
- Install required modifications to PLC I/O
- Update PLC logic to incorporate revised backwash procedures

CH2M HILL notes that there are preliminary engineering sketches and P&IDs accompanying the scope of works outlined in the *East Bank Filter Refurbishment – Preliminary Design Report*.

Based on the preliminary design-level of investigation done to date, CH2M HILL considers that the proposed scope of works for the project to be reasonable.

Standard of works

CH2M HILL notes that the *East Bank Filter Refurbishment – Preliminary Design Report* clearly sets out the design criteria and assumptions used and has provided an adequate level of constructability and works sequencing. Cost estimates have been based on market pricing for major equipment supplemented with first principles estimating.

Based on the information and documentation reviewed for this project CH2M HILL considers that the standards of work adopted are appropriate and in-line with industry good practice.

Project cost

The proposed capital expenditure for this project is $36.540 million. However, the preliminary design-level cost estimate provided to CH2M HILL as part of this review is approximately $35.5 million ($2014). The detailed preliminary design estimate is supported by a detailed cost breakdown and explicit unit rates and quantities. It has a stated level of accuracy of -30 percent to +30 percent. A summary breakdown of the preliminary design estimate is provided in Table 6-33.

Table 6-33: Mt Crosby East Bank Filter Refurbishment cost breakdown ($2014)

Item	Description	Amount ($)
1	**Direct Costs**	
	Site Establishment	$1,200,550
	Civil / Structural	$3,692,580
	Pipework	$5,314,808
	Valves	$2,938,541
	Media	$4,832,310
	Filter Mechanicals	$3,052,400
	Automation and Control	$692,120
	Documentation	$47,000
	Sub-Total	**$21,770,309**
2	**Other Owner Provisions**	
	Design	$830,000
	Legal Requirements	$321,112
	Project Management	$2,504,010
	Contractor Profit	$2,612,437
	Sub-total	**$6,267,559**
	PROJECT COST ESTIMATE	**$28,037,868**
	P50 Cost Estimate (@ Risk)	**$29,477,062**
	Contingency (19.8%)	**$5,834,729**
	TOTAL PROJECT ESTIMATE (rounded up)	**$35,500,000**

Source: SKM, 2014. *Preliminary Design Report (Appendix F)*

The project cost estimate above was developed by SKM and Hunter Water Australia to support the development of the business case. CH2M HILL notes that this estimate is based on market pricing for major equipment supplemented with first principles estimating. This cost estimate was based on a proposed Construct Only contract and includes a probabilistic assessment and costing of inherent risks.

The cause of the discrepancy between the reported capital estimate of $36.540 million submitted by Seqwater and the $35.500 million preliminary design estimate is unknown. No explanation or justification has been provided by Seqwater. CH2M HILL however, notes that the discrepancy of $1.040 million represents a variance of 3 percent, and is well within the stated level of accuracy.

CH2M HILL considers that the level of detail supporting the project cost estimate is reasonable for a preliminary design to support a business case. Key assumptions and limitations involved in the project cost estimate are clearly stated and a probabilistic assessment of inherent risks has been carried out. CH2M HILL considers that the business

case should confirm the project scope, timing and procurement methodology and the cost estimate should be updated accordingly.

CH2M HILL considers the reported cost for this project to be reasonable given the project development stage.

6.11.6 Efficiency gains

No efficiency gains have been identified for this project.

6.11.7 Assessment of Prudency and Efficiency

The *Mount Crosby East bank WTP – Filtration Improvements* project is currently at the *Validation, Planning & Investment Commitment* Stage of Seqwater's Capital Planning life-cycle. Based on a review of existing documentation, it has been assessed as prudent. The primary driver of compliance has been demonstrated, and the project is supported by a clear, consistent and transparent decision-making process to date.

Based on the level of investigation done to date, CH2M HILL considers that the proposed scope of works for the project appears reasonable. CH2M HILL notes that investigation carried out to-date has been undertaken through the appointment of consultants. The *East Bank Filter Refurbishment – Preliminary Design Report* clearly sets-out the design criteria and assumptions used, with an adequate level of consideration of constructability and works sequencing. As such, CH2M HILL considers that the standard of works adopted to date are appropriate and in-line with industry good practice.

CH2M HILL notes that there is a discrepancy between the reported capital estimate submitted by Seqwater ($36.540 million) and the preliminary design estimate ($35.500 million). While the cause of the $1.040 million discrepancy is unknown, it is noted that it is well within the stated level of accuracy of the preliminary design estimate. CH2M HILL considers that the level of detail supporting the project cost estimate is reasonable for a preliminary design and key assumptions and limitations have been clearly stated. CH2M HILL considers that the business case should confirm the project scope, timing and procurement methodology and the cost estimate should be updated accordingly.

CH2M HILL has assessed the *Mount Crosby East bank WTP – Filtration Improvements* project to be prudent and efficient.

6.11.8 Assessment of reported expenditure

Seqwater has identified proposed capital expenditure of $36.540 million (real 2014 terms) over the period from 2014-15 to 2017-18 for the Mt Crosby East Bank Filter Refurbishment project. Table 6-34 below identifies the recommended capital expenditure for this project.

Table 6-34: Mt Crosby East Bank Filter Refurbishment recommended capital expenditure (M)

Project Expenditure Profile	2014-15	2015-16	2016-17	2017-18	Total Forecast
Seqwater Forecast Expenditure	$1.440	$11.700	$11.700	$11.700	$36.540
Proposed Adjustment	-	-	-	-	-
CH2M HILL Recommended Expenditure Profile	**$1.440**	**$11.700**	**$11.700**	**$11.700**	**$36.540**

On the basis of the assessment outlined above, it is recommended that Seqwater's forecast capital expenditure remain unchanged as outlined in Table 6-34.

6.11.9 Extrapolation to other projects

Given the above findings and the fact that no systemic issue has been identified with the processes applied by Seqwater in relation to this project, CH2M HILL does not consider that the findings from this project can be extrapolated to other projects.

6.12 Mount Crosby West Bank WTP – Renewals

6.12.1 Project description

The Mt Crosby WTPs consists of two plants, designated East Bank and West Bank. The water from each WTP enters reservoirs at Cameron's Hill for disinfection and then travels to Holt's Hill for final chlorination prior to entering the distribution network. Supply from the Mt Crosby WTPs often exceeds 450 ML/day and in 2011 the average daily production was 320 ML/day.

West Bank is a250ML/day plant originally commissioned in 1985. It comprises two 125ML/day process streams and employs coagulation, sedimentation, dissolved air floatation (DAFF) and disinfection processes. The currently employed processes at the plant lack the ability to manage potentially harmful organisms and chemicals that could be expected from the unprotected Brisbane River catchment. It currently serves as a backup plant to the East Bank plant and is brought on-line to meet periods of high demand or when a shut-down is required at the East Bank plant.

The Mount Crosby West Bank renewals program consists of a range of projects which have been identified through the Mount Crosby West Bank WTP Facilities Asset Management Plan (FAMP). The FAMP employs an asset criticality and condition assessment approach to the identification of programmed activities which is transparent and robust. While a number of projects have been identified through the FAMP for inclusion in the Seqwater Capital Programme Budget, only those for which a Business Case Report has been prepared were submitted for review. A total of seven Business Cases have been reviewed.

All projects reviewed are in the Validation, Planning and investment stage of Seqwater's Capital Planning life-cycle (Gate 3 of the investment planning approval process).

6.12.2 Proposed capital expenditure

The seven submitted projects vary in proposed expenditure from $18,000 to $300,000. The total combined proposed capital expenditure of these projects is $681,000. Specific details of the projects are provided in Table 6-35 below:

Table 6-35: *Mount Crosby West Bank WTP – Renew*als, reported expenditure (real $2014/15)

Project	Commission Yr.	Expenditure
Replace Alum Dosing System Pipework	14/15	$50,000
Overhaul Sludge Processing Centrifuge	13/14	$70,000 (preferred)
Install Thermal Monitoring Three Raw Water Pumps	14/15	$143,000
Overhaul Raw Water Pump 5 Water Pump and Motor	14/15	$300,000
Refurbish DAFF Recycle Pump 7	14/15	$18,000
Replace Sump Pump in Raw Water Pump Well 2	13/14 14/15	$20,000
Replace Waste Water Pumps and Motors	14/15	$80,000

Source: Individual Project Business Cases.

