Gladstone Area Water Board

2015 Price Monitoring Investigation

Submission to the Queensland Competition Authority

APPENDICES Volume Two

September 2014

Gladstone Area Water Board
ABN 88 409 667 181

Ground Floor
147 Goondoon Street
Gladstone
Queensland

2015 Price Monitoring Investigation

Submission by Gladstone Area Water Board – Appendices

Gladstone Area Water Board

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2015 Price Monitoring Investigation

Gladstone Area Water Board

Appendix G – Capital Expenditure

Cardno:

***Capital Expenditure Review – QCA: GAWB Capital Works Review*, September 2014**

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CAPITAL EXPENDITURE REVIEW – QCA

GAWB Capital Works Review

7639-64

Prepared for
Gladstone Area Water Board

September 2014

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Shaping the Future

Contact Information

Cardno (Qld) Pty Ltd

ABN 57 051 074 992

Level 11, North Tower
515 St Paul's Tce
Fortitude Valley QLD 4006

Telephone: 3369 9822
Facsimile: 3369 9722
International: +61 7 3369 9822

cardno@cardno.com.au
www.cardno.com.au

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1	Client Review	CH		08/05/2014
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Limitation Statement

This assessment is limited to an extent by the information available, the time available and the criteria used for the assessment. In particular, the following limitations should be noted:

- Definitions of prudence and efficiency have not been specifically detailed for application to bulk water service providers. The definitions applied in this assessment are those defined for the south-east Queensland distributor-retailer entities and which have in practice been applied to the bulk water entities. This limitation is not likely to be material, but should be noted.
- While every effort has been made to apply in this assessment a similar approach and set of criteria as employed by the Queensland Competition Authority (QCA), no guarantee can be made that the conclusions drawn in this assessment would align with those made by the QCA or its consultants.
- This review has been carried out at a high level and has relied heavily upon the statements of GAWB employees interviewed during the evaluation process. Should the information given prove to have been misleading or in error it is possible that the opinions and findings in the report could change.
- Not all projects have been examined in detail. Cardno has sought to examine some aspects of selected projects in more detail, for example to see evidence that procurement policies have been followed, to enable a view to be formed as to whether GAWB policies and procedures have generally been followed or to form an opinion as to whether expenditure is prudent and efficient.

Executive Summary

Cardno has been engaged by GAWB to carry out an independent review on its capital expenditure to support GAWB's submissions to the Queensland Competition Authority (QCA) in its pricing review for the 5 year period commencing 1 July 2015.

Cardno has been separately engaged by GAWB to carry out detailed design for the Offline Storage and Re-pump Station project which is one of the projects considered in this review. GAWB has engaged CDM Smith to carry out this independent review.

Scope of Review

GAWB requires the following to be addressed:

1. Capital expenditure 2009-2015
    a. Review of material projects in GAWB's 2010 QCA submission (and that were approved by QCA and are being recovered in prices) where project spend has been higher or at significant variance with the QCA forecasts. The review is to assess differences in expenditure to that contained in QCA forecasts.
    b. Review of material projects not in GAWB's 2010 QCA submission. The review is to assess the prudence and efficiency of capital expenditure.

    For both a. and b. above, the review is to include:

        i. Actual capital expenditure undertaken between 1 July 2009 to 30 June 2014; and
        ii. Proposed capital expenditure for the period from 1 July 2014 to 30 June 2015.
2. Capital expenditure 2015-2020

Review of capital expenditure forecasts for the period from 1 July 2015 to 30 June 2020. In order to satisfy QCA requirements this capital expenditure review provides an assessment on whether:

- The capital expenditure forecasts are consistent with existing obligations and reasonable service standards. This includes a review of forecasts with regard to trends in historical expenditure, the reasons underpinning any difference in the expected level from those trends and any other relevant factors;
- There is sufficient evidence of, and consistency with, well developed asset management planning and a high level consideration of capital budgeting processes;
- The proposed program of capital expenditure is deliverable over the relevant time period. This includes a review of forecasts with regard to the required lead time, approvals processes, and preliminary consideration of the Gladstone Area Water Board 2015 QCA Price Review and any likely resource constraints. Consideration of historical performance in capital program delivery is not part of the scope; and
- The capital expenditure forecasts associated with meeting new obligations and/or meeting higher service levels reflect likely expenditure requirements. An assessment will be made as to whether the expenditure has been forecast with regard to any benchmarking or other quantitative techniques considered appropriate.

Interviews of GAWB staff were carried out in Gladstone on the 9th and 10th April with significant follow up information being provided and follow up telephone contact to clarify matters where necessary. Requests for data and clarification questions were duly responded to by GAWB staff in a timely manner.

Materiality

The Treasurer and Minister for Trade has referred the Gladstone Area Water Board (GAWB) to the Queensland Competition Authority (the Authority) for a price monitoring investigation for the period from 1 July 2015 to 30 June 2020.

The Referral Notice directed the QCA to consider the prudence and efficiency of capital expenditure, with a focus on cost areas which are material to price changes rather than matters which are likely to have a minor and inconsequential impact. In that regards, materiality refers to a material change in price for a customer.

The projects reviewed in this report are the capex projects GAWB has advised meet these materiality threshold criteria.

Projects which exceed or are at significant variance with forecast QCA expenditure

Two projects nominated by GAWB exceed or are at significant variance with the forecast QCA expenditure, one almost completed and the other ongoing, were reviewed. These are:-

- OP2010-009 Dam Safety Compliance Works (almost complete)
- OP2009-027 Awoonga Dam Spillway AFC Upgrades

Both projects were considered to be prudent and efficient.

Projects not in QCA Forecasts

GAWB nominated one project not included in the 2010 QCA submission for review. The project, *IPD 2014-023 GAWB Inventory Shed & Forklift*, is to protect GAWB inventory. The works are yet to commence. The proposed solution is considered prudent and efficient.

Forecast 2015-2020 Projects

A total of 6 projects were reviewed in this category with the following summary of results.

Number of Projects	Assessment summary	
6		Documentation provided sufficient
0		Some documentation provided/some issues with documentation
0		No documentation provided/insufficient evidence for justification
6		

All projects are considered to be prudent and efficient.

Deliverability

A large portion of the capital expenditure relates to renewal / refurbishment of existing assets under GAWB's control.

The Offline storage and Re-pump Station does require 2 critical actions with uncertain timeframes and implications being:

- Development approval from Gladstone Regional Council involving and number of State concurrence and advice agencies.
- Relocation of an 11kV electricity line from the ponded storage area.

Whilst the above actions hold significant uncertainty there has been a pre-consultation meeting with Gladstone Regional Council about the matter and there do not appear to be significant hurdles to delivery at this time.

Conclusions

The findings from this investigation are as follows:

1. GAWB has robust planning and procurement procedures in place and there is sufficient evidence that these procedures have generally been followed.
2. Expenditure on completed work for projects within the scope of this review is considered prudent and efficient. It is noted that in some instances the expenditures are in excess of QCA expenditure forecasts. This appears to be largely due to:
    a. significant but necessary scope changes;
    b. difficulty in accurate estimation of project costs for specialist work; and
    c. increased construction costs amidst challenging market conditions in Gladstone fuelled by an enormous upsurge in construction work in the region;
3. The forecast expenditure 2015 to 2020 is considered prudent and efficient given the available information at this time.

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1 Introduction

1.1 Project scope

Gladstone Area Water Board (GAWB) is in the process of preparing its submissions to the Queensland Competition Authority (QCA) in relation to its forthcoming price monitoring investigation of GAWB's pricing practices for the 5-year period commencing 1 July 2015.

Cardno has been separately engaged by GAWB to carry out detailed design for the Offline Storage and Re-pump Station project which is one of the projects considered in this review. GAWB has engaged CDM Smith to carry out this independent review.

GAWB has engaged Cardno to undertake an independent review and prepare a report on actual and forecast capital expenditure to support its submissions to the QCA including:

- Capital expenditure undertaken on specific projects in the period from 1 July 2009 to 30 June 2014;
- Proposed capital expenditure for the period from 1 July 2014 to 30 June 2015; and
- Proposed capital expenditure for the 5 year period from 1 July 2015 to 30 June 2020.

GAWB has requested that the following is assessed as part of this review:

1. **Capital expenditure 2009-2015**

    a. Review of material projects in GAWB's 2010 QCA submission (and that were approved by QCA and are being recovered in prices) where project spend has been higher or at significant variance with the QCA forecasts. The review is to assess differences in expenditure to that contained in QCA forecasts.

    b. Review of material projects not in GAWB's 2010 QCA submission. The review is to assess the prudency and efficiency of capital expenditure.

    For both a. and b. above, the review is to include:

        i. Actual capital expenditure undertaken between 1 July 2009 to 30 June 2014; and

        ii. Proposed capital expenditure for the period from 1 July 2014 to 30 June 2015.

2. **Capital expenditure 2015 - 2020**

    Review of capital expenditure forecasts for the period from 1 July 2015 to 30 June 2020. In order to satisfy QCA requirements this capital expenditure review provides an assessment on whether:

    - The capital expenditure forecasts are consistent with existing obligations and reasonable service standards. This includes a review of forecasts with regard to trends in historical expenditure, the reasons underpinning any difference in the expected level from those trends and any other relevant factors;
    - There is sufficient evidence of, and consistency with, well developed asset management planning and a high level consideration of capital budgeting processes;
    - The proposed program of capital expenditure is deliverable over the relevant time period. This includes a review of forecasts with regard to the required lead time, approvals processes, and preliminary consideration of any likely resource constraints. Consideration of historical performance in capital program delivery is not part of the scope; and
    - The capital expenditure forecasts associated with meeting new obligations and/or meeting higher service levels reflect likely expenditure requirements. An assessment will be made

as to whether the expenditure has been forecast with regard to any benchmarking or other quantitative techniques considered appropriate.

1.2 Scope exclusions

For the purpose of this review, only projects nominated by GAWB have been assessed and does not include all Capital Expenditure, actual and forecast, for the 2009 – 2020 period.

1.3 Prudence and efficiency

For the purpose of this review Cardno has adopted the following definitions of prudent and efficient capital expenditure, in accordance with the QCA terms of reference, refer to Appendix D.

Capital expenditure is prudent as a result of meeting a legal obligation, new growth, renewal of existing infrastructure, risk mitigation or it achieves an increase in the reliability or the quality of supply that is explicitly endorsed or desired by customers and external agencies.

Capital expenditure is efficient if:

- 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 regard 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.
- 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.
- The cost of the defined scope and standard of works is consistent with conditions prevailing in the markets for engineering, equipment supply and construction. Where sufficient information exists, Cardno has utilised information on recent construction costs for similar projects to provide comment on project costs.

1.4 QCA requirements

Under the *Queensland Competition Authority Act 1997* (the QCA Act), the Queensland Competition Authority (the Authority) requires GAWB to submit documentation in relation to a price monitoring investigation for the period from 1 July 2015 to 30 June 2020.

The Authority is to consider:

a) the planned change in prices of water having regard to, amongst other things:
   i. GAWB's pricing model; and
   ii. demand forecasts;

b) the forecast revenue based on the total prudent and efficient costs of carrying on the activity;

c) in respect of the return on capital consider the WACC applied by GAWB against the benchmark WACC;

d) the regulated asset base (RAB) roll-forward calculation (in accordance with the Authority's previously recommended methodology);

e) the revenue carryover calculation (in accordance with the Authority's previously recommended methodology);

f) for capital expenditure to be included in the forecast RAB, the Authority is to form a view on prudence and efficiency, with the focus on cost areas which are material to price changes rather than matters which are likely to have a minor and inconsequential impact; and

g) for operating expenditure to be included in the forecast revenue, the Authority may investigate the expenditure in any function where GAWB's forecast expenditure in that function exceeds

the level allowed in the Authority's 2010 pricing practices investigation by an amount that would give rise to a material increase in price.

For the avoidance of doubt, the Authority may consider a matter not indicated in (a) to (g) if it is likely to have a material impact on the price to a customer.

1.5 Materiality

The Treasurer and Minister for Trade has referred the Gladstone Area Water Board (GAWB) to the Queensland Competition Authority (the Authority) for a price monitoring investigation for the period from 1 July 2015 to 30 June 2020.

The Referral Notice directed the QCA to consider the prudence and efficiency of capital expenditure, with a focus on cost areas which are material to price changes rather than matters which are likely to have a minor and inconsequential impact. . In that regards, materiality refers to a material change in price for a customer.

GAWB has assessed the capital expenditure thresholds necessary to impact customer prices by more than 1% within each of the different pricing zones.

For capex undertaken during the period from 2010-2015 and proposed to be undertaken in the period from 2015-2020, projects have been considered material where the total expenditure incurred or proposed to be incurred on a project is above the materiality threshold. The projects reviewed in this report are the capex projects GAWB has advised meet these materiality threshold criteria.

2 Background

2.1 Gladstone Area Water Board

GAWB's vision is: ***"To be an excellent water business"*** and its mission statement is: ***"To ensure the long and short term water needs of current and future customers are met in ways that are environmentally, socially and commercially sustainable."***

GAWB does this by focussing on achieving the best possible balance of outcomes against its four business goals:

- Meeting water needs (not only demand requirements, but balancing water availability, reliability, quality and price requirements with risk);
- Commercial results;
- Corporate responsibility; and
- Capability.

2.2 GAWB role and responsibilities

Gladstone Area Water Board (GAWB) is a Category 1 Water Authority under the *Water Act 2000 (Qld) (Water Act)* and a registered service provider under the *Water Supply (Safety & Reliability) Act 2008 (Qld)*. GAWB operates as a commercialised Statutory Authority operating under the *Water Act 2000* and is responsible to the Minister for Energy and Water Utilities.

GAWB's main role is to supply water in bulk to major consumers in the Gladstone Region, including the supply of potable water to the Gladstone Regional Council. Approximately 20% of the bulk water supplied is potable water with the remaining 80% raw water supplied to industry.

GAWB owns and operates the following assets:

- Awoonga Dam on the Boyne River south of Gladstone;
- delivery pipelines and ancillary infrastructure;
- water treatment plants in Gladstone and Yarwun;
- water reservoirs and pumping stations at Awoonga, and treated water pumping stations at Benaraby, Calliope, Glen Eden, Boat Creek, Gladstone Water Treatment Plant and Yarwun Water Treatment Plant;
- untreated water reservoirs at Gladstone (Fitzsimmons Street) and Toolooa, and treated water reservoirs at Boyne Island, East End, Golegumma, South Gladstone and Yarwun;
- the Lake Awoonga Recreation Area adjacent to Awoonga Dam and large areas of land under and around Lake Awoonga;
- a main administration building in Gladstone City; and
- a fish hatchery in Gladstone City.