6.12.3 Provided documentation

The following documentation has been provided:

- Facility Asset Management Plan for Mount Crosby West Bank WTP (2011)
- Capital Program for 2014 Bulk Price Review 2014-09-26 No Efficiencies spreadsheet
- Seqwater Valuations Report - 24 06 2013
- TWB Budget Analysis V1.1 spreadsheet
- Business Cases (Minor Project) for the following projects:
  - Replace Alum Dosing System Pipework
  - Overhaul Centrifuge
  - Install Temperature Monitoring
  - Overhaul No 5 Raw Water Pump and Motor
  - Refurbish No 7 DAFF Recycle Pump
  - Replace Sump Pump in Raw Water Well 2
  - Replace Waste Water Pumps and Motors

6.12.4 Prudency

A review of the prudency of Seqwater's proposed projects under the Mount Crosby West Bank WTP Renewals Program is outlined below; specifically this includes a review of the identified project driver(s) and the decision making process supporting the proposed projects.

Project drivers

The *Facility Asset Management Plan* is the primary tool for large facility renewals budget determination at Seqwater. It employs a robust condition / criticality approach to identification and prioritisation of both asset renewal/refurbishment investment and preventative maintenance. This document should be considered the first 'gate' in determining the appropriateness of funding a project through the facility renewals budget. It follows that with limited exceptions; each project put up for funding in a Business Case should have already been identified in the 10-Year Renewal and Refurbishment Program presented in Appendix A of the FAMP

Of the projects where Business Cases have been provided for review: four can be readily identified in the FAMP Renewal and Refurbishment Program; one is ambiguous; and two are not on the program. The two projects not in the schedule are:

1. Install thermal monitoring on Raw Water Pump No 3; and
2. Refurbish DAFF Recycle Pump No. 7.

The thermal monitoring equipment project is technically not a renewal. It involves the installation of a new asset and is therefore a capital improvement. From a cost driver perspective however, a strong case can be made for this project being funded under a renewals program on the basis that it enables proactive maintenance which extends pump life and reduces risk of failure. The driver should therefore, be **reliability** and **service**, in accordance with the Seqwater *Guideline for Capital Expenditure Projects Budget FY 15*.

The FAMP did not pick-up the need to refurbish the DAFF recycle pump nor did it assess the condition of this pump as poor or its criticality as high. The Business case for this project does however, highlight that an event occurred subsequent to the condition/risk assessment that accelerated deterioration of the pump and this has been confirmed by visual assessment during maintenance of other DAFF recycle pumps. Taking this into account, CH2M HILL accepts the **renewal** driver for this project, as proposed in the Business Case.

For the remaining projects, including the ambiguous project, CH2M HILL accepts the drivers identified in the individual project Business Cases, as presented in Table 6-36 below.

Table 6-36: *Mount Crosby West Bank WTP – Renew*als, Project expenditure drivers

Project	Driver
Replace Alum Dosing System Pipework	Renewal
Overhaul Sludge Processing Centrifuge	Service
Install Thermal Monitoring Three Raw Water Pumps	Renewal
Overhaul Raw Water Pump 5 Water Pump and Motor	Service
Refurbish DAFF Recycle Pump 7	Service
Replace Sump Pump in Raw Water Pump Well 2	Service
Replace Waste Water Pumps and Motors	Service

Decision Making Process

CH2M HILL's review highlighted that the renewals program decision-making process comprises two main components:

1. The FAMP process, which informs the level of budget that is laid-in to meet anticipated future renewal, refurbishment and preventative maintenance funding demands; and
2. The development of Business Cases to justify commitment of expenditure of individual projects to be funded under the renewals program budget.

It is understood that that each FAMP is presented to the Seqwater Board for approval, but CH2M HILL has not sighted documentary evidence to demonstrate these approvals. On this point, it is noted that approval transparency could be improved simply by including a document / action authorisation box at the front of FAMP documents.

Business Cases supporting projects under the FAMP Renewal and Refurbishment program are subject to the project approval process which is standardised across Seqwater and supported by policy, processes, templates and governance arrangements. All Business Cases reviewed by CH2M HILL have been approved by appropriate Seqwater Managers.

CH2M HILL notes that the Business Case reports have been prepared using a template which is consistent with the templates provided in support of the Component 1 (Policy and Procedure) of this review. All of the projects reviewed fall within the Minor Projects scale and the Minor Projects template has been employed. These Business Cases have been drafted relatively recently and when compared with the Business Cased reviewed for the North Pine WTP Renewals Program, represent a significant improvement.

Project Business Cases reviewed consider a 'do nothing' option and one or two other funding options. The projects that consider three options generally investigate the costs and benefits of refurbishment or replacement of an asset, which demonstrates that whole-of-life costs are being considered. Business cases that investigate two options related to assets that generally don't have a sensible refurbishment option. CH2M HILL notes that it would be preferable for this to be explicitly stated in the Business Cases, for clarity.

Seqwater policy requires that a minimum of three options are considered in comprising a do-nothing, a capital option and a non-capital option. None of these projects have considered a non-capital option and therefore, do not comply with Seqwater policy. Non-compliance with

Seqwater policy notwithstanding, there is a risk in not considering more than two options that an optimal option is not identified, in terms of potential replacements. Furthermore and in-general, more information needs to be provided on what the risks of the 'do nothing' option are, in terms of operational continuity, structural integrity and risk to health and safety. Typically, the FAMPs do not provide detail on these risks.

6.12.5 Efficiency

A review of the efficiency of Seqwater's proposed *Mount Crosby West Bank WTP – Renewals* program is outlined below; specifically this includes a review of the proposed scope of works, the standard of works and estimated project costs.

Scope of the Works

The scope of individual projects has been provided in the project Business Cases at a variable, but generally acceptable level of detail. A number of Business Cases include a Project Brief Appendix that is scoped sufficiently to develop a robust cost estimate (Alum Dosing System Pipework, Raw Water Pump Overhaul, DAFF Recycle Pump Refurbishment, Raw Water Sump Pump Replacement, Thermal Monitoring Installation, Waste Water Pump Replacement and Centrifuge Overhaul). The remaining projects rely on an inferred understanding of the existing infrastructure.

CH2M HILL would generally expect to see details of the existing asset being replaced or refurbished, such as: model numbers and performance characteristics along with details of ancillary works that may be required to facilitate the replacement. The Business Cases are inconsistent in this respect. In addition, where there is potential for the ancillary works to be ambiguous, battery limits should be documented to ensure clarity of scope. In instances where the replacement / refurbishment cost is established on a unit-cost basis, the Business Case should provide details of the relevant measurements required.

CH2M HILL found that the level of scoping detail in the Business Cases was adequate for the scale of expenditure being considered.

Standard of works

Limited information has been provided on the standard of works that the individual projects will conform to as most Project Briefs included with the Business Cases employ a work method approach to project scoping. It is however, expected that the works will be required to comply with technical, design, construction and legislative requirements as a minimum. CH2M HILL recommends that the reinstatement specification be clearly stated in the individual project Business Cases, including an assessment of expected design life post-renewal. This approach would ensure that these requirements are transferred into the contract documentation set at the time of procurement for both quality assurance and warranty purposes.

Program cost

Project costs for the submitted projects are adequately substantiated for their individual levels of expenditure and complexity. Two projects included quotations to substantiate project costs – the DAFF Recycle Pump Refurbishment and the Raw Water Sump Pump Replacement. The remaining project prices are based on Seqwater estimates prepared by the Asset Engineer with no detail provided to substantiate the estimates.