Figure 2-1 indicates GAWB's operational raw and treated water infrastructure networks (May 2013)

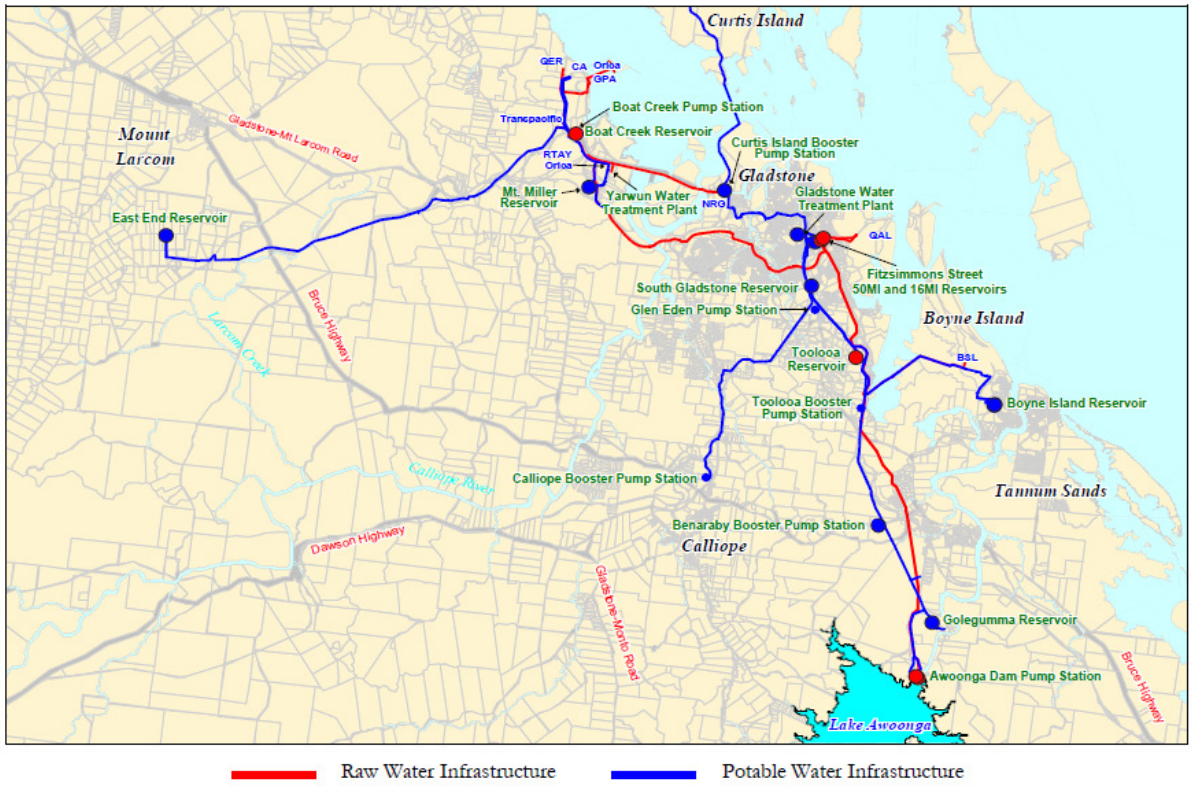

Figure 2-1 GAWB Operational Infrastructure Map

Figure 2-2 indicates the potential future expansions to the raw and potable water networks to enable GAWB's core business goals to be achieved.

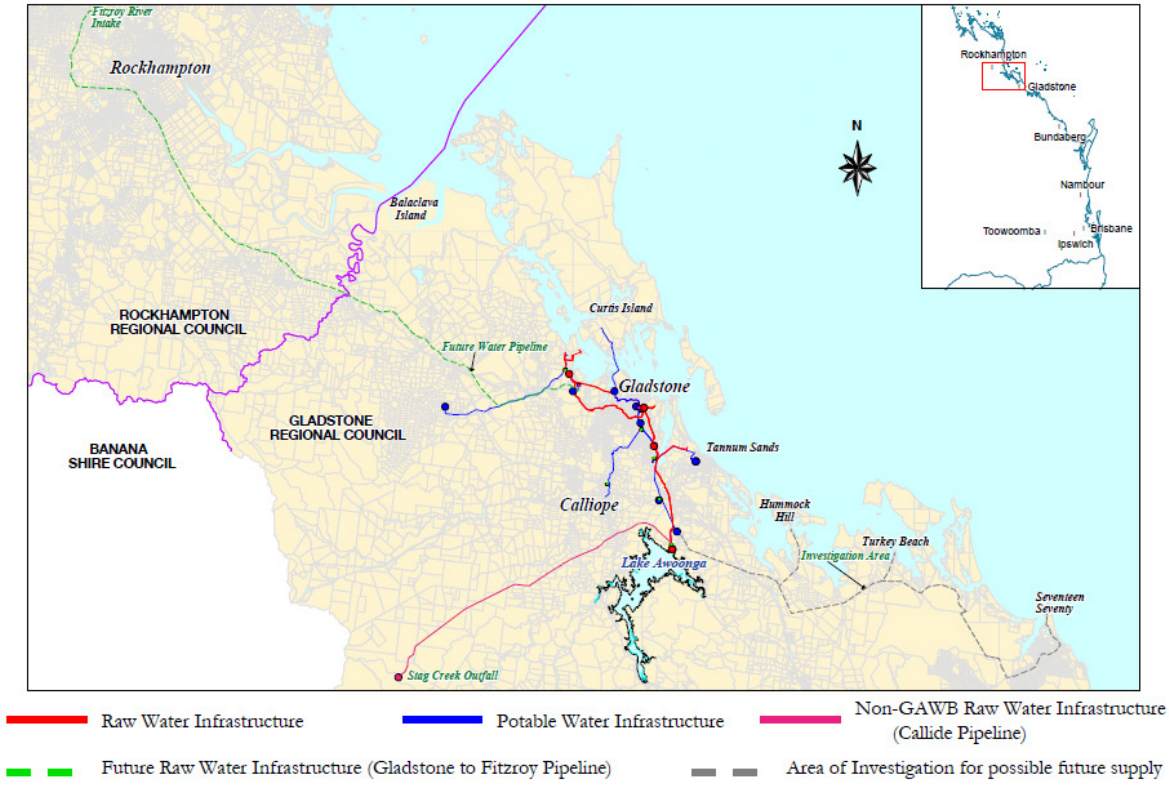

Figure 2-2 Possible Future Extensions of GAWB's Network Infrastructure

3 Policies and Procedures

3.1 GAWB Corporate Process

Gladstone Area Water Board has a number of corporate documents covering internal policies processes and strategies to deliver the companies objectives for its customers. It should be noted that not all of these documents have been sighted during this review process. These documents include, but are not limited to:

- **Corporate plan**, a 5 year plan reviewed annually
- **Operational Plan**, an annual plan
- **Strategic Water Plan** references the CQ Regional Water Supply Strategy 2006. This document refers to the Lower Fitzroy River Infrastructure Project and the Gladstone-Fitzroy Pipeline Project which are key requirements for GAWB to meet growth in demand or secure supplies to existing customers during drought. This document also references the network risk assessment and design standards.
- **Asset Management Plan (including performance indicators)**
- **Infrastructure Planning Document** which outlines GAWB's approach including triggers for planning
- **Life Cycle Plans**
- **Purchasing Policy**
- **10-20 year capital investment plan and financial model**

3.1.1 Real time SCADA data

Real time SCADA data from all of GAWB's billing meters is now available. All major meters are on a bi-annual or annual calibration program. This information is a valuable means of controlling and understanding customer demands. For example, through this initiative, GAWB has the capability to detect raw water customers incorrectly taking water in contravention of contractual agreements. This information is useful for demand management (an example of a non-asset solution).

3.1.2 Stakeholder consultation

GAWB routinely engages with customers and the wider public where necessary during planning processes.

3.1.3 Design Standards

In terms of design standards, GAWB uses the Water Services Association of Australia (WSAA) documentation plus a heavy reliance on engineering consultants.

3.1.4 Cost Estimation

GAWB does not have formalised cost estimating guidelines. Where specialist cost estimation skills are required, GAWB relies on consultants to formulate cost estimates including the appropriate contingencies, project management and other cost inputs. In terms of cost control, costs are tracked against the detailed estimated costs from GAWB's financial software, Navision.

3.1.5 Infrastructure Assessment

GAWB builds infrastructure to meet contracted demand only.

Capital projects are driven by legislative changes, level of service changes, risk mitigation, asset renewals and other factors. A prioritisation model to apply to proposed capital expenditure is currently being developed for significant projects in order to better determine forecast capital expenditure.

Risk management is considered at the project justification stage and is further prompted in the planning and construction process for infrastructure delivery.

3.1.6 Asset Management

GAWB has a number of direct buried steel and ductile iron cement lined pipelines with known problems with external corrosion attack. GAWB have advised that there is a recent trend towards increases in the number of pipeline failures but also the severity of failures which is adding to system losses.

Renewals programs are guided by lifecycle plans for different asset types which have been developed by GAWB. Physical asset management and maintenance company, Assetivity is currently reviewing these lifecycle plans.

3.1.7 Purchasing Policy

GAWB's purchasing policy has a number of levels briefly described as follows:

- <$10,000 - Single source permitted
- >$10,000 to $250,000 - 3 Quotations are required
- >$250,000 to $500,000 – Expression of Interest\Invitation to Offer\Invitation to Tender
- >$500,000 - Open Tender or Expression of Interest\Invitation to Offer\Invitation to Tender depending on circumstances

3.1.8 Project specific

In addition GAWB have a number of templates to aid in the preparation of internal documentation and include:

- Project justification template
- Project plan template
- NPV template
- Risk Assessment template
- Business case template
- Project closure report template

3.2 GAWB Project Process

GAWB have a number of planning and delivery processes that are undertaken during the life of a project. These may include, but are not limited to, the following:

- Budget Estimate;
- Project Justification Form (PJF);
- Project Plan;
- Business Case;
- Planning documents and reports;
- Contract documents and reports; and
- Project Closure Report

3.2.1 Budget Estimate

A budget estimate is often one of the first levels of documentation that are required for budgeting purposes and are usually produced as a result of recommendations from planning and asset management reports i.e. option studies, feasibility studies, condition assessments etc.

3.2.2 Project justification form

The project justification form gives a high level overarching summary of the project in its initial stage. It details the capital expenditure project justification category and operating expenditure project justification category (Primary and Secondary), including details of the asset replacement, condition assessment, construction involvement and project definition and project deliverables.

Project duration and estimated costs are broken down into phases for scoping, planning and implementation, identifying any external resources that are required for any of these phases.

The project justification form also identifies other considerations such as Workplace Health and Safety, Environmental, Legal, Land, Operational and highlights potential Impacts with other projects.

A strategic fit assessment is undertaken to ensure the project aligns with one or more of the strategic business goals. The process identifies the risks that will be mitigated, identifies where no risks are considered applicable and details the level of project criticality.

The project justification form is prepared by the Project Manager, approved by the Business Unit Manager or Chief Executive Officer and noted by the Finance Team.

3.2.3 Project Plan

The project plan is a detailed project document developed from information provided in the project justification form. Individual components of the project plan are signed-off by responsible managers with approval required by the Business Unit Manager or Chief Executive Officer. The project plan may include:

- Business unit ownership
- Background information
- Project justification category
- Objective of the project
- Key stakeholders
- Scope
- Project Schedule
- Budget
- Quality/Compliance
- Resources
- Communications
- Risk management
- Procurement management
- Recommendations

3.2.4 Business Case

The business case is a document prepared by the Business Unit Manager and subject to either Chief Executive Officer or GAWB Board approval (for higher value projects). Ministerial approval is required for projects greater than $10 million. Individual components of the business case are signed-off by responsible managers. The business case may include:

- Project description
- Stakeholders
- Scope
- Evaluation of Options

- Preferred option analysis
- Regulatory considerations
- Project Schedule
- Resources (including budget and NPV calculation if >$250,000)
- Communications
- Risk management
- Recommendations

3.2.5 Planning documents and reports

Documentation authored by GAWB or external consultants to support the decision-making process.

3.2.6 Contract documents and reports

Documentation authored by GAWB or external consultants to justify and support project implementation decisions and related costs.

3.2.7 Project Closure Report

The Project Closure Report is a document prepared by the Project Manager at completion of the project and is signed off by the Project Manager, Business Unit Manager and Financial Controller. The project closure report may include:

- Initial project overview;
- Initial project objectives;
- Agreed changes to project objectives;
- Project outcomes including budget and final project costs;
- Deliverables checklist;
- Incidents, issues and risks summary; and,
- Lessons learnt

3.3 Legislative Requirements

GAWB is required to comply with a number of regulatory requirements including some industry specific which are detailed below, but may not be limited to:

- *Australian Drinking Water Quality Guidelines* 2011
- *Boyne River Basin Resource Operations Plan* commenced on 20 December 2013
- *Central Queensland Regional Water Supply Strategy* December 2006
- *Environmental Protection Act* 1994
- *Environmental Protection (Water) Policy* 2009
- *Financial Accountability Act* 2009
- *Financial and Performance Management Standard* 2009
- *Fitzroy Basin Resource Operations Plan* (listed under the Water Act 2000) revised October 2013
- *Plumbing and Drainage Act* 2002
- *Public Health Regulation* 2005
- *Queensland Competition Authority Act* (1997)

- *Queensland Procurement Policy*
- *Sustainable Planning Act* 2009
- *Water Act* 2000
- *Water Supply (Safety and Reliability) Act* 2008

4 Capital expenditure review

4.1 Summary

The following section contains a summary of the projects reviewed for their capital expenditure detailing the projects costs, and a list of the documentation provided for each project. In addition an assessment of the documentation provided for completeness, project prudence and efficiency was undertaken.

The projects have been detailed as follows:

- Capex Projects 2009 - 2015 – Expenditure Higher or at significant variance with QCA forecasts
    - Completed Projects
    - Ongoing Projects
- Capex Projects 2009 - 2015 – Not in GAWB's 2010 QCA submissions
- Forecast Capex 2015 - 2020

The table below details the colour legend adopted for review of the documentation provided, project prudence and efficiency.