Operational cost considerations have not been documented in any of the Business Cases seeking renewal and refurbishment funding. Operating costs should be considered for activities such as inspection and certification and the like. It is accepted that based on the nature of these projects, not all of the projects will significantly influence operations costs, but these should be clearly identified by exception to comply with Seqwater policy.

Policy and Procedures

Seqwater's Procurement procedure, *PRO-01336 Corporate Procurement*, provides a guide to procurement sourcing options based on the project risk rating and capital cost (including contingency). For the submitted projects, the stated procurement methodology appears to be based on a standard text and has not been reviewed against or aligned to the procurement procedures.

A number of the projects have been assessed in the Business Cases to have a 'High' risk (not necessarily a high risk rating) and this is not always aligned with the condition and criticality ratings in the FAMP. For all high risk projects, the contracting strategy should be advised by Seqwater's Strategic Procurement Services. Even when not allowing for the risk rating, the procurement methodology proposed in the business cases does not align with *PRO-01336*.

Table 6-37 below summarises the recommended procurement methodology from the Business Case documents and the market approach suggested by *PRO-01336* for projects with a low or medium risk rating where no arrangement is in place.

Table 6-37: *Mount Crosby WTP – Renew*als, Comparison of Business Case procurement approach against Seqwater Policy

Project	Procurement Approach from Business Case	Risk Rating from Business Case	Contract Value from Business Case	Procurement Approach from PRO001336 Guidelines
Replace Alum Dosing System Pipework	3 Quotes	Medium	$50,000	Seek minimum of 3 quotes
Overhaul Sludge Processing Centrifuge	3 Quotes	Extreme	$70,000	To be assessed by Strategic Procurement Services
Install Thermal Monitoring Three Raw Water Pumps	3 Quotes	High	$143,000	To be assessed by Strategic Procurement Services
Overhaul Raw Water Pump 5 Water Pump and Motor	3 Quotes	High	$300,000	To be assessed by Strategic Procurement Services
Refurbish DAFF Recycle Pump 7	Employ Panel Provider	High	$18,000	To be assessed by Strategic Procurement Services
Replace Sump Pump in Raw Water Pump Well 2	Purchase / Installation by Seqwater	High	$20,000	Not applicable
Replace Waste Water Pumps and Motors	3 Quotes	Moderate	$80,000	Seek minimum of 3 quotes

Timing and Delivery

Seqwater has scheduled all projects identified in the Business Cases provided for delivery in 2013/14 and 2014/15. Having reviewed the Seqwater capital program, CH2M HILL believes that projects reviewed will be delivered in the 2014/15 financial year, but cannot verify this because the individual program projects are not separately identified in the capital expenditure spreadsheet. All of the proposed projects are expected to be delivered well within a calendar year.

CH2M HILL notes that of the projects that can be identified in the FAMP 10-Year Renewal and Refurbishment Program, the Sludge Processing Centrifuge Overhaul project has been brought forward from the 2017/18 financial year. No substantive justification has been provided for bringing forward this work in the Business Case. The Thermal Monitoring Installation is also not on the FAMP program, but CH2M HILL acknowledges the benefits of fitting this equipment as soon as possible.

The Business Cases provided present cost estimates that are +/- 30% accurate and good practice would require a higher level of accuracy for delivery. CH2M HILL found no

documentary evidence of a planned review of project estimates prior to tendering the works. Furthermore, given the relative immediacy of the delivery schedule, limited time is available for such reviews to be completed before delivery.

6.12.6 Efficiency gains

Some of the individual Business Cases present qualitative statements on the potential efficiency gains that may be delivered by the proposed projects. Examples of this are the Thermal Monitoring Installation and all of the projects justified by improved reliability (Service driver). None of the Business Cases for these projects however, quantify what the potential savings resulting from project investment may be.

6.12.7 Assessment of Prudency and Efficiency

The projects reviewed under the *Mount Crosby WTP – Renewals* program are currently at the *Validation, Planning and Investment Commitment* Stage of Seqwater's Capital Planning life-cycle. Based on a review of the documentation provided by Seqwater all of the projects have been assessed as prudent.

The primary project cost driver for the projects reviewed have been identified as either renewal or service and these are appropriate for funding through the renewals budget. CH2M HILL has identified an opportunity for Seqwater to improve the transparency of its decision-making processes with respect to facility renewals programs. It is recommended that all Business Cases for future projects assessing renewals / refurbishment funding be more aligned to the FAMPs, in terms of:

- Project scope / drivers / intent (with due attention to the differentiation between capital improvement and renewals/refurbishment);
- Assessed risk / criticality outcomes;
- Expected project benefits;
- Program to project line-of-sight;

On the latter point, the use of common activity identifiers between FAMPs and associated business cases would significantly increase transparency. CH2M HILL acknowledges that not all projects will be captured in FAMP programs but where this is the case, the other three criteria noted above should be adequately addressed to gain funding approval.

The Business Cases should also provide more substantiation of why a specific cost driver is applicable. At a minimum, current asset age, design life, duty cycle and maintenance reliability history should be recorded to justify renewal. The argument for asset renewal/replacement on the grounds of expired asset life or reduced whole-of-life cost should always be clear and substantiated in these documents to avoid unnecessary investment in economically serviceable assets. Cost justification within renewal project Business Cases was also found to be appropriate and in-line with the level of investment sought (as is required by Seqwater project justification policy/procedures).

A summary of our assessment of the prudency and efficiency of each project is provided in Table 6-38 below:

Table 6-38: *Mount Crosby WTP – Renew*als, Summary of Prudency and Efficiency Summary

Project	Prudent?	Efficient?
Replace Alum Dosing System Pipework	Yes	Yes
Overhaul Sludge Processing Centrifuge	Yes	Yes
Install Thermal Monitoring Three Raw Water Pumps	Yes	Yes
Overhaul Raw Water Pump 5 Water Pump and Motor	Yes	Yes
Refurbish DAFF Recycle Pump 7	Yes	Yes
Replace Sump Pump in Raw Water Pump Well 2	Yes	Yes
Replace Waste Water Pumps and Motors	Yes	Yes

6.12.8 Assessment of reported expenditure

Seqwater has identified proposed capital expenditure of $40.539 million (real 2014 terms) over the period from 2014-15 to 2027-28 for the *Mount Crosby WTP – Renewals* program. Table 6-39 below identifies the recommended capital expenditure for time horizon of the projects reviewed.

Table 6-39: *Mount Crosby WTP – Renewals,* recommended capital expenditure (M)

Project Expenditure Profile	2014-15	2015-16	2016-17	2017-18	2018-28	TOTAL
Seqwater Forecast Expenditure	$0.663	$0.923	$0.671	$0.827	$37.454	$40.539
Proposed Adjustment	-$0.070	-	-	$0.070	-	-
CH2M HILL Recommended Expenditure Profile	**$0.593**	**$0.923**	**$0.741**	**$0.827**	**$37.454**	**$40.539**

Source: Seqwater spreadsheet *Capital Program for 2014 Bulk Price Review 2014-09-26 No Efficiencies.xlsx* and CH2M HILL analysis

CH2M HILL notes that the Seqwater forecasts for renewals expenditure at the Mount Crosby WTP facility increase significantly beyond 2023, which is beyond the FAMP planning horizon for the plant. Consequently, there is no document that CH2M HILL is aware of that justifies this increase. There is a strong case to be made for perpetuation of funding levels around $1 million per annum, as currently established and justified in the Mount Crosby WTP FAMP, in the absence of any such justification.

6.12.9 Extrapolation to other programs / projects

On the basis of the results of the review, CH2M HILL does not consider that the findings from this program can be extrapolated to other programs.

6.13 Kilcoy WTP Upgrade

6.13.1 Project description

The *Kilcoy WTP Upgrade* project is a completed project for a new water treatment plant to replace the former treatment plant due to insufficient capacity to meet demand and the water quality associated with the off-stream storage from Kilcoy weir was subject to water quality issues during the summer months, which impacted upon plant output. The new plant is located adjacent to the existing Kilcoy-Somerset WTP and will draw raw water from Somerset Dam.

The *Kilcoy WTP Upgrade* project involved capital works for a new 4 ML/day water treatment plant, raw water pump station to draw water from Somerset Dam, connection into Queensland Urban Utilities' existing Saleyard Road reservoirs and new road and bridge upgrade to access the site.

Project development stage

This project is at the *Implementation* Stage of Seqwater's Capital Planning life-cycle (Gate 4 of the investment planning approval process), and as such has progressed through construction but has not achieved project completion and handover.

6.13.2 Proposed capital expenditure

As outlined in Seqwater's 2015-18 Submission, there is no further proposed capital expenditure for this project. The final capital cost expenditure forecast was stated in Seqwater's Post Market Budget Review, a final revised project budget of $17.822 million was required for this project. The annual reported capital expenditure for the *Kilcoy WTP Upgrade* project has not been provided for this Review.

Further discussion of the reported capital expenditure for the *Kilcoy WTP* project is provided in Section 6.13.5

6.13.3 Provided documentation

Documentation reviewed in respect of the *Kilcoy WTP Upgrade* project included:

- GHD, Kilcoy Water Treatment Plant Planning and Concept Design – Concept Design Report, June 2010
- Seqwater, Kilcoy WTP Upgrade – Business Case, August 2010
- Seqwater, Kilcoy WTP Upgrade – Post Market Budget Review, May 2011
- Seqwater, Kilcoy Water Treatment Plant – Board Meeting Paper, June 2011
- Seqwater, Board Meeting Notes – Meeting of 09 June 2011, July 2011
- Seqwater, Formal Instrument of Agreement, July 2011
- Seqwater, PID00150 – TKI New Kilcoy WTP – Project Status Report, July 2014
- Seqwater, Kilcoy WTP Project – Scope Change Register.

6.13.4 Prudency

A review of the prudency of Seqwater's proposed *Kilcoy WTP Upgrade* project is outlined below; specifically this includes a review of identified the project driver(s) and the decision making process supporting the proposed project.

Project driver

The primary driver identified by Seqwater for this project was compliance.

The old Kilcoy WTP had a nominal capacity of 1.8 ML/day and supplied a population of 1,700 people in addition to 1 ML/day to the Kilcoy Abattoir. This level of demand required the plant to operate for more than 20 hours per day for 23% of the time. In addition, key components of the plant were assessed to have reached the end of their useful life.

In 2010, Seqwater engaged GHD to undertake a Planning and Concept Design Study to:

- Assess a number of possible raw water sources for water quality and yield
- Review condition of current infrastructure and suitability for upgrade
- Establish future demands and water quality and treatment specifications
- Review, assess in a workshop and recommend a preferred site for a new water treatment plant
- Review, assess in a workshop and recommend a preferred treatment process
- Complete a concept design and cost estimate for a new water treatment plant in accordance with Seqwater requirements and the outcomes of the workshop.

This report recommended that a 4 ML/day treatment plant be constructed with two parallel trains to meet project demands over a 25-year horizon. The selected site was decided based on non-cost criteria, with the costs associated with the evaluated three sites having been determined to be comparable. Upgrade of the old Kilcoy WTP or the Kilcoy-Somerset WTP was determined to not be practical. It should be noted that no costs were provided to confirm the stated conclusion that upgrade of the old Kilcoy WTP was unlikely to be cost-effective.

Based on a review of available information, CH2M HILL considers that the cost driver for this project has been appropriately identified.

Decision making process

The *Kilcoy WTP Upgrade* project is supported by a documented Business Case and Concept Design Report up to the procurement gate. Following receipt of tenders, the project is supported by a *Post Market Budget Review* and the signed contract. The contract administration phase is supported by a project scope change register and a project status report.

As part of the Concept Design Report assessment, a range of conceptual upgrade options were assessed to review the raw water supply, the treatment plant location and the treatment plant technology.

These options included:

- Water Source:
  - Kilcoy Weir

- Somerset Dam.

- Treatment Plant Location:
  - Existing Kilcoy-Wade St plant site
  - Existing Kilcoy-Somerset WTP site
  - New site located downhill from the town reservoirs in Saleyard Rd, east Kilcoy
  - New site located adjacent to the Kilcoy weir and OSS.
- Treatment Process:
  - DAFF + UV
  - Clarifier/Filter + UV
  - MF or UF/Ozone/BAC.

Recognising that the *Kilcoy WTP* project was at the *Validation, Planning & Investment Commitment* Stage of Seqwater's Capital Planning life-cycle when further detailed analysis was recommended in both the Business Case and Concept Design Report before the project was progressed to Gate 3, CH2M HILL considers that a clear, consistent and transparent decision-making process had been followed to this point with respect to this project. However, CH2M HILL has not been able to ascertain that this process was carried through the Gate 3 and Gate 4 processes, as a feasibility design has not been seen and significant cost overruns were identified based on the *Post Market Budget Review*.

The preferred procurement strategy for the project was an Early Design & Construct contract. The identified advantages of this procurement strategy were that it would enable all design phases to be rolled into one contract, reducing the project schedule, while also allowing for a consistent designer to be involved throughout the project. CH2M HILL has seen neither the documentation associated with the request for proposals nor evidence of the tender selection process. It is noted however, that the Seqwater *Post Market Budget Review* and the subsequent signed contract document do indicate that the awarded tender was significantly higher than the business case cost estimate. While the *Post Market Budget Review* does explain the difference in estimated capital cost expenditure relative to the Business Case, it did not attempt to review whether an alternate procurement methodology may have been more appropriate for this scope of works. Furthermore, given that the tendered price for the project was materially higher than the business case estimate, CH2M HILL has not been able to identify whether a review of the preferred option was undertaken.

Overall, CH2M HILL considers that an adequate decision-making process has been followed with respect to this project.

6.13.5 Efficiency

A review of the efficiency of Seqwater's proposed *Kilcoy WTP Upgrade* project is outlined below; specifically this includes a review of the proposed scope of works, the standard of works and estimated project costs.

Scope of works

The *Kilcoy WTP Upgrade* project is currently being constructed and is approaching Gate 5 for Project Completion & Handover. The documentation reviewed cover the Business Case (Gate 3) and Procurement Process (Gate 4).

The Gate 3 *Kilcoy WTP Upgrade – Business Case* was based on a Concept Design Report, which was intended as a high-level review and screening of options and development of costs for planning purposes. CH2M HILL notes that a single conceptual engineering sketch accompanied the Concept Design Report. The scope of works outlined in the business case included:[59]

1. Completion of outstanding survey and geotechnical investigations
2. Additional water sampling from Somerset Dam at the off-take location
3. Community consultation
4. Liaison with external parties including private land holders, Energex, Queensland Urban Utilities, Somerset Regional Council, SEQ Water Grid Manager and QWC
5. Detailed design, construction and commissioning of raw water infrastructure (pump station and pipeline)
6. Detailed design, construction and commissioning of new WTP including reconfiguring Wade St site
7. Preparation of documents for Development Approvals and Permitting lodgment for construction and plant
8. Design and integration of SCADA system
9. Detailed design and construction of the site access road and bridge upgrade

Based on the concept-level of investigation done to date, CH2M HILL considers that the proposed scope of works for the project was not consistent with the level of detail typically required for a Gate 3 Business Case.

Based on the documentation provided, CH2M HILL considers that the scope of works defined in the *Kilcoy WTP Upgrade – Business Case* for the purposes of progressing to market was limited but adequate. Reflecting Seqwater's recently review and revised policies and planning procedures, CH2M HILL would expect future business cases to provide greater detail with respect to the planned scope of works.

Standard of works

CH2M HILL notes that the Kilcoy WTP Upgrade – Business Case references in appropriate detail the need to: comply with the (then) existing Grid Supply contract for quality and quantity; achieve treated water quality requirements; comply with Seqwater *Development Guidelines for Water Quality Management in Drinking Water Catchments* (2010); and align with the Seqwater HAACP planning and risk profile.

Based on the information and documentation reviewed for this project CH2M HILL considers that the standard of work adopted is appropriate and consistent with industry requirements and standards.