Table 4-1 GAWB Capex Review – Legend for documentation provided for review

Legend	Description
	Documentation provided sufficient
	Some documentation provided/some issues with documentation
	No documentation provided/insufficient evidence for justification

4.2 GAWB Interview process

Interviews were conducted with the following personnel on 9 and 10 April 2014 to discuss the documentation provided and obtain more detail, where required, on specific projects.

Table 4-2 GAWB Interviews

Name	Position
John Brennan	Strategic Planning Manager
Terry Ward	Infrastructure Planning & Delivery Manager
John Tumbers	Operations & Maintenance Manager
Darryl Edgerton	Health & Safety Manager
Stephen Vercoe	Operations Support Officer
Bruce Van Blerk	Principal Electrical Engineer
Greg Clifford	Technical Officer Projects
Dean Tappin	O&M Specialist
Brett Nicholls	Land Manager
Peter Tame	Ops Asset & Dam Safety Supervisor
Brian Brown	Mechanical & Electrical Supervisor

4.3 Capex Projects 2009-2015 – Expenditure Higher or at significant variance with QCA forecasts

4.3.1 Summary

The following section details completed material capital expenditure projects between July 2009 and June 2014 that exceed or are at significant variance with the forecast costs detailed in the 2010 QCA submission.

It should be noted that these projects are not representative of all GAWB capital expenditure projects as GAWB has successfully completed a number of capital expenditure projects that were within the 2010 QCA forecast.

4.3.2 Completed Projects

The following table details the completed material 2009-2015 projects (as nominated by GAWB for capital expenditure review) which have project expenditure higher than forecast in the 2010 QCA submission, including the original QCA forecast figure, actual project costs (provided June 2014) and the resultant excess over the QCA forecast.

Table 4-3 Project Cost Summary – Completed projects expenditure higher than QCA forecast

Project Number	Project Description	QCA Forecast	Actual Project Cost (Jun 2014)	Excess over QCA forecast
OP2010-009	Dam Safety Compliance Works	$526,377	$4,444,330	$3,917,953

The table below details the documentation provided for the project.

Table 4-4 Completed projects expenditure higher than QCA forecast - Documentation Provided by GAWB

Project Number	Project Name	Documentation	Date
OP2010-009	Dam Safety Compliance Works	Scope of Work	28 Nov 2008
		GHD implementation and Strategy Report	Jun 2009
		Business Case	23 Oct 2009
		Program of Works	8 Oct 2010
		Variations	Various
		Contract Documentation	Various
		Board Paper and Minutes	26 May 2011
		Reports	Various

Detail of the project drivers, original scope, scope variations and cost summary for the project is included in Appendix A. The following commentary provides a summary for the project drawing on interviews with GAWB staff and document review.

4.3.2.2 OP2010-009 Dam Safety Compliance Works

It is understood that when commencing the works a substantial amount of preparation work was required to ensure the required works could be undertaken. This required a series of Dam intake system isolations and shutdowns of the Awoonga Dam Pumping System within an 8 hour working period. The works required valve replacement, thus individual bolts required removal and greasing to ensure they were operable thereby enabling replacement work to proceed unhindered in the short time frame

available. Additional costs, not originally budgeted for, were incurred relating to confined space requirements, the requirements for Consultant supervision while the works took place and the identification of additional work to paint the steel pipeline between valve and flange.

In addition to the proposed works the scope was varied to include the replacement of the old intake tower crane. A by-product of these works was the requirement for the construction of a new platform for the relocation of an osprey nest from the old crane. As a result there were approximately 9-10 packages of work undertaken under the one job number.

The cost overrun on this project appears to be caused through the increase in the scope of the work and the underestimating of the tasks which were in the original scope. The underestimation of cost appears to be largely due to the undertaking of specialist works for which GAWB had no prior experience. Furthermore, increases in cost also resulted from "heated" market conditions in Gladstone caused by demand for resources to complete major local projects including the Curtis Island LNG projects.

It is noted that the original October 2009 business case identified $844k CAPEX expenditure and $1.933 million OPEX expenditure for a total project cost of $2.7 million. It is apparent that a portion of the OPEX expenditure was later capitalised which has partly led to the sharp increase in the CAPEX expenditure.

The management of scope changes and variations appears to have been well carried out in accordance with relevant policies. It is noted that a number of unforeseen events occurred throughout the duration of the project and that GAWB undertook appropriate steps to ensure the work was undertaken as efficiently as possible within the project constraints which became evident. There is evidence that risk management was undertaken before and during the project.

This project is almost complete. It is noted that the 26 May 2011 Board Paper stated that:

"Upon completion of the project, a comprehensive review of the whole program will be undertaken and documented in a single form providing explanation behind the expenditure, the reasons for it and how value for money was demonstrated and achieved. The CEO will have responsibility for the completion of this review."

This comprehensive review has not yet been undertaken.

With respect to this project it is considered that:

- Whilst the initial scoping and budgeting phase did not foresee all of the issues encountered and associated costs we believe that reasonable efforts were made to consider and control the risks involved. The works were carried out as efficiently as possible within the project constraints which became evident;
- Variations of scope were justified and applicable;
- The required works were properly considered in relation to compliance with all statutory requirements and best practices; and
- The project costs, given the prevailing market conditions, appear reasonable and are considered relevant and therefore justified in order to meet compliance issues.

4.3.2.3 Summary of Findings

The following table summarises the results of the review.

Table 4-5 GAWB Capex Review – Completed projects expenditure higher than QCA forecast

Project Number	Project Description	QCA Forecast	Forecast Total Project Cost	Project Documents	Prudent	Efficient	Comments
OP2010-009	Dam Safety Compliance Works	$526,377	$4,444,330				Considered prudent and efficient

4.3.3 Ongoing Projects

The following table details the ongoing 2009-2015 projects nominated by GAWB for capital expenditure review which have forecast total project expenditure at significant variance to that included in the 2010 QCA submission, including the original QCA forecast figure, actual project costs, forecast total project cost and the resultant difference with the QCA forecast.

Table 4-6 Project Cost Summary – Ongoing projects significant variance with QCA forecast

Project Number	Project Description	QCA Forecast	Actual project cost (Jun 2014)	Forecast total capital project cost	Estimated variance with QCA forecast
OP2009-027	Awoonga Dam Spillway AFC Upgrades	$22,110,394	$827,099	$8,993,000**	-$13,117,394

** Total project cost of $9.537 million includes operating expenditure of $0.544 million and capital expenditure of $8.993 million.

The table below details the documentation provided for the project.

Table 4-7 Ongoing projects significant variance with QCA forecast - Documentation Provided by GAWB

Project Number	Project Description	Documentation	Date
OP2009-027	Awoonga Dam Spillway AFC Upgrades	Project Closure Report	Ongoing
		Project Justification	11 Apr 2011
		Business Case (Stage 1)	27 Oct 2011
		Variation	12 Mar 2010
		Business Case (Stages 1 & 2)	7 Jul 2014
		Others	Various

Details of the project drivers, original scope, scope variations and cost summary for each of the projects is included in Appendix B. The following commentary provides a summary for selected projects drawing on interviews with GAWB staff and document review.

4.3.3.2 OP2009-027 Awoonga Dam Spillway AFC Upgrades

From the documentation provided and interviews undertaken it is understood that the original QCA forecast included works required at Saddle Dam 4 in 2015 and an independent estimate provided was based on the 2007 guideline requirements.

Stage 1 is specifically meeting regulatory requirements.

Stage 2 construction in conjunction with Stage 1 presents a real cost saving.

The Dam Safety Guidelines were updated in 2010 which resulting in the works for Saddle Dam 4 not being required until 2035. However GAWB is currently compiling a submission to the Ministerial office to bring forward Stage 2 (Saddle Dam 4) into the upcoming 2015-2020 forecast. The value of Stage 1 and Stage 2 works will meet the $15M budget. The above approach will be considered by the Board in the near future.

The work is considered justified to meet regulatory requirements and is currently ongoing.

4.3.3.3 Summary of Findings

The following Table provides a summary of the review.

Table 4-8 GAWB Capex Review – Ongoing projects significant variance with QCA forecast

Project Number	Project Description	QCA Forecast	Forecast total capital project cost	Project Documents	Prudent	Efficient	Comments
OP2009-027	Awoonga Dam Spillway AFC Upgrades	$22,110,394	$8,993,000				Considered prudent and efficient

4.4 Capex Projects 2009-2015 – Not in GAWB's 2010 QCA submissions

4.4.1 Summary

The following Table details the completed and ongoing 2009-2015 projects nominated by GAWB for capital expenditure review which were not included in the 2010 QCA submission, including actual project costs and forecast total project cost.

Table 4-9 Project Cost Summary – Projects not included in 2010 QCA submission

Project Number	Project Description	Original Board Approved Budget	Actual project cost (Jun 2014)	Forecast total project cost
IPD 2014-023	GAWB Inventory Shed & Forklift	-	$589	$573,589

The Table below details the documentation provided for the project

Table 4-10 2009-2015 Non QCA Submission Projects - Documentation Provided by GAWB

Project Number	Project Description	Documentation	Date
IPD 2014-023	GAWB Inventory Shed & Forklift	Email of cost estimate	2 May 2014
		Project Justification	5 May 2014

Details of the project drivers, original scope, scope variations and cost summary for each of the projects is included in Appendix C. The following commentary provides a summary for selected projects drawing on interviews with GAWB staff and document review.

4.4.1.2 IPD 2014-023 GAWB Inventory Shed & Forklift

It is proposed to be a light industrial shed approximately 40m x 10m plus a covered pipe rack 40m long on 5 m wide slab and hardstand pavement be provided at the Yarwun Water Treatment Plant compound. The purpose of the shed is to store inventory which will be damaged when exposed to weather. GAWB currently utilises temporary shipping containers which are insufficient for current needs.

Documentation provided consists of a signed project justification and an email with details of the proposal. The works are considered prudent to protect GAWB inventory and the proposed solution appears to be an appropriate response to the problem. The works are yet to commence.

4.4.2 Summary of Findings

Table 4-11 provides a summary of the findings.

Table 4-11 GAWB Capex Review – Projects not included in 2010 QCA submission

Project Number	Project Description	Forecast Total Project Cost	Project Documents	Prudent	Efficient	Comments
IPD2014-023	GAWB Inventory Shed & Forklift	$581,601				This job has only just commenced. The proposal is considered prudent and efficient.

4.5 Forecast Capex 2015-2020

4.5.1 Summary

The following table details the 2015-2020 projects nominated by GAWB for capital expenditure review.

Table 4-12 Project Capital Expenditure 2015-2020

Project Number	Project Name	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	Total
	Boat Creek Expansion – Stage 1		$3,125,609				$3,125,609
IPD2012-028	YWTP Switchboards/MCC Replacement	$608,137					$608,137
	Offline Storage & Re-pump Station*			$21,947,979			$21,947,979
	East End Reservoir – Various Repairs		$1,176,700				$1,176,700
IPD2013-016	Low Lift & High Lift Pump Station Switchboard & Variable Speed Drives*	$5,086,948					$5,086,948
OM2013-013	South Trees Pipe Bridge Structural Refurbishment	$1,685,100					$1,685,100
	Totals	**$7,380,185**	**$4,302,309**	**$21,947,979**			**$33,630,473**

The capital budget figures for these projects include escalation of forward capital costs by CPI, in accordance with the 2010 QCA price reset (refer 2010 QCA Final report, p136). The escalation has been applied to capital cost forecasts from the 2015/16 financial year onwards.

The table below details the documentation provided for each of the projects

Table 4-13 2015-2020 Forecast Projects - Documentation Provided by GAWB

Project Number	Project Name	Documentation	Date
	Boat Creek Expansion – Stage 1	Project Justification Form	Apr 2014
		Aurecon concept and cost estimate	Jan 2014
IPD2012-028	YWTP Switchboards/MCC Replacement	Project Justification Form	5 Dec 2011
		Project Plan	15 Dec 2011
		Aurecon Feasibility Report	5 Apr 2012
	Offline Storage & Repump Stations	Budget Estimate	31 Jan 2014
	East End Reservoir – Various Repairs	Budget Estimate	30 Jan 2014
IPD2013-016	Low Lift & High Lift Pump Station Switchboard & Variable Speed Drives	Business Case	10 Jan 2014
		Board Meeting Minutes	Undated
OM2013-013	South Trees Pipe Bridge Structural Refurbishment	Project Justification Form	5 Mar 2013
		Vinsi inspection report	20 Nov 2013
		Vinsi scope	14 Jan 2014
		Donald Cant Watts Corke Cost Estimate	14 Mar 2014

4.5.2 Boat Creek Expansion - Stage 1

It is intended to enlarge the Boat Creek reservoir to provided additional water security to the northern region. The reservoir currently contains less than 1 day risk storage for the northern zone. The objective is to maintain a minimum of 24 hours available risk storage in all parts of the delivery network. The expansion of the Boat Creek reservoir will allow this minimum to be met. Further expansion stages, which have not yet been included in GAWB's capital expenditure forecasts, will ultimately increase the capacity to a four day supply. The project is considered justified.

Aurecon have provided a memorandum (January 2014) which has provided a reasonable scope for the work to be carried out. The Aurecon estimate (+/- 30%) indicates a figure of $269k to clean out the reservoir and $2.917M to increase the Stage 1 capacity. The $269k to clean out the reservoir is considered as OPEX. The budget figure has been derived through escalation of the remaining $2.917M CAPEX component.

The project driver is to increase capacity for water security (risk mitigation) and the project is considered justified.

4.5.3 IPD2012-028 - YWTP Switchboards / MCC replacement

The Motor Control Centre (MMC) at Yarwun Water Treatment Plant (YWTP) is 22 years old and has reached the end of its useful life. The purpose of this project is to replace the MCC at YWTP which is critical to the operation of the plant.

Aurecon have produced a feasibility report which has provided a reasonable scope for the works and a detailed cost estimate. The Aurecon estimate (+/- 20%) indicates a figure of $465,000 dollars to design and replace the MCC unit which includes engineering design, procurement and construction management.

The project driver is renewal and the project is considered justified.

4.5.4 Offline Storage & Re-pump Station

Detailed design of the Offline storage and pump station by Cardno is well advanced. A preliminary construction estimate of $20.8M (including 30% contingency) has been completed based on this design.

The delivery of this project will require 2 critical actions with uncertain timeframes and implications being:

- Development approval from Gladstone Regional Council involving and number of State concurrence and advice agencies.
- Relocation of an 11kV electricity line from the ponded storage area.