Project cost

The indicative concept-level project capital cost for the *Kilcoy WTP Upgrade* project was $10.960 million. This was based on cost curves and was noted that at the time of preparation, the scope of works was not fully defined. A breakdown of the project capital cost estimate is provided in Table 6-40.

[59] Seqwater, 2010. *Kilcoy WTP Upgrade – Business Case*, p. 7.

Table 6-40 Kilcoy WTP Upgrade capital cost breakdown ($2010)

Item	Description	Quantity	Unit Rate	Amount ($)
1	**Raw Water Pump Station (floating offtake)**			
1.1	Floating pontoon, complete with warning markers etc	1	90,000	$90,000
1.2	Pump assembly (complete with pumpsets, footvalves, valves and appurtenances) for attachment to pontoon	1	100,000	$100,000
1.3	Floating delivery pipeline (DN280 HDPE)	135	300	$40,500
1.4	Electrical installation including SCA, variable speed drives, cabling etc	1	250,000	$250,000
1.5	Pipework interconnection with existing	1	5,000	$5,000
1.6	Waterhammer mitigation devices (including one-way surge tanks and replacement air valves)	1	135,000	$135,000
1.7	Contingency (40%)	1	248,200	$248,200
	Sub-Total			**$868,700**
2	**WTP Infrastructure**			
2.1	Balance tank- 125kL @ head of plant (Raw water + mixers + flash mixer)	1	210,000	$210,000
2.2	WTP at site (Includes standard earthworks, civil works, SCADA and telecommunications)	1	4,500,000	$4,500,000
2.3	New CWS tank - 200kL	1	150,000	$150,000
2.4	Upgrade to TW Pump at Somerset WTP site (incl, building, VSD, elec)	1	150,000	$150,000
2.5	Supernatant recycle PS and pipe	1	250,000	$250,000
2.6	Thickener, centrifuge and building	1	635,000	$635,000
2.7	Bulk excavation (above normal f or a new WTP, allows for deeper excavations and higher cartage costs than in Brisbane)	6,500	20	$130,000
2.8	Contingency (25%)	1	1,506,250	$1,506,250
	Sub-Total			**$7,531,250**
3	**Services Infrastructure**			
3.1	New transformer at Kilcoy-Somerset site (assumes Max 200kVA, pole-mounted, installed)	1	100,000	$100,000
3.2	Upgraded road access to Kilcoy-Somerset site	1	300,000	$300,000
3.3	Bridge upgrade	1	625,000	$625,000
3.5	Contingency (25%)	1	256,250	$256,250
	Sub-Total			**$1,281,250**
4	**Engineering**			
4.1	Preliminary design and tender phase services	1	300,000	$300,000
4.2	Construction phase services (Superintendent's Rep) (10%)	1	968,120	$968,120
	Sub-Total			**$1,270,000**
	TOTAL PROJECT COST ESTIMATE			**$10,960,000**

Source: GHD, 2010. *Concept Design Report*, p. 73.

The above concept-level project cost estimate was developed by GHD for budget planning purposes as part of the planning and concept design. This cost estimate was carried forward as part of the *Kilcoy WTP Upgrade – Business Case*, with a slight downward revision to

$10.905 million. CH2M HILL considers the variance between the estimates to be immaterial. The total project cost estimate, including operating expenditure, was $11.445 million with a stated level of accuracy of -10 percent to +30 percent.

As outlined above, CH2M HILL understands that no preliminary design investigation had been undertaken in the development of the above cost estimate and that it should be considered indicative only for planning purposes. It is recognised that concept engineering sketches were developed to support the concept-level cost estimate. CH2M HILL notes that the concept design cost estimate undertaken by GHD clearly states that the cost estimate was developing using a top-down cost curve approach, supplemented by budget quotes for some equipment items.

CH2M HILL considers the level of detail supporting the project cost estimate to be adequate, however, notes that it could have been further refined prior to being tendered. CH2M HILL further notes that the *Kilcoy WTP Upgrade – Business Case* clearly stated that a preliminary design was to be carried out in March 2011. No evidence has been provided to support that a preliminary design was prepared prior to tender of the project.

As a result of the tender evaluation the preferred tenderer's base price was $11.308 million, with a contingency allowance of 15 percent. **Following the acceptance of the preferred tenderer's price**, Seqwater undertook a *Post Market Budget Review* in May, 2011. As a result of the review, a range of necessary works were identified in addition to the scope of works included in the original D&C contract specification. These items related to a raw water pipeline, treated water pipeline and a new access road and upgrade to the existing road, and were required to ensure compliance with *Seqwater Development Guidelines for Water Quality Management in Drinking Water Catchments* (2010) and associated treated water quality requirements. Seqwater's cost estimate for the additional items was $3.511 million.

Taking into account the additional works required, associated project delivery costs, market escalation and contingency allowance, Seqwater identified a revised budget of $17.822 million(an approximately 55% increase over the original project budget of $11.445 million). While the *Post Market Budget Review* provides justification as to the identified additional costs, CH2M HILL notes that Seqwater did not place the project on hold pending a review of the business case and original options assessment. The decision to proceed with the project based on the revised project budget was noted at the 09 June, 2011 board meeting. Subsequent documentation including the *Project Status Report*, suggest that the project will be completed within the revised project budget, with a forecast total of $16.8 million by end of 2014-15.

Based on the available documentation, CH2M HILL considers that a preliminary design should have been undertaken prior to proceeding with the project. In line with Seqwater's policy *GDE-00041 – Cost Estimation Guidelines*, projects with a value of greater than $5 million should be based on first principles estimate, with a general scope of works developed and the estimate based on preliminary sizing of all major equipment and bulk items identified and priced to provide a minimum acceptable level of accuracy of +/- 30 percent. Consideration should be given to further refining this to a level of -10 percent to +15 percent when delivery projects via a D&C procurement strategy.

It is unclear as to whether undertaking an appropriately developed preliminary design prior to going to tender would have resulted in a materially different cost estimate from $17.822 million. However, it seems very likely that a preliminary design cost estimate would have reduced cost uncertainty and potentially avoided the requirement for a *Post Market Budget Review*. Furthermore, CH2M HILL considers that Seqwater should have considered

undertaking a review of the original business case and options assessment to ensure the preferred option was still viable given revised project cost estimates.

CH2M HILL notes that the project costs for the *Kilcoy WTP Upgrade* project are based on tendered prices and appear reasonable.

6.13.6 Efficiency gains

No efficiency gains have been identified by Seqwater for this project.

6.13.7 Assessment of Prudency and Efficiency

The *Kilcoy WTP Upgrade* project is currently at the *Capital Delivery Program* Stage of Seqwater's Capital Planning life-cycle. Based on a review of existing documentation, it has been assessed as prudent. The primary driver of compliance has been demonstrated, and the project is supported by an adequate decision-making process to support this.

CH2M HILL considers that the proposed scope of works for the project could have been further refined prior to going to market and awarding a design and construction contract. CH2M HILL considers the lack of a preliminary design prior going to tender was a contributing factor for the need of *Post Market Budget Review*. While the *Post Market Budget Review* provides justification as to the identified additional costs, CH2M HILL notes that Seqwater did not place the project on hold pending a review of the business case and original options assessment. Additionally, no consideration appears to have been given to whether the identified procurement strategy was still the preferred approach for project delivery.

Notwithstanding the above, documentation following contract award suggests that a change management process was in-place for the contract administration phase and that the project appears to have been delivered within the revised *Post Market Budget Review* cost estimate. Noting that the project cost is based on a competitive tender, CH2M HILL has assessed this project as efficient.

CH2M HILL has assessed the *Kilcoy WTP Upgrade* project to be prudent and efficient.

6.13.8 Assessment of reported expenditure

CH2M HILL notes that there is no further reported expenditure for this project. On the basis of the assessment outlined above, it is recommended that Seqwater's actual capital expenditure for the *Kilcoy WTP Upgrade* project remain unadjusted.