Whilst the above actions hold significant uncertainty there has been a pre-consultation meeting with Gladstone Regional Council about the matter and there do not appear to be significant hurdles at this time.

This project was submitted to QCA in the 2009 review when GAWB requested $22 million but was allocated $2M for further investigative work. It is noted that there is also forecast capital expenditure planned for Feb 2014 to June 2015 in addition to the budget for 2015/16.

4.5.5 East End Reservoir - Various Repairs

A Donald Cant Watts Corke Schematic Design Estimate (January 2014) provides a reasonably detailed scope of work. The work was costed at $1.098M and was based on lessons learnt from previous similar work carried out by GAWB on Fitzimmons 50ML and 16ML reservoirs.

The work is considered justified to ensure the maintenance of the asset.

4.5.6 IPD 2013-016 Low Lift & High Lift Pump Station Switchboard & Variable Speed Drives

The project drivers for work are end-of-life replacement and risk mitigation. The objective of the project is to maintain a reliable electrical supply to the Gladstone Water Treatment Plant.

The Project Plan (December 2012) outlines a Board approved budget of $1.03M for the planning and design phase of the project.

The Welcon report (December 2011) details the options considered:

- Option 1 – Install VSD's Only (No Switchboard Upgrade)
- Option 2 – Direct Replacement of High Lift / Low Lift Switchboards
- Option 3A – Install Combined High Lift / Low Lift Switchboard
- Option 3B – New Switch Room

The Welcon report recommends implementing Option 3A or Option 3B if budget constraints allow. A cost estimate provided by Welcon (May 2014) details a project cost of $3,718,300. The budget determined by GAWB has been built up to include additional items not included in the Welcon Estimate as well as additional contingency.

Table 4-14 IPD2013-016 Budget Estimate Build Up

Item	Welcon	Budget
	$2,834,611	$2,834,611
Increase in contingency allowance	$572,036	$978,000
Added demolition cost for low lift building (Location changed due to location of underground services and provision for future expansion)		$100,000
Added replacement of High Lift Motors (Not included by Welcon in estimate)		$64,000
Increase in cost of new main power supply to new switchboard (Location changed due to location of underground services and provision for future expansion)	$233,253	$540,000
Auxiliary supplies and equipment (Not included by Welcon in estimate)		$34,000
Revision of Principal Contractor Preliminaries	$78,100	$122,100

Detailed design Cost (Capital) (Not Included by Welcon in estimate)			$180,000
Costs incurred to date and other costs			$234,237
	Totals	**$3,718,000**	**$5,086,948**

The project is considered to be reasonably scoped and estimated. The work is considered to be justified and of high priority.

4.5.7 OM2013-013 South Trees Pipe Bridge Structural Refurbishment

The circa 1985 sixteen span bridge spans the South Trees Inlet (Boyne River) carries two pipelines (one for treated water and the other for raw water) to Boyne Island. The treated water pipeline services the Boyne Island and Tannum Sands residential areas and the raw water pipeline supplies the Boyne Smelter.

The pipe bridge is suffering from various forms of corrosion and deterioration and the walkway is no longer safe. The driver for this project is to repair the walkway and return it to a safe operating condition (a regulatory obligation for safety).

Vinsi Partners carried out a Stage 1 Condition Assessment for the pipe bridge structure in 2013 and have recently outlined a preliminary scope of work to repair the structure. A Stage 2 detailed structural condition assessment is proposed to be carried out, to more accurately determine the extent of corrosion/deterioration. Vinsi Partners assessed the risk as “high”.

The draft project justification for the Stage 2 work indicates a CAPEX spend of $202,000. A Donald Cant Watts Corke Cost Estimate (14 March 2014) estimated the total cost of the works at $2,237,000 based on the preliminary scope of work. The $1,685,100 budget figure was determined excluding work carried out separately in 2014/15 (design work, walkway repair and valve replacement).

The project is considered to be justified and scope is well defined.

4.5.8 Summary of Findings

The following Table provides a summary of the findings.

Table 4-15 CAPEX Summary Forecast 2015-2020

Project Number	Project Name	Total estimated project cost ($)	Documentation	Comments
	Boat Creek Expansion – Stage 1	$3,125,609		Documentation is sufficient
IPD2012-028	YWTP Switchboards / MCC replacement	$608,137		Documentation is sufficient
	Offline Storage & Repump Station	$21,947,979		Documentation is sufficient
	East End Reservoir – Various Repairs	$1,176,000		Documentation is sufficient
IPD2013-016	Low Lift & High Lift Pump Station Switchboard & Variable Speed Drives	$5,086,948		Documentation is sufficient
OM2013-013	South Trees Pipe Bridge Structural Refurbishment	$1,685,100		Documentation is sufficient

5 Conclusions

5.1 Conclusions

The findings from this investigation are as follows:

1. GAWB has robust planning and procurement procedures in place and there is sufficient evidence that these procedures have generally been followed.
2. Expenditure on completed work for projects within the scope of this review is considered prudent and efficient. It is noted that in some instances the expenditures are in excess of QCA expenditure forecasts. This appears to be largely due to:
    a. significant but necessary scope changes;
    b. difficulty in accurate estimation of project costs for specialist work; and
    c. increased construction costs amidst challenging market conditions in Gladstone fuelled by an enormous upsurge in construction work in the region;
3. The forecast expenditure 2015 to 2020 is considered prudent and efficient given the available information at this time.

GAWB Capital Works Review

APPENDIX A

CAPEX PROJECTS 2009-2015 – COMPLETED PROJECTS EXPENDITURE HIGHER THAN QCA FORECASTS

Cardno
Shaping the Future

OP2010-009 Dam Safety Compliance Works

Project Drivers

The key driver for this project is to meet the regulatory requirements as a referrable dam under the Water Supply (Safety & Reliability) Act.

Original Scope

- Tender Preparation and Contracts Supervision
    - Project Inception meeting, risk assessment, tender specification and evaluation, engineering support and site supervision
- Inlet Tower – Crane System and other Modification's, Valve Inspections and Maintenance
    - Refurbishment of centre crane, including upgrade to 6 tonne capacity, installation of new crabs and chain lifting system for trash screens
    - Overhaul of 6xDN1500 inlet valves at RL10.5, RL15.0, RL19.5, RL23.0, RL25.5, RL28.0
    - Installation of guard rails around tower floor penetrations/slots
    - Installation of penstock air vent support
    - Removal of DN300 UPVC air pipe at RL 28
    - Corrosion repair of riser pipe
- Spillway – Gallery Modifications and Drain Remediation
    - Relocation of cable tray and relocation of stairs on spillway gallery
    - Remediation of drain holes in spillway apron, abutments and gallery
- River Discharge and Chlorine Pit Valve Inspections and Maintenance, Chlorine Pit Repairs, Installation of Remote Operations
    - River discharge – refurbishment of DN2000 and DN900 butterfly valves, DN1900 fixed cones dispersion valve, DN300 needle/cone valve
    - Chlorine Pit – removal of pipework, repairs to platform, overhaul of DN1400 butterfly valve
- Awoonga-Callide Connection – Repairs
    - Repairs to concrete lining

Scope Variations

n136459 (Variation):- $910,000

- Replace DN 1400 butterfly valve
- Construct & demolish coffer dam
- Additional consulting fees to GHD

n136230 (Variation):- $442,317

- Preparation of initial concept for grappling system
- Job Management
- Crane Supporting Structure Capacity Check
- Crane Inspection and Refurbishment Works
- New Grappling System and Fine Screen

n136229 (Variation):- $ 1,139,893

- Design Modifications
- Recommendations for valve repairs
- Strategy for new valve installation
- Outlet tower crane modification
- Valve refurbishment: Preparatory works
- Valve refurbishment: Design preparation
- Valve refurbishment: Tender assistance
- Valve refurbishment: Preparation Works
- Valve refurbishment: River Discharge Pit
- Valve refurbishment: Chlorination Pit
- Valve refurbishment: Outlet Tower valves
- Contract Administration
- Design / Technical Assistance to the valve refurbishment
- Job management

Hydrojet

Original Contract Value:- $ 408,034.54 (inc GST)

- Variation 1: $ 18,892.33
    - Build earth ramps to enable access to spillway apron, and fill around pipeline manhole
- Variation 2: $ 28,800.00
    - Clean spillway apron with high pressure water to ensure apron is free of slime, vegetation and other foreign matter

Final Contract Value:- $ 968,993.19 (inc GST)

Extra costs not associated with variations but include extra camera work, transport, crane hire, drilling and day hire.

Eagle RCR

Original Contract Value:- $ 783,210.00 (inc GST)

- Variation 1: $ 16,985
    - Supply, deliver and install handrails for the Outlet Tower deck as per quote ref no EQ 3369 rev 1 dated 3 August 2010
- Variation 2: $ 2,000
    - Clean 1m section of the DN900 pipe lining up and downstream of the DN900 BV as per quote ref no. EQ 3485 dated 20 September 2010. Cleaning of the upstream work will be done according to the schedule of rates.
- Variation 3: $ 23,600
    - Install and later remove the DN600 cone valve as per his quote ref no EQ 3466 rev 3 dated 20 September 2010.

- Variation 4: Reduced by $ 6,136
    - Paragraphs 2, 3 & 4 of clause 6.3.2 Small Bore Pipework of contract removed as work completed by Principal.
- Variation 5: $ 20,104
    - Test 100% of DN90 pipe lining downstream of DN900 blank flange. Repair damage and pinholes and repaint complete lining to final DFT 750 microns as per the Corrosion Protection Specification.
- Variation 6: $ 31,140
    - Weld a 5mm thick steel band onto the DN900 pipe downstream of the DN 900 butterfly valve to increase the OD to 925mm.
- Variation 7:
    - Not approved, replaced by Variation 9
- Variation 8: $ 18,890
    - Manufacture, supply, deliver to site and install the removable handrail sections on RL 15, 19.5, 23,2, 25.5, 28, 30.5.
- Variation 9: $ 28,318
    - Manufacture, supply, deliver to site and install new covers for the River Discharged Pit.
- Variation 10:
- Variation 11: $ 26,217
    - Clean, sweep, blast and paint internal lining of 2000mm river discharge pipe.
- Variation 12: $ 1,400
    - Relocation of three (3) shipping containers from Chlorine Building to River Discharge area.
- Variation 13: $ 3,797
    - Removal of 300mm NB valve and fit 750mm blank flange on pipe spool at RL 28.0m and transport to maintenance workshop.
- Variation 14: $ 2,100
    - Machining galvanising from the threads of 80 each M56 stud bolts for DN2000 valve
- Variation 15: Reduce by $ 48,595.14
    - Change scope to delete installation of 1500mm butterfly valve at RL 10.5, which is no longer required
- Variation 16: $ 4,355
    - Manufacture of two supports for DN 1400mm Isolation Valve

Final Contract Value:- $ 880,859.86 (inc GST)

<u>TEMMCO:-</u>

Original Contract Value:- $ 659,172.80 (inc GST)

- Variation 4: $ 13.302
    - Additional welding and machining work for refurbishment of DN 900 valve and DN 900 spool piece.

- Variation 5: $ 309
    - Additional machining required for refurbishment of DN 300 valve
- Variation 8: $ 11,850
    - Additional repairs and machining to DN 1500 butterfly valve (RL 19.5).
- Variation 9: $ 6,587
    - DN 2000 butterfly valve: destructive removal of studs and additional work for separation of valve body.
- Variation 10: $ 12,105
    - DN 1900 cone value: Repair corrosion damage using Belzona 1111 and coat complete inside of valve surface (except stainless steel sleeve) with Belzona 1341.
- Variation 11: $ 29,932.30
    - Transport and painting of DN 1500 spools at RL 10.5, 15.0, 19.5, 25.5
    - Installation of inspection ports on DN 1500 valve sppols at RL 19.5 and 25.5
    - Supply of inspection ports for DN 1500 Valve Spools at RL 10.5, 15.0
    - Supply new bolts for DN 2000 valve half joint and lifting lugs
    - Additional repairs and machining of DN 1500 Valve (RL 25.5)
- Variation 12: $ 4,750
    - Transport from/to site, cut out inspection plug and weld in plate, NDT, cut off excess length, machine to required length, machine OD pipe to required diameter for 200mm for seal, blast and paint as per corrosion protection specification
- Variation 13: $ 35,876
    - Additional reqpairs to DN 1500mm Valve RL 23.0 due to corrosion/erosion
    - Additional repairs to DN 1500mm Valve RL 18.0 due to corrosion/erosion
    - Additional blast and painting for DN 1500 Valve Spool RL 23.0
    - Additional blast and painting for DN 1500 Valve Sppol RL 28.0
    - Modify DN 1500 Spool RL 23.0 for inspection ports
    - Modify DN 1500 Spool RL 28.0 for inspection ports
    - Press out gear box shaft and splines RL 23.0 & 28.0
    - Additional welding and machining of DN2000 spool
    - Weld repair to cracked gearbox flange RL28.0
- Variation 14: $ 4,330
    - DN 1500 valve at RL 23.0 repair of cracked gearbox flange
    - DN 1500 valve at RL 23.0 storage box supply and packing
- Variation 15: Reduced by $ 26,528
    - Item 4.4.1 DN 1400 butterfly valve refurbishment, including seals and spare parts, blast and paint assemble and pressure test, refurbish actuator (70%), factory acceptance test, commissioning and transport

Final Contract Value:- $ 719,108.30 (inc GST)

<u>KONE</u>

Original Contract Value:- $ 157,769.70 (inc GST)

- Variation 1: $ 24,376.31
    - Rail Q Survey of Intake Tower crane runway
    - Repair of crane runway including welding of runway clamps to spacers, torqueing of nuts and application of cold Galv to welds
    - Provide access to crane rails including the hire boom lift, delivery to site and crane hire
- Variation 2: Reduced by $ 5,556.81
    - Deletion for work not able to be completed
- Variation 3: $ 110,634.00
    - Install new Osprey perch and move existing crane rails
    - Remove existing two cranes form instake tower and transport to storage yard
    - All transportation and carnage is included

Final Contract Value:- $ 272,880.50 (inc GST)

Monadelphous

Original Contract Value:- $ 141,223.00 (inc GST)

- Variation 1: $ 14,663
    - Blast clean, spot prime and surface treat modified baulk with High Build Epoxy to a minimum dry film thickness of 500 microns
    - Assemble grapple and trial fit to modified baulk and screen
- Variation 2: No change
    - Change to practical completion date

Final Contract Value:- $ 155,886.00 (inc GST)

Pacific Marine

Original Contract Value:- $ 23,060.00 (inc GST)

- Variation 1: $ 17,450 (Originally $30,725.50, reduced by GAWB)
    - Claim for three (3) days standby due to crane electrical problems/design issues. GAWB reduced claim to allow for two (2) days only. $11,212.50
    - Claim for the hire of the dive support vessel for thirteens (13) days hire. GAWB advised that costs were already accounted for in Tender but as a gesture of good will, agreed to pay the out of pocket costs less the original tender amount. $5,850
    - Claim for the hire of 25t crane for site establishment/disestablishment movement Nitrox Unit. Not approved by GAWB as variation was initiated by Pacific Marine with the understanding that no extra costs would be imposed on GAWB.

Final Contract Value:- $ 40,510.00

Cost Summary

QCA Forecast: $ 526,377

Budget Cost: $ 4,553,427

Spend to Jan 14: $ 4,467,704

GAWB Capital Works Review

APPENDIX B

CAPEX PROJECTS 2009-2015 – ONGOING PROJECTS SIGNIFICANT VARIANCE TO QCA FORECASTS

Cardno®
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OP2009-027 Awoonga Dam Spillway AFC Upgrade

Project Drivers

The key driver for this project is to meet the regulatory requirements as a referrable dam under the Water Supply (Safety & Reliability) Act. The Office of the Dam Safety Regulator revised the Dam Safety Conditions to include a requirement that Awoonga Dam achieves 100% of "Acceptable Flood Capacity" (AFC) as defined within the *Guidelines for the Acceptable Flood Capacity of Dams*

Original Scope

Stage 1

Planning and Design

- Site geotechnical investigations, particularly for identification of suitable materials;
- Detail site surveys;
- Detail design of the works;
- Preparation of drawings, scope of works and technical specifications;
- preparation of Expression of Interest, Tender and Contract Documents;
- Environmental surveys, vegetation mapping.
- Identification of planning and statutory approval requirements, and planning and development applications;
- Constructability and safety in design reviews;
- Local Industry Participation Plan;
- Procurement of construction contract management assistance (Superintendent Representative, Cost Control, Administration and Document Control)
- Procurement of engineering assistance during construction.

Implementation

- Procurement of construction engineering, and project management support.
- Engagement of Principal Contractor.
- Principal Contractor's scope of work includes:
    - Mobilisation of equipment, site establishment and facilities;
    - Clearing and stripping of borrow areas and the existing embankment and downstream foundation area for the embankment earthworks;
    - Construction of operational access road to Saddle 6 which can also be used as a haul road during construction;
    - Excavation of materials from Saddle 6, sufficient to supply embankment general fill and clay core zone 1 fill materials for raised embankment at Saddle 3, in such a manner as to form part of the future (Stage 2) auxiliary spillway;
    - Importation of sand for embankment filter layer and rock for embankment toe;
    - Placement of materials for the Saddle Dam 3 embankment raise including sand filter, compacted general fill and core materials, and rock toe, raising of Saddle Dam 3 crest level from RL 47.9m to 49.6m.
    - Rehabilitation and grassing of excavated surfaces and embankment slopes using stripped topsoil, shred vegetation cleared from the site, and spreading native grass and perennial seed;

  - Removal of Contractor's equipment and facilities at completion of the works;
- Engineering advice and response to requests for information from the Principal Contractor, inspections, and quality assurance reviews during construction.
- Minor capital works "post-construction" required to:
  - finalise fencing, gates and general access
  - repair existing roads damaged during construction
  - continue watering and monitoring for revegetation of exposed surfaces after practical completion,
  - removal of erosion and sedimentation controls once surfaces stabilised
- Project and contract management, project cost control, project administration and document control
- Acquisition of land for Saddle 6 works and drainage easement below Saddle 6.

Cost Summary

QCA Forecast: $ 22,110,394.00

Budget Cost (Original Business Case): $ 9,960,000 (Stage 1) $15,091,000.00 (Total)

Amended forecast capital project cost advised by GAWB is as follows.

Project Number	Project Description	QCA Forecast	Actual project cost (Jun 2014)	Forecast total capital project cost	Estimated variance with QCA forecast
OP2009-027	Awoonga Dam Spillway AFC Upgrades	$22,110,394	$827,099	$8,993,000**	-$13,117,394

** Total project cost of $9.537 million includes operating expenditure of $0.544 million and capital expenditure of $8.993 million.

GAWB Capital Works Review

APPENDIX C

CAPEX PROJECTS 2009-2015 – NOT IN GAWB'S 2010 QCA SUBMISSIONS

Cardno
Shaping the Future

GAWB Inventory Shed & Forklift

Project Drivers

Primary justification: Business Process Improvement

Secondary justification – Risk Mitigation

Project Deliverable is to provide secure, easily accessible storage location for piping, valves and other items. Items will be stored on undercover racks and will not be exposed to the weather. Access for pedestrians and vehicles will be safer

Original Scope

The O&M group has requested that an inventory shed approximately 27m long x 15m wide x 6m high to be used for storage of spares and equipment, and covered pipe racks be constructed at the Yarwun Water Treatment Plant compound.

The existing storage area consists of pallets of parts and piping sitting directly on the ground and completely exposed to the weather. Many of these items will suffer from UV degradation and corrosion when left exposed for extended periods, greatly reducing there usability and shelf life.

In wet weather, materials are not accessible even with a mobile crane.

Current storage area is not level and difficult /unsafe to access by the forklift which is available on site.

There are parts scattered over several sites that also needs to be stored.

Spares are stored for use in the Northern Area and on Curtis Island. Other materials will also be stored in the shed for short periods for project work in other areas.

A larger more stable forklift is required to enable safe handling of the longer lengths of piping and stacking of pallets in racks.

Cost Summary

Budget: $581,601

Final Cost: Cost to January 2014: no spend to date

GAWB Capital Works Review

APPENDIX D
QCA TERMS OF REFERENCE

Cardno
Shaping the Future

REFERRAL

SECTIONS 23A
QUEENSLAND COMPETITION AUTHORITY ACT 1997

1) Referral

As the responsible Minister, pursuant to section 23A of the *Queensland Competition Authority Act 1997* (the QCA Act), I refer the Gladstone Area Water Board (GAWB) to the Queensland Competition Authority (the Authority) for a price monitoring investigation for the period from 1 July 2015 to 30 June 2020.

2) Conduct of the QCA pursuant to this referral

In referring this investigation, the Authority is to consider:

a) the planned change in prices of water having regard to, amongst other things:
   i. GAWB's pricing model; and
   ii. demand forecasts;

b) the forecast revenue based on the total prudent and efficient costs of carrying on the activity;

c) in respect of the return on capital consider the WACC applied by GAWB against the benchmark WACC;

d) the regulated asset base (RAB) roll-forward calculation (in accordance with the Authority's previously recommended methodology);

e) the revenue carryover calculation (in accordance with the Authority's previously recommended methodology);

f) for capital expenditure to be included in the forecast RAB, the Authority is to form a view on prudency and efficiency, with the focus on cost areas which are material to price changes rather than matters which are likely to have a minor and inconsequential impact; and

g) for operating expenditure to be included in the forecast revenue, the Authority may investigate the expenditure in any function where GAWB's forecast expenditure in that function exceeds the level allowed in the Authority's 2010 pricing practices investigation by an amount that would give rise to a material increase in price.

For the avoidance of doubt, the Authority may consider a matter not indicated in (a) to (g) if it is likely to have a material impact on the price to a customer.

3) Consultation

The Authority must undertake an open consultation process with all relevant parties and consider submissions within the timetable for the review and reports. Consistent with section 34 of the QCA Act, all reports and submissions must be published on the Authority's website.

4) Timing

GAWB is to provide a submission to the Authority in respect of its pricing practices by 30 September 2014.

The Authority must provide a Draft Report by 28 February 2015 and a Final Report by 31 May 2015.

TIM NICHOLLS
Treasurer and Minister for Trade

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Gladstone Area Water Board

Appendix H – Functional Cost Allocation

PricewaterhouseCoopers:

***Functional Cost Allocation Review: Final Report*, August 2014**

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Functional Cost Allocation Review
Final report

Gladstone Area Water Board (GAWB)

Functional Cost Allocation Review

August 2014

pwc

Executive summary

Anthony Ottaway – Chief Financial Officer, GAWB

38 Hope Street, South Brisbane, Queensland

28th August 2014

Dear Anthony,

In accordance with our letters of engagement dated November 2013 and May 2014, you asked us to undertake a review over the appropriateness of Gladstone Area Water Board's (GAWB) functional reporting definitions and rationale (Phase 1 of the engagement) as well as to conduct a quality assurance check over the translation into the five functional definitions of the 2010 QCA Price Forecast and GAWB's operating expenditure for years 2011 to 2015 (Phase 2 of the review).

We understand that the functional categories are to be used for internal cost reporting purposes and that this accounting exercise, consisting of the functional allocation of your expense base, will support a revised cost analysis and foster more insightful discussions on performance and activity.

Our initial Phase 1 of the review concluded that the five functional definitions originally proposed were reasonable, appropriate and reflective of business activities. However, observations and opportunities for improvement raised by PwC for management consideration led to the merger of two functional categories and the renaming of the resultant four categories as follows:

- Strategy and asset creation
- Asset life cycle management
- Operations
- Corporate Services.

Our quality assurance checks performed over the translation of GAWB's cost base into the four functional definitions did not highlight any exceptions. To the extent that we were able to validate the calculations against source documentation, the translation rules applied to 2010 QCA Price Review Forecast appear to have been accurately and consistently applied to subsequent years' data in accordance with the proposed functional allocation methodology.

This final report captures the points raised against each of the functional categories and general observations to be considered in deploying the framework, based on work performed during all phases of the engagement and information provided up until 18 August 2014.

Yours sincerely,

Craig Fenton
Partner

Contents

1 Functional Cost Allocation Methodology

1.1 Review of appropriateness of the functional reporting definitions and rationale

As part of Phase 1 of our engagement, we reviewed GAWB's functional reporting proposed definitions and rationale. The objective of this review was to assess the proposed approach to reporting GAWB's operating expenditure in a way that realistically reflects the way the business is operated. The benefits of the approach were anticipated to include support for more robust decision-making processes internally and greater transparency around GAWB's costs structure and related pricing model.

Objective

We understand that GAWB's primary purpose of the functional reporting is to enhance the transparency of accounting procedures thus improving how costs are reported internally to management. This will become the main lens to prepare budgets and to monitor and report business performance although the functional reporting framework is intended to complement analysis of expenditure by other means (Cost Centre / Pricing Zone).

Process

The process was initiated in 2009 but circumstances at the time were not favourable for a successful implementation of a revised functional reporting approach. The current initiative has involved early and extensive consultation with management to ensure business buy-in. This has included a series of meetings and workshops to refine the initial function definitions and to address any concerns raised. We have also been advised that the Functional Reporting project is supported by GAWB's CEO and the Board.

The new functional reporting format was initially structured around five functions with the aim to provide GAWB's management with greater transparency around the costs baseline. Description of the original five functions proposed by GAWB are provided at Appendix A.

Review activities undertaken by PwC

GAWB engaged PwC to assess the overall methodology being proposed and the five reporting functions and associated definitions. The following approach was adopted:

PwC held three meetings with GAWB's CFO in order to understand the review objectives, methodology and approach for translation of 2010 QCA Price Review Forecast. PwC also held a workshop on Wednesday 4th December 2013 with GAWB's Executive Team to validate the functional definitions and to ensure management had a shared understanding of the proposed approach under the new reporting framework. We also undertook an initial scan of the work papers provided to us on 2nd December 2013 and conducted limited sample testing over departmental splits, staffing allocations and justifications, and internal management engagement and sign off, in order to validate the mapping methodology.

1.2 Observations for management consideration

As part of the first phase of the engagement, PwC sought to understand the proposed functional definitions and to suggest enhancements to the processes intended to be implemented by GAWB. Despite GAWB having a reasonably well-developed proposition and supporting documentation, the draft report prepared for Phase 1 provided opportunities for improvement in relation to each of the five original functional definitions. PwC's comments and suggestions were considered by GAWB management and embedded to enhance and refine the proposed reporting functions. The initial functional definitions assessed and commented by PwC have been included at Appendix A.

Subsequent to our review, management amended the cost allocation methodology with a reduction in the number of defined functions from five down to four, namely Strategy and Asset Creation, Operations, Asset Life-Cycle Management and Corporate Services. In particular, our assessment of the Asset Creation and De-commissioning cost category highlighted the smaller size and limited relevance of this function on its own, given that it only captured the operating expenditure component of projects aiming to create or decommission assets. Asset Creation was subsequently merged with the Strategy function given the strategic nature of the activity. Additional minor changes were also embedded onto the methodology and functional descriptions, as proposed by PwC.

Further observations were made for management consideration in deploying the framework and transitioning its reporting to the new functional definitions.

Alignment of reporting functions and organisation departments

In larger utilities businesses, functional activities and organisational structures would ideally be aligned for ease of governance and reporting. This is an issue that could be reviewed and revisited in light of any future growth or restructuring of the business. However, we acknowledge that, given the current size and structure of GAWB where roles may span across various functions, the proposed alignment might not be practical or feasible as of yet.

Shared Organisation Accountability across Functions

The Executive Team noted that there may be some ambiguity with regard to accountability for performance in those cases where organisational structures and functional activities do not fully map. We do not envisage that this would present a major challenge in practice, but it is an area that should be revisited after implementation of the framework to ensure staff are comfortable with the information being produced and how it is being used to manage performance.

Support the effective deployment of the new reporting framework

In order to set the foundations for an effective deployment of the new reporting framework, management should consider the ongoing change management program to ensure success including training, communication and documentation requirements. It would also be beneficial to formally review and refine the effectiveness of the framework on a periodic basis and report back to the Board on any changes or improvements identified.

Mechanics of the 2010 QCA Forecast translation

In relation to the QCA Forecast translation, we noted that the Forecast presented to the regulator is not reflective of the entire operating expenditure position of GAWB given that only part is allowed to be recovered through pricing. Sample testing was conducted at a later stage of the engagement in order to validate the cost baseline that was used as starting point for this exercise.

2 Quality Assurance Process

2.1 Our approach to quality assurance for the translation of costs

Phase 2 of the engagement aimed to provide quality assurance for the translation of costs into the four reporting business functions for the following data sets:

- GAWB's operating expenditure forecasts (for years FY11 to FY15) submitted to QCA as part of the 2010 Price Review
- year 2010/11 actual operating expenditure
- year 2011/12 actual operating expenditure
- year 2012/13 actual operating expenditure
- year 2013/14 actual operating expenditure
- year 2014/15 forecast operating expenditure.