6.13.9 Extrapolation to other projects

Given the above findings and the fact that no systemic issue has been identified with the processes applied by Seqwater in relation to this project, CH2M HILL does not consider that the findings from this project can be extrapolated to other projects.

Appendix A: Seqwater Review Terms of Reference

TERMS OF REFERENCE - SEQWATER OPEX AND CAPEX REVIEW

Project Background

Queensland Competition Authority

The Queensland Competition Authority (the QCA) is an independent statutory body responsible for assisting with the implementation of competition policy for government owned business entities in Queensland.

On 5 May 2014 the Treasurer and Minister for Trade referred the monopoly business activity of bulk water supply by the Queensland Bulk Water Supply Authority (Seqwater) to the QCA for an investigation about pricing practices relating to that activity with the objective of recommending bulk water prices ("Prices") in southeast Queensland for the period of 1 July 2015 to 30 June 2018.

Purpose/outline of consultancy

The purpose of the consultancy is to assist the QCA to assess actual and forecast operating and capital expenditure of Seqwater that contribute to the total costs to be recovered by bulk water prices.

The consultancy will review actual expenditure from 2013-14, estimated actual expenditure for 2014-15 and forecast expenditure over a 13-year period from 1 July 2015 to 30 June 2028.

The QCA is seeking tenderers that can complete all three components of the consultancy.

Component 1 - Policies and planning review

The consultant must assess whether Seqwater's capital and operating policies and procedures are consistent with good industry practice. This component requires the consultant to:

(1) identify or describe good industry practice and

(2) assess Seqwater's performance against good industry practice.

In this regard, the consultant must take into account Seqwater's performance against:

(1) asset management - industry standards such as ISO 55000 may be relevant

(2) capital expenditure planning and delivery - including coordination with customers, cost estimation, expenditure prioritisation and timing, options analysis, implementation strategy and gateway review processes

(3) procurement

(4) legislative compliance.

In each area the consultant's assessment must consider the implication for both operating and capital expenditure and identify opportunities for improvement. If possible, the consultant must quantify the expected cost savings that improved policies and procedures could be expected to achieve.

Component 2 - Prudency and efficiency of operating costs

Sample

The operating expenditure categories to be subject to a detailed prudency and efficiency review are specified in the Notice as:

(1) employee costs (including contractors). Employee costs means wages and costs related to employees directly employed by the business. Employee expenses should be disaggregated according to:

   (a) superannuation

   (b) WorkCover

   (c) long service leave

   (d) payroll tax

   (e) training and study assistance

   (f) overtime

(2) materials and services (excluding electricity). Materials relate to items typically consumed in the normal activities of Seqwater, such as treatment chemicals, office supplies and small parts used in maintenance activities. Services relate to externally provided operational activities, typically delivered through a service contract. This may include sludge removal, scheduled or responsive maintenance, equipment hire, ground keeping, cleaning, security, etc

(3) corporate costs. Corporate costs means general corporate expenditure that cannot be reasonably allocated to other cost types, such as:

   (a) general management and board costs

   (b) legal counsel

   (c) human resource management

   (d) risk management

   (e) insurance management

   (f) environment management

   (g) property management

   (h) financial management

   (i) costs incurred by the corporate office.

Prudency and efficiency review

The consultant must assess whether Seqwater's operating expenditure from 1 July 2013 to 30 June 2028 is prudent and efficient. In doing so, the consultant must:

(1) describe the drivers of significant increases in 2014-15 operating expenditure relative to 2013-14 and 2012-13, including whether the expenditure is driven by legal obligations, new growth, operations and maintenance of existing infrastructure, or it achieves an increase in the standard of service that is explicitly endorsed by external agencies

(2) assess whether the unit rates and indexes used to escalate operating costs from 2014-15 to 2027-28 are consistent with prevailing market conditions and historical trends

(3) assess whether each of the sampled cost items are prudent and efficient. Operating expenditure is **prudent** if it is required to meet Seqwater's requirements relating to its legal and regulatory obligations or its contracts with external agencies. Operating expenditure is **efficient** if it is undertaken in a least-cost manner over the life of the relevant assets and is consistent with relevant benchmarks

(4) identify the value of any expenditure considered not to be prudent or efficient

(5) identify whether any causes of imprudent or inefficient expenditure can be extrapolated to other, un-sampled operating expenditure

(6) identify any efficiency gains or economies of scale sought or achieved by Seqwater, and identify a prudent and efficient level of future gains with reference to appropriate benchmarks

(7) have regard to the strategic and operational plan approved by the responsible Ministers under the South East Queensland Water (Restructuring) Act 2007

(8) accept Seqwater's demand forecasts, provided that they include a long term residential demand of 184 litres per person per day (L/p/d) and a non-residential demand of 91 L/p/d (not including demand from power stations and Toowoomba Regional Council).

Component 3 - Prudency and efficiency of capital expenditure

Sample

A sample of capital expenditure projects will be chosen by the QCA for prudency and efficiency review. A capital expenditure project may relate to a diverse program of capital works on a single asset (such as a Water Treatment Plant upgrade) or a relatively uniform program of capital works on a series of assets (such as a meter replacement program).

The number of sampled capital expenditure projects will be no less than five, but as per the Notice, no more than ten. The sample may include capital expenditure projects that have been completed, capital expenditure projects that are underway or forecast capital expenditure that is yet to commence.

Prudency and efficiency review

The consultant must assess whether Seqwater's capital expenditure from 1 July 2013 to 30 June 2028 is prudent and efficient. In doing so, the consultant must:

(1) assess whether each of the sampled capital expenditure projects are prudent and efficient.

Capital expenditure is **prudent** if it is required as a result of a legal obligation, new growth, renewal of existing infrastructure, or it achieves an increase in the reliability or the quality of supply that is explicitly endorsed or desired by customers, external agencies or participating councils

Capital expenditure is **efficient** if:

(i) the scope of the works (which reflects the general characteristics of the capital item) is the best means of achieving the desired outcomes after having regards to the options available, including more cost-effective regional solutions, the substitution possibilities between capital and operational expenditure and non-network alternatives, such as demand management

(ii) the standard of the works conforms with technical, design and construction requirements in legislation, industry and other standards, codes and manuals. Compatibility with existing and adjacent infrastructure is relevant as is consideration of modern engineering equivalents and technologies. Compliance with regulatory obligations is likely to be highly relevant

(iii) the cost of the defined scope and standard of works is consistent with conditions prevailing in the markets for engineering, equipment supply and constructions. The consultant must substantiate its view with reference to relevant interstate and

international benchmarks and information sources. For example, the source of comparable unit costs and indexes must be given and the efficiency of costs justified. The consultant should identify the reasons for any costs higher than normal commercial levels

(2) identify the value of any expenditure considered not to be prudent or efficient

(3) identify whether any causes of imprudent or inefficient expenditure can be extrapolated to other, un-sampled capital expenditure

(4) if applied by Seqwater, assess whether the unit rates and indexes used to escalate capital expenditure costs from 2014-15 to 2027-28 are consistent with prevailing market conditions and historical trends

(5) identify any efficiency gains or economies of scale sought or achieved by Seqwater, and identify a prudent and efficient level of future gains with reference to appropriate benchmarks

(6) have regard to the strategic and operational plans approved by the responsible Ministers under the South East Queensland Water (Restructuring) Act 2007

(7) accept Seqwater's demand forecasts, provided that they include a long term residential demand of 184 litres per person per day (L/p/d) and a non-residential demand of 91 L/p/d (not including demand from power stations and Toowoomba Regional Council).

Resources/data provided

The consultant will be required to source information from Seqwater's information returns in the first instance, and will be required to liaise with Seqwater and the QCA. Cost information in Seqwater's submission will be based on third-quarter actuals of the 2013-14 financial year. Seqwater's submission will include operating costs from 2012-13, but comparisons to 2013-14 will be impeded by the recent merger of Seqwater, LinkWater and the SEQ Water Grid Manager.

To facilitate the flow of information, the consultant should consider:

(1) setting up a secure online portal for the provision of large documents from Seqwater

(2) allowing for two days on site with Seqwater to ask follow up questions

(3) keeping a weekly record of outstanding information for Seqwater and the QCA.