Review activities undertaken by PwC

In undertaking our assessment, various aspects of the aggregation of costs by function were considered, in particular, the following integrity principles on which sample testing of the working papers was based:

- Completeness
- Accuracy
- Consistency
- Transparency, including record-keeping and documentation practices.

Our quality assurance check over the translation into the four functional definitions of the Price Review Forecast reported to QCA in 2010 and GAWB's actual and forecast operating expenditure from 2011 to 2015 was undertaken through sample testing of the documentation provided and discussion with management to clarify the rationale and basis of the calculations shown in the cost allocation working papers. It involved the following steps:

- Inspection of work papers and other relevant documentation provided to us (as per the list below) in relation to GAWB's translation of costs for the years noted above
- Undertaking limited sample testing over the cost allocation by functional activities including review of existing reconciliations to source data, review consistency of General Ledger accounts mapping to functions and by asset, validation of personnel functional allocation, and validation of adjustments applied to GAWB's original cost allocation
- Reviewing record-keeping and documentation practices as well as effectiveness of integrity controls
- Conducting interviews with key staff in order to understand the methodology as required and seeking clarification from GAWB's management on testing exceptions or process queries

- Liaising with management on an ongoing basis to communicate potential opportunities for improvement to the cost allocation by function.

Specifically, we reviewed the following working papers provided by GAWB:

- Functional Reporting Translation Approach – 2010 Price Review forecasts and Cost Allocation Methodology papers
- Functional Splits completed 1.12.13 worksheets
- GAWB Employee Position Descriptions
- Attachment A - QCA Other Cost Efficiency calculations worksheets
- EDOCS_n287761_v6_FY15_opex_budget_to_qca_review
- EDOCS_n287761_v5_FY15_opex_budget_to_qca_review
- L4 Labour Budget Template version 7 3 2014 worksheets
- Split out of QCA Functional Allocation to GL level (F Section - QCA in USB)
- Allocation of QCA Efficiencies (F Section - QCA in USB)
- G Section - 2013 opex worksheets
- H Section - 2012 opex worksheets
- I Section - 2011 opex worksheets
- Compare functional splits original vs revised worksheet.

2.2 *Observations arising from the assessment exercise*

Our quality assurance check conducted over 2010 QCA Price Review Forecast, FY 2010/11, FY 2011/12, FY 2012/13 and FY 2013/14 actual operational expenditure and FY 2014/15 forecast operational expenditure translations did not highlight any significant issues.

To the extent that we were able to validate the calculations against source documentation, the translation rules applied to 2010 QCA Price Review Forecast and subsequent yearly cost baselines, appear to have been accurately and consistently applied in accordance with the proposed functional allocation methodology. Methodology papers, including key assumptions, and other documentation reviewed clearly outlined the cost allocation process undertaken at GAWB and respective reconciliation to source data. Specific observations arising from our assessment of the translation of 2010 QCA Price Review Forecast into functional categories have been included at Appendix B.

Additional information was readily available to support the QCA efficiencies and further re-allocation of General Ledger amounts into functional categories. Generally, GAWB work papers were clear, complete and included additional commentary for ease of reference. Data integrity checks have been embedded throughout the calculation worksheets to ensure accuracy. PwC could also easily trace the changes applied to convert the initial cost allocation from five functions into the final four categories.

PwC discussed with GAWB the change in approach for the translation of FY2015 forecasted expenditure. Satisfactory explanations were also provided for the adjustments applied to transfer costs between functional categories to better align with the functional definitions.

Minor changes were made to the functional allocation of some General Ledger accounts, both for actual operating expenditure and for QCA figures. These immaterial movements between functions, mainly consisting of costs being split across various functions, represent a further

refinement of the functional allocations with the aim to enhance consistency across years and allow for better comparisons. Their effect on the total costs is nil.

Further, as FY15 forecast is being finalised by GAWB, additional adjustments were applied post PwC review. Supporting documentation with tracked changes was revised by PwC, and we are satisfied with the logic applied and the integrity of the changes.

Appendix A Initial functional definitions

Function	Definition	Guidance for application	Comments and suggestions
Strategy	The Strategy function entails activities necessary to meet strategic business positioning and corporate governance requirements. Activities include: ➢Board and CEO ➢Strategic planning ➢Economic regulation ➢New customer / business development	✓ Activities are not day to day functions ✓ Example - preparing a new WRP is strategy, where as monitoring of the WRP is operations	✓ This function captures the corporate activities of the organisation ✓ Personnel costs included in this function are readily differentiated from operational staff ✓ Total expenditure justifies having this function separated from Support Services ✓ Business Development is a minor activity given the monopoly situation within which GAWB operates
Operations	The Operations function entails activities and inputs required to produce or provide a desired product. Activities include: ➢ Storage ➢ Delivery ➢ Treatment ➢ Hatchery	✓ Activities do not include maintenance ✓ Activities are typically 'business as usual' e.g. water treatment, SCADA, etc. ✓ Inputs to operations include electricity, operations, consumables, etc. ✓ The hatchery activity produces a product, therefore is classified as Operations, where as easement maintenance / land management activities are specifically undertaken to maintain GAWB assets	✓ Guidance provided in relation to electricity costs could note that this will be separate between operational and corporate offices ✓ Suggest removing "operations" as an example ✓ It is noted that plant and fleet costs are invariably attributable to their functional usage and are not shared across assets ✓ Staff allocations are generally clearly attributable with only some staff requiring a split in costs between operations and asset maintenance

Function	Definition	Guidance for application	Comments and suggestions
Asset Management (existing assets)	The Asset Management function entails activities required to manage and maintain existing assets. Activities include: ➢ Maintenance planning and execution ➢ Condition assessments ➢ Land management ➢ Easement maintenance ➢ Recreation area management ➢ Maintenance of corporate assets	✓ Asset management activities are typically captured via work orders	✓ Consider re-wording the function description to ensure it refers to the management of the asset life-cycle (not only to its management) ✓ Consider completeness of the function description by including a reference to "inspect, repair and maintain assets" ✓ Consider the guidance for application should note that the use of work orders is not a requirement per internal policy and is not always the case in practice ✓ Management of recreation areas does not revert back any material income but represents a community service ✓ Consider providing greater guidance to ensure all assets are captured (e.g. fences)
Asset Creation and De-commissioning	The Asset Creation and De-commissioning function entails activities to develop and deliver GAWB's capital expenditure program. Activities include: ➢ Pre-feasibility, scoping and planning ➢ Non-capital creation and acquisition costs	✓ Typically captures non-capital expenditure incurred on projects where the objective is to create / decommission an asset	✓ Reporting on asset creation and de-commissioning will understate the significance of this function as it captures only the Opex component and not Capex. As such, the relevance of this function in managing performance is perhaps less than for other functional areas, but the logic of this grouping is valid ✓ Consider including in the guidance examples of costs within this function such as new technologies, investigation, consultant fees, project planning or feasibility studies ✓ Consider providing greater guidance regarding the exclusion of land acquisition and disposal (to be treated as Capital)

Function	Definition	Guidance for application	Comments and suggestions
Support Services	The Support Services function entails activities that are primarily to support the functions and operations of the other activities (and cannot be specifically allocated to a function). Activities include: ➢ Finance ➢ Procurement ➢ HR ➢ ICT ➢ Legal ➢ Provision of corporate facilities (excluding maintenance) ➢ Other administration / reception	✓ Captures day to day, business as usual activities that do not relate specifically to another functional activity, or are more appropriately categorised as supporting all business functions. ✓ Support service activities (e.g.. procurement and legal) may relate to other specific functional activities. If possible, allocation of expenditure should be made in the first instance to the more specific function before the support services function.	✓ Consider whether Internal Audit costs should be included under Strategy as a corporate activity ✓ Consider providing further guidance in relation to IT systems (SCADA not included), telecommunications and accommodation costs

Appendix B Observations from the translation of 2010 QCA Price Review Forecast

Tests	Observations
3-step Reconciliation to Source Data Control over the completeness of GAWB's expenditure translation is ensured by a three-step reconciliation conducted and documented by management. Additionally, we noted multiple check sums embedded into the calculation worksheets in order to flag any differences. ***Review objective: assess completeness***	• We have validated this reconciliation and the relevant adjustments (such as increase in QCA fees) step-by-step, and have been able to match yearly totals as per the QCA Final Report and Total Costs per Function. • It is to be noted that Other Income has been netted off from Total Costs on the translation we reviewed. However, the CFO is considering removing the netting off impact, in which case the variance left would need to be clearly documented and explained.
Allocation of Total Employment Costs (TEC) We sample tested 10 Position Descriptions to ensure that there was a reasonable basis for the functional allocation. The percentage allocations are based on relative effort and have been established through a review of PDs and consultation with the Executive Team. ***Review objective: assess accuracy***	• Other than in one case where costs had been incorrectly mapped to a function, our testing showed that the allocation across the functions was reasonable based on the PD's provided. • We were not asked to validate the percentages applied as management are comfortable that the process followed to derive the rules provides sufficient assurance over their accuracy. • Given that TEC forms the bulk of the expense base, there may be some scope to increase the transparency for the basis of allocated percentages if challenged by QCA or other stakeholders.
Consistent Mapping of G/L Accounts (non-staff) We sample tested a number of non-pay expense accounts across a number of assets to ensure consistency of treatment. ***Review objective: assess consistency***	• No discrepancies identified. • Consistency across the various forecasted periods has also been preserved by using identical calculations year after year, with a CPI increasing factor for some cost elements.

Tests	Observations
Transparency through documentation and record-keeping We inspected key work papers provided to us in order to check the clarity, accuracy and availability of supporting documentation. We also sought to verify that key assumptions applied to the translation of costs forecast were adequately documented. ***Review objective: assess transparency***	• Our assessment has relied on the adequate documentation and retention of main workings and related documents, such as the Functional Reporting Translation Approach and the reconciliation of total costs, used in the translation of costs. • The main assumptions relate to the relative effort applied to the functional allocation of individuals and to the costs baseline used as starting point for the 2010 Price Review forecast. The rationale behind the relative effort is partially documented on the Functional Reporting Translation Approach. We were not required to validate the initial costs forecast position reported in 2010, which was not based on actual expenditure at the time. • Having all costs recorded and calculated on formula-based Excel worksheets, provides the necessary flexibility to GAWB and allows for the audit trail and re-performance of all cost forecast calculations.

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2015 Price Monitoring Investigation

Gladstone Area Water Board

Appendix I – Demand Forecasting Methodology

HoustonKemp:

***Methodology for Forecasting Demand*, September 2014**

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HOUSTONKEMP
Economists

Methodology for forecasting demand

A report for the Gladstone Area Water Board

19 September 2014

Report Authors

Greg Houston

Oliver Nunn

Contact Us

Level 40, 161 Castlereagh Street
Sydney NSW 2000

Phone: +61 2 8880 4800

Disclaimer

Contents

1. Introduction

This report has been prepared by HoustonKemp at the request of the Gladstone Area Water Board (GAWB). Its subject is the appropriateness of GAWB's proposed demand forecast methodology to be adopted in the context of the review of GAWB's pricing practices for the period commencing 1 July 2015 through to 30 June 2020.

In particular, we have been asked to consider the implications of GAWB's proposed demand forecasting methodology for the level and time profile of water supply prices in the context of the Queensland Competition Authority's (QCA's) 2015 review of GAWB's pricing practices.

The principal matter we have been asked to address is the appropriateness of GAWB's proposed approach to forecasting water demand in the 15 years beyond the forthcoming five year period for which prices are to be determined in this particular review. In answering this question, we have had regard to the QCA's original rationale in adopting the 20 year price averaging period, and in particular to:

- efficiency, ie, that over time prices should align with long run marginal cost; and
- the balancing of the interests of current and future customers.

The remainder of the report is structured as follows:

- section 2 describes the context for the QCA's review, and includes a description of the essential components of GAWB's proposed methodology;
- section 3 presents our assessment of GAWB's proposed methodology; and
- section 4 summarises our findings.

2. Relevant Context

The QCA is reviewing GAWB's pricing practices ('the 2015 review') in a process that will determine the prices applicable for the five year period from 1 July 2015 to 30 June 2020. This is the fourth review of GAWB's pricing practices that has been conducted by the QCA, with the most recent having determined prices to apply for the period 1 July 2010 through to 30 June 2015.

2.1 Twenty year planning period

Notwithstanding that GAWB's prices are determined for periods of five years at a time, the QCA has conducted its last three reviews by establishing cost building blocks and corresponding annual revenue requirements over a 20 year forecast period. The basic mechanics of this process involve:

- establishing building block cost forecasts (at the level of each source and network segment) over a 20 year 'planning period';
- determining a target revenue for each source and network segment that matches the applicable 20 year building block cost forecasts in net present value (NPV) terms; and
- setting a unit price for each source and network segment that is constant in real terms, and which delivers expected revenue that is equal in NPV terms to the 20 year building block cost forecasts identified above.

The significance of the 'constant real price' constraint in determining GAWB's annual revenue profile over the 20 year planning period is that:

- GAWB's revenues over the period can be expected to grow in line with its forecast demand; and
- providing forecast water demand can be met from the existing capacity of GAWB's supply system, its building block costs are essentially flat in real terms over the period; and so
- GAWB's achieved rate of return in the early years of the planning period is well below that which is required by its estimated cost of capital.

In order to ensure that GAWB's sub-normal rate of profit ('rate of return deficit') in the early years is made up later in the 20 year planning period, when the price determination process is repeated at the subsequent price review (ie, to determine prices from year six of the 20 year period and beyond), the accumulated rate of return deficit is added to the forward looking revenue requirement from that year six (and year 11, etc, as the case may be).

The essential function of the 20 year planning period, in combination with the constant real price constraint, is to smooth GAWB's supply prices relative to what they would have been the case had a conventional five year building block process been adopted.

The rationale for adopting this approach is that GAWB's supply system has a significant degree of spare capacity that is anticipated to be taken up by growth in large industrial customer demand later in the planning period. The adoption of the smoothing mechanism means that, provided no further large augmentations are anticipated within the 20 year planning period, a portion of the cost of GAWB's current spare capacity is shifted from present to future customers. The principle of cost sharing between current and future customers was cited by the QCA as an explicit objective of the mechanism when it was first established.