The QCA expects that the consultant will be familiar with:

(1) the QCA's investigations into Grid Service Charges in 2011-12 and 2012-13, including submissions from Seqwater and the former LinkWater

(2) the QCA's investigation into irrigation prices charged by Seqwater for the 2013-17 period.

(3) the assessment of prudency and efficiency in other water reviews (including in other jurisdictions) and relevant approaches and benchmarks from these reviews

(4) the recent history of institutional changes to the bulk water sector in SEQ, which may impede the ability of the consultant to establish a stable baseline of historical expenditure.

Project timeframe

The consultancy will commence in late July 2014, with a completion date of 30 October 2014.

The timeframe for the consultancy is as follows:

(1) Seqwater will provide a written submission and corresponding information template to the QCA and the consultant on 31 July 2014. Where preliminary information is provided by Seqwater in advance of the 31 July 2014 due date, this will be shared with the consultant

(2) in the second week of August, a preliminary visit to Seqwater's offices to undertake discussion of the submitted information, discuss the possible sources of further information if required, and to understand the approach used by Seqwater to develop its submission

(3) a report, one week after the Seqwater visit, outlining preliminary findings for at least one sampled capital expenditure project, and one sampled operating expenditure category

(4) staged delivery of the remaining items within the scope of the consultancy, culminating in a draft report by Friday, 19 September 2014

(5) a three week consultation with Seqwater and QCA following the release of the draft report, which provides the last opportunity for stakeholders to provide further information

(6) a final report that addresses the views of stakeholders arising from consultation by Friday, 31 October 2014.

The consultant may also be required to provide further advice following the receipt of submissions on the QCA's draft report. The extent and scope of this work will depend on the nature of submissions. If required, this work will be undertaken by the consultant during January and February 2015 and form a separate item under the contract (with separate terms of reference) to be charged at the agreed hourly rates.

Proposal specifications and fees

The proposal should:

(1) include the name, address and legal status of the tenderer

(2) provide the proposed methods and approach to be applied

(3) provide a fixed price quote for the provision of the services detailed herein. The tenderer should specify the quote for each component separately. As the number of capital expenditure projects to be reviewed will not be finalised until after appointment of a successful tenderer, quotes for component 3 should include a fixed price quote per capital expenditure project

(4) nominate the key personnel who will be engaged on the assignment together with the following information:

    (a) name

    (b) professional qualifications

    (c) general experience and experience which is directly relevant to this assignment

    (d) expected time each consultant will work on the project

    (e) standard fee rates for any contract variations.

The fee quoted is to be inclusive of all expenses and disbursements (and include GST). A full breakdown of consultancy costs is required with staff costs reconciled to the consultancy workplan.

Total payment will be made within 28 days of receiving an invoice at the conclusion of the consultancy.

Contractual arrangements

This consultancy will **only** be offered in accordance with the QCA's standard contractual agreement.

This agreement can be viewed at http://www.qca.org.au/about/consultancyagreement.php

Reporting

The consultant must provide its assessment in a clear and comprehensive manner to allow for ease of use in the QCA reports.

The QCA requires reasoned and substantiated assessments, including the provision of a high standard of detailed information. The QCA expects the consultant to substantiate and justify its conclusions with reference to relevant benchmarks and information sources.

The consultant should advise at earliest opportunity, any critical issues that may impede progress of the consultancy, particularly issues that impact on the successful delivery of the Purpose of Consultancy outlined above.

The consultant may be required to provide the QCA with a formal presentation on the findings of the draft and final reports. An electronic version of the final report is required, saved in Microsoft© Word with any numeric data in Microsoft© Excel.

Confidentiality

Under no circumstance is the selected consultant to divulge any information obtained from the QCA or a third party for the purposes of this consultancy to any party other than with the express permission of the QCA or the relevant third party.

Conflicts of interest

For the purpose of this consultancy, the consultant is required to affirm that there is no, and will not be any, conflict of interest as a result of this consultancy.

QCA assessment of proposal

The proposal will be assessed against the following technical criteria (weighting):

(1) understanding of the project (20%)

(2) skills and experience of the firm and team (30%)

(3) the proposed methods and approach (30%)

(4) capacity to fulfil the project's timing requirements (20%).

The rankings against technical criteria are then adjusted by the relative quoted price of each tenderer to evaluate whether the highest ranking technical tender represents value for money. For example, a tender which achieved a technical rating of half of the leading tender would have to be less than half the quoted price to be selected.

Insurance

The consultant must hold all necessary work cover and professional indemnity insurance.

Quality assurance

The consultant is required to include details of quality assurance procedures to be applied to all information and outputs provided to the QCA.

Grievances

If during the course of your engagement you wish to raise any grievances or make a complaint, please contact Mrs Robyn Farley-Sutton, Director Corporate Services, on (07) 3222 0505 or robyn.farley-sutton@qca.org.au.

Lodgement of proposals

Proposals are to be lodged with the QCA by **14 July 2014**.

For further information concerning this consultancy, please contact William Copeman on (07) 3222 0589 or william.copeman@qca.org.au.

Proposals should be submitted to:
Director - Water
Queensland Competition Authority
GPO Box 2257
Brisbane Qld 4001

Phone:(07) 3222 0555
Fax: (07) 3222 0599
Email: william.copeman@qca.org.au

Appendix B:
Investment Policy and Procedure Good Practice Paper

Capital and Operating Expenditure:

Good Practice Paper

PREPARED FOR: Matt Bradbury
Queensland Competition Authority

COPY TO: CH2M HILL Project Team

PREPARED BY: Brad Lawrence

DATE: August 18, 2014

PROJECT NUMBER: 650263

CH2M HILL has been commissioned by the Queensland Competition Authority (QCA) to review the prudency and efficiency of Seqwater's capital and operational expenditure, as part of a broader QCA review of this organisation's bulk water pricing. One component of the CH2M HILL review is the investigation of processes procedures and policies implemented by Seqwater to support the planning, approval and delivery of capital and operational investments. In particular, CH2M HILL is required to assess whether Seqwater procedures, policies processes are consistent with good industry practice.

This Good Practice Paper seeks to present current regional industry norms in capital and operational expenditure and in doing so, to provide a baseline for transparent assessment of Seqwater's current practices.

The objective of this Paper is not to provide a comprehensive guideline on good practice, but to document a high-level checklist of the considerations or success factors in key areas of business function related to capital and operational expenditure. These areas include:

- Corporate Planning;
- Service Levels;
- Capital Investment Planning;
- Asset Management;
- Procurement;
- Governance; and
- Investment Decision-support Systems.

The primary considerations for good practice in each functional areas identified are presented in the following sections. It is recognised that these functional areas have significant interfaces and overlaps and as a result, specific considerations may appear in functional areas other than those some readers may expect.

Corporate Planning

Corporate Planning is the mechanism employed by organisations to define the strategies that have been put in-place to achieve business objectives and the underlying rationale for these strategies. It focuses the efforts of the business and informs the allocation of funding and resources over a defined and longer-term time horizon.

- All corporate reporting requirements for a Water Business in the State of Queensland are met:
    - Corporate Plan
    - Annual Plan
    - Operational Plan
- Comprehensive coverage of external planning drivers - legislative and planning directives
- Planning documentation is available at the strategic, operational and tactical level
- The current business and operational environment is accurately represented in planning documentation
- The most likely future business and operational environment is presented in planning documentation – possibly a number of scenarios
- Clear identification of all external stakeholders and their needs/requirements
- Strong alignment and linkage of objectives in all planning documentation and corporate policies
- Clear and unambiguous articulation of corporate priorities across all documents
- Clear method of measuring and reporting achievement of objectives
- Supported by modelling and analysis at an appropriate level of rigour and reviewed at an appropriate time interval
- Clearly defined achievement tracking and change control mechanisms for proposed strategies
- Well documented governance arrangements (refer to Governance section)
- It is becoming common to set out long term objectives within the corporate planning process, beyond the current price path, providing stakeholders with a road map of the direction the company is heading over the next 25 years

Service Levels

Service levels define the parameters of business performance and the values of these parameters that the business will commit to. They focus the business on cost-effectively achieving defined business objectives and track progress against this achievement.