We note that such a 20 year planning period approach to setting regulated prices is highly unusual, if not unique to GAWB. However, the circumstances of, and outlook for, demand growth from GAWB's customer base is also very unusual. In particular, GAWB has a relatively small number of very large customers, and a range of highly idiosyncratic factors are likely to govern the circumstances under which future customers (who are also likely to have very large requirements, but be few in number) can be expected to seek a water supply from GAWB.

2.2 GAWB's Proposed Methodology

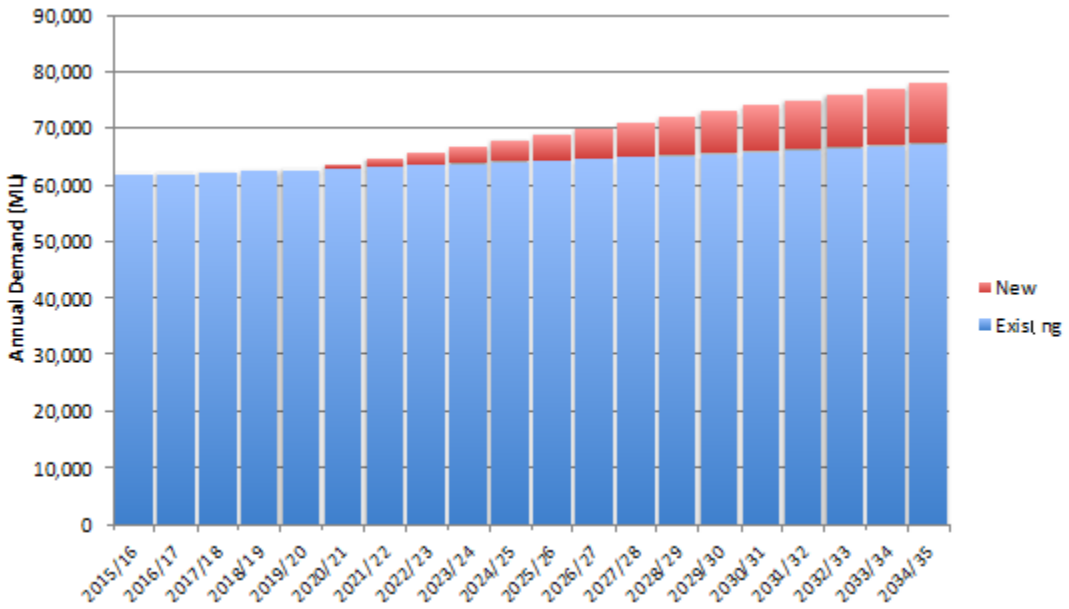
In its submission for the 2015 price review, GAWB proposes to accept the 20 year planning period approach we describe above. In addition, GAWB proposes to adopt the QCA's proposed approach to forecast demand for the first five years of the planning period (1 July 2015 to 30 June 2020).

For the period beyond 30 June 2020, GAWB has proposed that the future demand projection be set so that forecast demand:

- increases linearly from the starting point of the expected demand in the fifth year of the planning period; and
- reaches the full annual water delivery capacity capacity of Awoonga dam by 30 June 2035.

Application of this approach for the 20 year planning period gives rise to the demand forecast profile set out in Figure 1.

Figure 1 – GAWB forecast annual demand



Source: GAWB demand forecasts.

Given the 20 year planning period framework, the forecast demand growth in the last 15 years of the planning period gives rise to a reduction in the proportion of total revenue recovered in the first five years of the planning period, and an increase in the proportion of revenue recovered during the remainder of the planning period.

3. Appropriateness of Methodology

Having described the relevant context and GAWB's proposed methodology, in this section we consider the original objectives of the 20 year planning period and the appropriateness of GAWB's proposed demand forecasting methodology with reference to those objectives.

3.1 Objectives of the 20 year planning period

The QCA first developed the concept of the 20 year planning period for the setting of prices in its 2002 investigation of GAWB's pricing practices. At that time, the QCA stated that its rationale for the adoption of the 20 year planning period included that:

- the structure and level of prices over time should reflect both the long run marginal cost (LRMC) of supply and the objective of achieving revenue adequacy for GAWB;
- the uncertainty of demand and the lumpy nature of capital investment that characterise GAWB's operating environment may result in 'excess capacity' being present for significant periods of time; and
- the recovery of the costs for the 'optimised excess capacity' of Awoonga dam should be built into the price for all of GAWB's current and future anticipated customers.

In our opinion, these principles were sound at the time and remain so today – no information has emerged that would lead us to review these original principles. The question we have been asked to consider is whether GAWB's methodology is appropriate, as compared with a formal forecast of expected demand for the 20 year period, which is the approach that the QCA has previously adopted.

Our assessment hinges on three propositions or considerations:

- demand for water supplied by GAWB is so uncertain that best estimates provide no benefit over the projection method proposed by GAWB;
- given the significant uncertainty and idiosyncracies associated with future water demand, the practical application of any forward-looking estimate of long run marginal cost is unlikely to provide much guidance for decisions on the optimal time profile of prices;
- the efficient development of GAWB's water supply arrangements will necessarily be associated with prolonged periods of surplus capacity, and an important function of the demand forecast for the last 15 years of the planning period is to apportion these costs; and
- GAWB's proposed approach best serves the objective of smoothing the cost of the existing surplus capacity, so that current customers do not bear that cost to a disproportionate extent.

We discuss each of these perspectives below.

3.2 Uncertainty of demand forecasts

The approach to setting demand forecasts for the last 15 years of the planning period adopted hitherto by the QCA is to use an estimate of future expected demand – this amounts to the use of a 'best guess' of demand over the 20 year period.

We describe GAWB's approach in the previous section. GAWB acknowledges that its proposed approach to forecasting demand in the last 15 years of the planning period is not intended to reflect an explicit, year-by-year assessment of future expected outcomes, and indeed is

independent of its capital planning program. Instead, GAWB's approach ultimately has been designed with a different objective in mind – the apportionment of costs between current and future users.

The merits of each approach depend in large part on the degree to which it is possible to make accurate forecasts of demand. Were it possible to know future demand with perfect foresight, the QCA's explicit forecast approach would be preferable. Conversely, if forecasts are no more reliable than a random choice, as we explain below, GAWB's consistent and predictable approach is more likely to offer greater benefits.

GAWB faces considerable uncertainty in terms of its future demand, primarily because a relatively small number of existing industrial customers account for a large proportion of demand – GAWB has just 20 or so customers and around 97 per cent of its revenue derives from only ten. Moreover, the potential development of a small number of large industrial projects will determine the trajectory of demand.

The lumpy and indivisible nature of these industrial projects means that the commissioning, closure, or deferral of any single project can have a significant effect on the GAWB's future water demand. Prediction of the timing of these projects is inherently difficult, particularly in the long term. GAWB's submission presents evidence that supports this conclusion.

In our opinion, the uncertainty as to future demand is sufficiently great that a 'best estimate' is unlikely to outperform a rule-based projection. Further, the adoption of considered forecasts that are likely to change significantly from one planning period to the next may introduce unnecessary uncertainty and variability into the price determination process, outweighing any perceived benefits of improved accuracy of forecasting.

3.3 LRMC-principles provide limited guidance

The QCA has correctly identified that the structure and level of prices should reflect not only the long run marginal cost of future water supply (primarily, a price structure question) but also the need for GAWB's costs to be recovered (which primarily concerns the average price level).

In our opinion, the particular circumstances applying to GAWB mean that the weight normally given to long run marginal cost principles is unlikely to be capable of providing much guidance for the choice of planning period demand forecast methodology (and so the time profile of GAWB's water supply prices).

The idiosyncratic nature of GAWB's existing and future potential customer base means that any properly developed, forward-looking estimate of long run marginal cost would be highly contingent on the anticipated future decisions of a small number of large existing and potential customers. For example, if the next change in GAWB's contracted demand was to be the exit of a major customer, then LRMC principles would call for GAWB's price structure to signal ample availability of future supplies.

On the other hand, if a major new customer was to emerge, then GAWB's prices would ideally signal the converse, ie, the likely need to bring forward the next and relatively expensive increment to water supply capacity.

If these two scenarios each had a similar likelihood, then the forward-looking LRMC of GAWB's water supply would have a very wide plausible range, so that the practical application of this principle provides little guidance. Further, since GAWB's existing (and any future potential) are all under contracts that require it consult as to the price effects of any major supply augmentation, this

process is itself likely to elicit the economically efficient responses to any future potential investment that would otherwise sought to be achieved through LRMC-based price signals in circumstances where prices are the principal means of guidance for efficient consumption decisions.

It follows that the revenue adequacy pricing principle cited by the QCA is likely to have far more utility for guiding decisions on the time profile of GAWB's revenues than is the desirability of prices reflecting the level and time profile of LRMC. In the particular and unusual circumstances faced by GAWB, giving weight to LRMC is unlikely to offer much guidance.

3.4 Demand forecasts act to apportion costs of surplus capacity

Consistent with the idea that the more important dimension of the LRMC and revenue adequacy pricing principles cited by the QCA is likely to be the latter, it is important to be clear about the effect of adopting such a long time horizon ('a 20 year planning period') for the price determination process. Put another way, does an inability to forecast long term demand undermine the 20 year planning period?

The lumpy nature of capital investment associated with major water supply augmentations (such as GAWB's Awoonga Dam) necessitates that efficient long term supply arrangements will necessarily be associated with prolonged periods of 'surplus' capacity. The 20 year planning period adopted for the determination of GAWB's water supply prices provides a mechanism by which the costs of the surplus capacity can be apportioned as between current and future users. Even if long term forecasts turn out not to be accurate, they serve as the mechanism that underpins the apportionment.

Once it is recognised that the long term demand forecast is highly uncertain, its principal purpose becomes the apportionment of costs (or, the profiling of prices) as between current and future users – it determines who should pay for GAWB's existing water supply capacity, and when.

3.5 Balancing cost recovery between current and future customers

Given that the principal purpose of the long term demand forecast in the 20 year planning framework is to apportion costs between current and future users and so to smooth the recovery of the cost of GAWB's current surplus capacity, the principal consideration in choosing between one forecast methodology and another is to ensure that current customers do not bear that cost to a disproportionate extent.

Of the two potential approaches, that proposed by GAWB has the advantage of providing a consistent mechanism to apportion these costs. In contrast, the QCA's approach is dependent on an explicit forecast of demand, which is likely to vary significantly from one pricing period to the next, thereby introducing uncertainty.

In our opinion, the uncertainty so introduced is not associated with any benefit, and so we conclude that GAWB's approach is the more appropriate of the two.

4. Summary and Conclusion

The adoption of a 20 year planning period for GAWB's costs and required revenues, and a constant real price constraint over that period for the determination of GAWB's prices to apply for the next five years gives rise to the need for a demand forecast out to 2035. GAWB proposes to adopt the assumption that, from 2020 onwards, its existing surplus water supply capacity will be used up over the remaining 15 years in uniform annual increments.

We have assessed this methodology by reference to principles identified by the QCA. In our opinion, it is more appropriate than the alternative of adopting a considered forecast of year-by-year customer demand, because:

- future demand for water supplied by GAWB is so uncertain that a best estimate approach adds no insight as compared with the projection method proposed by GAWB;
- the significant uncertainties and idiosyncracies associated with future demand mean that revenue adequacy offers much more practical guidance to the time profile of prices than any estimate of long run marginal cost;
- the principal function of GAWB's planning period demand forecast is therefore to apportion the cost of its existing, surplus (but efficient) capacity between present and future customers; and
- GAWB's proposed approach best serves the objective of smoothing the cost of the existing surplus capacity, so that current customers do not bear that cost to a disproportionate extent.

HOUSTONKEMP
Economists

Level 40, 161 Castlereagh Street,
Sydney, NSW, 2000
Phone: +61 2 8880 4800

2015 Price Monitoring Investigation

Gladstone Area Water Board

Appendix J – Offline Storage and Standby Pump System Multi Criteria Analysis

CDM Smith:

***Offline Storage and Standby Pump System – Multi Criteria Analysis*, September 2014**

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21 McLachlan St
Fortitude Valley
QLD 4006
Telephone: +61 7 3828 6900
Fax: +61 7 3828 6999

12 September 2014
Project Number: BWR140004.01

Mr Terry Ward
Infrastructure Planning and Delivery Manager
Gladstone Area Water Board
PO Box 466
Gladstone QLD 4680

Dear Sir

RE: Offline Storage and Standby Pump System – Multi Criteria Analysis

Background

Gladstone Area Water Board (GAWB) owns and operates bulk treated (potable) and raw (non-potable) water storage and supply system and is the sole source of water for the Gladstone region of Central Queensland. Assets include:

- Awoonga Dam on the Boyne River and raw water pumping station;
- 121 km of raw water pipelines including raw water reservoirs at Gladstone (50ML and 16ML) and Toolooa (50ML);
- Water Treatment Plants at Gladstone and Yarwun; and
- 90 km of treated water pipeline including treated water reservoirs at Boyne Island, East End, Golegumma, South Gladstone, Mt Miller, Gladstone Clearwater and Yarwun Clearwater.

The current operating arrangement is to pump raw water from Awoonga Dam to Toolooa Reservoir and the water is then distributed throughout the network under gravity. GAWB maintains a nominal 24 hours reserve storage capacity in the system to allow for pipe breaks and pumping issues. There is limited time available for preventive or corrective maintenance on critical pumping and pipe infrastructure, or in response to an unforeseen significant events requiring greater than 24 hours to rectify, without potentially causing significant interruption to supply.

Since 2009, GAWB has commissioned numerous studies to identify a practical and cost effective solution to mitigate this risk and improve the reliability of supply. The option identified is the proposed Offline Storage and Standby Pumping System. The intent of the system is to provide a short term water supply independent of Awoonga Dam and the associated outlet structure, critical pipe work and Awoonga Pump Station such that:

- Scheduled major maintenance can be implemented without numerous high risk and short duration shutdowns; and

- That in the event of a major failure of critical infrastructure (concentrated at Awoonga), water supply to Gladstone and Gladstone industries may be maintained.

The Queensland Competition Authority (QCA) will later this year be undertaking, as part of a larger water pricing review, a review of GAWB's proposed 5 year capital works program (2015 -2020). A significant component of this program is the proposed Offline Storage and Standby Pumping System.

GAWB previously commissioned CDM Smith Australia Pty Ltd to prepare a project justification review of the Offline Storage System, for consideration by the QCA. That work is finalised in a separate CDM Smith letter dated 3 September 2014.