- Defined service levels cover both business and asset performance
- Service levels are informed by regulatory requirements, contractual obligations and stakeholder needs
- There is a clear line of sight from corporate / regulatory objectives and policies to service levels
- Service levels are clearly documented and widely understood in the business
- The method of service level measurement is clearly documented and there is good governance over service level changes
- Relevant service levels are transparently considered in business and asset investment decision-making

- Evidence of stakeholder buy-in to the proposed service levels. [for example, use of locally based 'Customer Challenge Groups' by UK water companies to agree priorities and outcomes, is now standard practice]
- Evidence of stakeholder 'willingness to pay' for any improvements in service level proposed during the price path. This ensures a balanced and justifiable programme is proposed

Capital Investment Planning

Capital investment planning is the process of identifying the best tangible asset investment to make to meet current and future service demands. These service demands may be driven by growth, contractual obligations, regulatory requirements and/or stakeholder needs.

- General alignment with relevant external capital planning guidelines:
    - Queensland Government Capital Works Management Framework and supporting instruments
- Candidate capital projects are informed by corporate objectives / policies, appropriate service levels and quality objectives
- Capacity improvements/expansions and their timings are substantiated with robust demand forecasts
- Asset renewals are informed by deterioration profiles appropriate to the operating environment (refer asset management section)
- Any enhancements to current service offerings are supported by stakeholder willingness to pay assessments.
- The downstream operational and maintenance implications over the expected economic life of future capital projects are considered in the options analysis process. [Note: Opex from capex implications is an area that is given lip service in the UK but not properly considered. Important to reasonably assess for each scheme, to ensure lowest whole life cost solution is proposed].
- A high-level, long-term forecast of future capital investment requirements has been developed and documented – with increasing levels of detail as each annual programme gets closer to delivery.
- A program of specific future capital projects is documented well ahead of delivery with clear linkages to demand and business need.
- The substantiation of capital projects on-program is well documented:
    - Demonstration of need for each project [what is the driver for the investment]
    - Options analysis (including benefit / risk / cost assessments)
    - Project prioritisation
    - Business Cases
- Analytical rigour increases with project scale and also as projects move through planning "gates"
- Allocation of costs to capital projects is in accordance with Asset Accounting Standards and Queensland Government Guidelines – would expect to see proportional allocation of expenditure to purpose, rather than prime purpose allocation.

Asset Management

Asset Management is the process of optimising asset service levels at least whole-of-life cost. In the context of the CH2M HILL assessment, it covers all asset investment throughout the asset life-cycle, including operating costs.

- General alignment with relevant external maintenance management guidelines:
    - Queensland Government Maintenance Management Framework and supporting instruments
- An exhaustive asset register that is periodically reviewed and updated in accordance with asset accounting standards, is readily available and at a level of componentisation that enables both appropriate assessment of asset remaining life and optimal whole-of-life cost decisions
- Asset management processes comply with relevant standards and guidelines:
    - PAS55 / ISO 55000
    - International Infrastructure Management Manual
    - Relevant Australian Asset Accounting Standards (AASB 1049/116)
    - The Queensland Government Non-current Asset Policies for the Queensland Public Sector, as applicable
- The criticality of each asset or asset component to service level delivery/achievement is well understood and documented. Asset deterioration / service level degradation is robustly and regularly assessed.
- The scope of all minor capital, operation and maintenance tasks related to the current asset portfolio is well documented and consistently understood across the business - historical trends in performance (i.e bursts, blockages & collapses/1000km etc) should also be mapped to historical levels of investment in the historical period, to justify the level of project maintenance spend required going forward.
- The intervention criteria that “trigger” minor capital, operations and maintenance tasks are well documented (or captured in decision-support system configurations) and consistently understood
- Historical records are kept of all delivered minor capital, operation and maintenance activities, as well as the criteria that initiated them, to build / improve corporate operational knowledge. As above, historical performance should be mapped and trends developed to justify the quantum of future spend
- Asset equipment standardisation is employed wherever possible, to optimise both operations & maintenance procedures and resource allocation, without locking-in the potential to employ new equipment or technologies where there is an economic case to do so.
- Capital, maintenance and non-infrastructure options are considered for all service level shortfalls identified and the best option is selected on the basis of least whole-of-life cost (opec and capex) and optimal risk management
- The maintenance planning approach employed seeks to reduce unplanned maintenance and focus on appropriately programmed or preventative maintenance.
- In general, the use of risk based planning and cost benefit analysis should be used to support the forecast asset maintenance programme, rather than simply carrying forward historic levels of maintenance expenditure and delivering a maintenance programme that matches the budget. Procurement
- A procurement policy and supporting documentary guidelines have been developed, are readily available to relevant users, are clearly understood and followed

- These policies / guidelines are in alignment with regulatory requirements and other external stakeholder requirements:
    - Queensland Government Procurement Policy (2013) and its underlying principles
- The procurement approach leverages market competition wherever possible to maximise value for money
- The term “Value for Money” is:
    - Clearly defined in corporate documentation;
    - Linked to service levels and risk mitigation; and
    - Consistently understood across the business
- The form of procurement method of contracting is informed by an assessment of the risk factors inherent in the services/deliverable being procured
- The capability and capacity of potential service providers is assessed and categorised on a regular basis (pre-qualification, etc)
- Consideration of ‘pain/gain’ mechanisms to provide incentivisation for innovation and protection against unforseen circumstances

Governance

- Specific roles and accountabilities of capital and operational investment decision-makers are clearly documented and consistently understood, including delegated financial authorities
- There is a clearly defined and documented escalation path for capital and operational investment decision-making [this needs to be more than an executive rubber stamping exercise and evidence of challenge should be documented to ensure schemes have a demonstrable need and a cost effective solution that will meet the drivers].
- Risk registers and proposed mitigation measures are kept and regularly maintained at the strategic, operational and tactical level
- The status of all identified risks is captured, current and readily accessible to appropriate decision-makers
- Specific parties or committees in the organisation have been assigned accountability / responsibility for:
    - Determination of service levels;
    - Assessment of service level shortfalls and their corrective actions; and
    - Prioritisation and approval corrective actions, in consideration of other programmed / budgeted activities.
- Specific parties or committees in the organisation have been assigned accountability / responsibility for:
    - Capture of risks;
    - Identification of mitigation measures; and
    - Prioritisation and approval of mitigation actions, in consideration of other programmed / budgeted activities.
- Specific parties or committees in the organisation have been assigned accountability / responsibility for financial sign-off and there is a clear audit trail for all expenditures [separate capital cost capture systems have been developed to capture and track the allocation of all capital programme related expenditure]

- The objectives, roles responsibilities and powers of all corporate committees are well defined and documented
- All decision-making processes and actions are transparent and supported by meaning consultation with relevant internal and external stakeholders to ensure all stakeholder interests are appropriately considered.
- The level of rigour applied to investment planning and approval is commensurate with the likely level of expenditure and inherent risk of the services / deliverables being invested in

Investment Decision-Support Systems

- Investment data necessary for multiple investment decision-support functions is either centrally held in, or accessible to, the enterprise information system (single source of data), including but not limited to:
    - The consolidated asset register
    - Investment activity scopes and unit cost rates [through a detailed capital programme cost capture system]
    - Current and forecast demands by asset class
    - Current asset service level status
    - Current asset criticality and risks
- There are no duplicate information systems providing inconsistent decision-support for the same business function
- Decision-support systems are in-place that automate approvals and audit trail creation wherever possible to ensure transparency, consistency and efficiency
- The status of all internal and external work orders and their committed resources is captured and up-to-date
- Complex network demands and asset interactions are modelled to aid operational understanding facilitate scenario planning and forecast future needs
- Computer-based models developed are regularly validated by comparing modelled outputs with field observations