Subsequently GAWB commissioned CDM Smith Australia Pty Ltd to undertake a high level Muliti Criteria Analysis (MCA) considering all viable alternatives to the Offline Storage. The MCA was undertaken in a mini-workshop with a representative of GAWB, and considering information from previous reports. This report documents the outcomes of that workshop.

Previous Work

The MCA was based on the information contained in the following documents provided by GAWB which included outcomes of previous workshops undertaken by GAWB.

Reports

1. Storage / Pumping Options Due Diligence Review, R2A Due Diligence Engineers, July 2010 including the following reports as Appendices:
    - Appendix A R2A Critical Assets Due Diligence Review (February 2009)
    - Appendix B Aurecon Off-line Storage Feasibility Study Report (12 January 2010)
    - Appendix C R2A Off-line Storage Feasibility Study review letter (1 February 2010)
    - Appendix D GHD Report for Awoonga Dam-Dam Maintenance Requirements & effects on reliability of Supply (May 2010)
    - Appendix E Aurecon Conceptual Design Report Standby Storage / Pumping System (12 July 2010)
2. Conceptual Design Report Standby Storage/Pumping System, Aurecon, 14 September 2010
3. Planning and Environmental Approvals Plan – Offline Storage, Cardno, June 2013
4. Proposed GAWB Augmented Storage - Factual Report Geotechnical Investigations, Cardno Bowler, 3 July 2013

5. Offline Storage – Concept Development Report, Cardno, September 2013
6. Offline Storage Civil Drawings, Cardno
7. Offline Storage Pump Station Drawings, Cardno
8. Offline Storage Structural Drawings, Cardno
9. Offline Storage Electrical Drawings

GAWB Documents

10. Business Case: OP2010-035 Offline Storage (Planning Phase), July 2012
11. GAWB Offline Storage Reservoir Control Philosophy, undated
12. GAWB Offline Storage Capital Works Cost Estimate, 31 January 2014

MCA Methodology

The MCA was essentially undertaken in a mini-workshop held in CDM Smith's offices in Fortitude Valley Brisbane on 19 August 2014. The workshop participants were:

- Terry Ward, Infrastructure Planning and Delivery Manager, GAWB; and
- David Murray, Principal Engineer, CDM Smith

The following agenda was followed:

- Develop criteria for the option assessment;
- Develop weightings for each criteria using a Paired Comparison Analysis;
- Identify options to assess; and
- Rate each of the options against the criteria.

Workshop Outcomes

Assessment Criteria

The criteria used in the Business case (Reference 10) were adopted with some modification and additions as follows:

Risk mitigation	To what extent does the option mitigate the risks of planned and unplanned events
Cost	Capital cost operating cost
Staging and ability to upgrade	Option to meet future demands and or ease of upgrades to meet future demands.
Raw water quality	Potential impact on the quality of water entering the WTP both advantageous or disadvantageous
Complexity of operation and maintenance	Potential to introduce new and / or increase high risk activities required to operate and maintain the option
Stakeholder impacts	Potential impacts on external stakeholders excluding customers

Criteria Weighting

The criteria weighting were determined using Paired Comparison Analysis. This is a tool for weighing up the relative importance of different options. It's particularly helpful where priorities aren't clear, where the options are completely different, where evaluation criteria are subjective, or where they're competing in importance.

The tool provides a framework for comparing individual options against all others, and helps to show the difference in importance between factors.

The results of this analysis are shown below.

Option	A: Risk	B: Cost	C: Staging	D: Raw water	E: O&M	F: Stakeholde
A: Risk		A, 2	A, 3	A, 1	A, 2	A, 1
B: Cost			B, 3	B, 1	B, 1	B, 1
C: Staging				D, 1	E, 2	F, 1
D: Raw water					D, 1	-
E: O&M						-
F: Stakeholde						

Option	Total	Rank
A: Risk	9	1
B: Cost	6	2
C: Staging	-	6
D: Raw water	2	3
E: O&M	2	3
F: Stakeholde	1	5

Using the outcomes of this comparison as guide and based on the experience and project understanding of the workshop participants the following weightings were agreed.

Criteria		Weighting
Risk mitigation	To what extent does the option mitigate the risks of planned and unplanned events	40%
Cost	Capital cost operating cost	30%
Staging and ability to upgrade	Option to meet future demands and or ease of upgrades to meet future demands.	5%
Raw water quality	Potential impact on the quality of water entering the WTP both advantageous or disadvantageous	10%
Complexity of operation and maintenance	Potential to introduce new and / or increase high risk activities required to operate and maintain the option	10%
Stakeholder impacts	Potential impacts on external stakeholders excluding customers	5%

Options Assessed

The preferred options identified in the Business Case Study (Reference 10) were assessed namely:

- Offline Storage at Site 2; and
- Pontoon Pump Station on Awoonga Dam.

The Pontoon Pump Station does not mitigate the risks to the same extent as Offline Storage Option ie risks of failure associated with the transfer system between Awoonga Dam and Toolooa Reservoir. It was considered that the option of a Pontoon Pump Station with a redundant pipeline between Awoonga Dam and Toolooa Reservoir should also be assessed.

The final option assessed was the "do nothing" or undertake temporary works as necessary for planned and unplanned maintenance.

Option Rating

Each option was scored against each criteria using a 1 to 10 scoring system. The scores as shown below were a consensus view of the workshop participants based on the information in the documents referenced above, the experience and project understanding of workshop participants.

	Risk	Cost	Staging	Raw water	O&M	Stake-holder	Total Score	Rank
	40%	30%	5%	10%	10%	5%		
Temporary works as necessary	1	10	10	6	1	10	5.10	4
Pontoon pump station	5	10	7	4	7	10	6.95	2
Pontoon pump station plus pipeline	8	2	7	4	7	8	5.65	3
Off-line storage at Site 2	10	5	4	8	10	8	7.90	1

The following summarises the considerations and rationale for the adopted scores.

Risk mitigation	Temporary works is considered as very high risk with limited or no ability to respond to unplanned events. Pontoon pump station has indefinite pumping capability but does not mitigate risks associated with Awoonga Gladstone pipeline failure and more widespread risk that may impact Awoonga Dam area such as electrical power supply failure and the loss of road access during flooding. In addition the pontoon creates additional risks such as operability during flooding, debris impacting the floating pipeline from the pontoon to the shore and operational risks. For example the pontoon design has been based on the Eungella Dam Pontoon. This requires stays to anchor the pontoon to the base of reservoir. It is vital that these anchors are maintained and operated correctly particularly during flooding to avoid a catastrophic failure of the pontoon. Pontoon Pump Station plus pipeline has indefinite pumping capability but does not mitigate the risks more widespread risk that may impact Awoonga Dam area such as electrical power supply failure and the loss of road access during flooding. Similarly to above the pontoon creates additional risks such as operability during flooding and operational risks. Offline Storage does mitigate all of the identified risks. Intrinsically an additional storage as close as possible to customers is the best option to address supply risk and there is precedence for this approach. For example the Eungella to Moranbah Pipeline (1997) was designed with two large in line storages towards the end of the pipeline specifically for this purpose.
Cost	Temporary works least cost, though still significant. O&M costs high but short term only. Pontoon Pump station has the lowest capital cost and while the operating costs are high the operation of the pump station would be relatively infrequent. Pontoon Pump Station plus pipeline has the highest capital costs mainly driven by the cost of the pipeline. While the operating costs are high the operation of the pump station would be relatively infrequent.. Offline Storage capital costs are significant and lie between the two pontoon options. Operating costs moderate. It should be noted that as a result of the more detailed work done to date, there is more certainty regarding the offline storage costs (limited downside $risk) than pontoon pump station costs which

	potentially has a more substantial implementation cost risks.
Staging and ability to upgrade	Temporary works have full flexibity to suit current needs. Pontoon Pump Station & Pontoon Pump Station + pipeline have potential for pump / impeller / motor upgrades to suit needs. (Depending on electrical systems). Offline Storage – capacity can be increased but at significant cost.
Raw water quality	Temporary works – limited ability to select draw level and location from Awoonga and as such offers no advantages. Pontoon Pump Station & Pontoon Pump Station + pipeline have very limited ability to select draw level and location from Awoonga and as such offers no advantages. There is the potential for water quality issues in Awoonga Dam. The offline storage option provides an alternative water source to Awoonga. It offers the potential advantages of and alternative water supply in major flood or extreme high BGA in Awoonga.
Complexity of operation and maintenance	Temporary Works: Response to planned events requires temporary pumping and pipework, which would impact on available O&M resources, and which would be more complicated less safe to operate than permanent works. Pontoon Pump Station & Pontoon Pump Station + pipeline have working over water and related difficult access issues. Offline Storage introduces another major storage, pump station accessible and similar to existing systems, and integrates well with existing pipeline & reservoir arrangements.
Stakeholder impacts	Temporary Works & Pontoon Pump Station have no material external impacts. Pontoon Pump Station + pipeline has pipeline construction impacts Offline Storage has visual, earthworks construction impacts.

Discussion on Outcomes

The MCA clearly identifies the Offline Storage at Site 2 as the preferred option. Intrinsically an additional storage as close as possible to customers is the best option to address supply risk and there is precedence for this approach. For example the Eungella to Moranbah

Pipeline (1997) was designed with two large in line storage towards the end of the pipeline specifically for this purpose.

The lower cost Pontoon Pump Station on Awoonga Dam scores a significantly lower rating. The reason is that the pontoon pump station does not mitigate risks associated with Awoonga Gladstone pipeline failure and more widespread risk that may impact Awoonga Dam area such as electrical power supply failure and the loss of road access during flooding. In addition as discussed above, the pontoon creates additional risks such as operability during flooding, debris impacting the floating pipeline from the pontoon to the shore and operational risks.

It should also be noted that there is more certainty regarding the cost of Offline Storage option than the Pontoon Pump Station options. As such there a greater likelihood that the cost differential between the Offline Storage option and Pontoon Pump Station option is not as great as has been scored; further reinforcing the Offline Storage option as the preferred option.

Notwithstanding that the outcome of the MCA appears to be fairly conclusive, the outcome is based on the subjective scores given to the criteria by the two workshop participants. To verify the veracity of the process, the sensitivity of the option ranking was tested by taking a more pessimistic view of the scoring of the preferred option, the Offline Storage option and arbitrarily reducing the scores as follows:

1) Impact of lower "Cost" score, two point reduction:

	Risk	Cost	Staging	Raw water	O&M	Stake-holder	Total Score
	40%	30%	5%	10%	10%	5%	
Off-line storage at Site 2	10	3	4	8	10	8	7.30

2) Impact of lower "Risk" score (largest weighted parameter), two point reduction:

	Risk	Cost	Staging	Raw water	O&M	Stake-holder	Total Score
	40%	30%	5%	10%	10%	5%	
Off-line storage at Site 2	8	5	4	8	10	8	7.10

3) Impact of lower scores one point each for all parameters except cost (which is reasonably well defined):

	Risk	Cost	Staging	Raw water	O&M	Stake-holder	Total Score
	40%	30%	5%	10%	10%	5%	
Off-line storage at Site 2	9	5	3	7	9	7	7.2

In all three case the Offline Storage option still scores higher than the second rank option; the Pontoon Pump Station option and as such the option ranking remains unchanged.

Conclusions

GAWB owns and operates bulk treated (potable) and raw (non-potable) water storage and supply system and is the sole source of water for the Gladstone region of Central Queensland. The system relies on a single supply source at Awoonga Dam.

Since the system relies on a single source of supply, GAWB has commissioned numerous studies to identify cost effective solution to mitigate interruption to supply risks and improve the reliability of supply.

The Multi Criteria Analysis of the preferred option confirms the outcome of previous studies that the preferred option is an offline storage and pump station near the Toolooa Reservior ("Site 2").

The intent of the system is to provide a short term water supply independent of Awoonga Dam and the associated outlet structure, critical pipe work and Awoonga Pump Station such that:

- Scheduled major maintenance can be implemented without numerous high risk and short duration shutdowns; and
- That in the event of a major failure of critical infrastructure (concentrated at Awoonga), water supply to Gladstone and Gladstone industries may be maintained.

Gladstone Area Water Board
Offline Storage and Standby Pump System - Project Justification
12 September 2014

Regards,

David Murray
Principal Engineer

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2015 Price Monitoring Investigation

Gladstone Area Water Board

Appendix K – Weighted Average Cost of Capital

Synergies:

***Review of the WACC to apply to GAWB for Pricing Purposes*, September 2014**

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Synergies
ECONOMIC CONSULTING

Review of the WACC to apply to GAWB for pricing purposes

September 2014

Synergies Economic Consulting Pty Ltd
www.synergies.com.au

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Synergies
ECONOMIC CONSULTING

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Figures and Tables

1 Purpose and Scope

1.1 Background

Synergies Economic Consulting (Synergies) has been requested by Gladstone Area Water Board (GAWB) to provide advice on the Weighted Average Cost of Capital (WACC) to apply for pricing purposes for the 2015-20 period.

The Queensland Competition Authority (QCA) has been directed by the Treasurer and Minister for Trade to undertake a price monitoring investigation, including consultation. This is a more light-handed form of regulation compared to past reviews.

The Ministerial Direction notice requires that for the purpose of assessing the rate of return, the QCA is to consider the WACC applied by GAWB against a 'benchmark WACC'. The QCA's proposed benchmark WACC will not be published before GAWB is required to submit its proposed pricing practices to the QCA.

In the absence of knowing what the QCA's proposed benchmark WACC will be, GAWB needs to apply an indicative WACC for the purpose of preparing indicative prices. Once the QCA's proposed benchmark WACC has been published, GAWB will be able to consider and respond to this via submissions.

We have been asked to develop this indicative WACC estimate, having regard to relevant QCA precedent. This includes examining the Final Decisions published by the QCA on its WACC methodology review at the end of August 2014. Reference can also be made to the QCA's Position Paper on the WACC to apply to the SEQ water retailers under the long term price monitoring framework, which was also published at the end of August 2014, although these businesses are subject to different pricing and regulatory arrangements.

1.2 Implications of the Benchmark WACC

The implications of the 'benchmark WACC' remain uncertain in this context. In its Position Paper for the SEQ water retailers, the QCA makes it clear that:[1]

> Consistent with the light-handed nature of the proposed regulatory framework to allow retailers to have control over their WACCs, it is not proposed that the benchmark WACC be prescribed by QCA for use by water retailers.

[1] Queensland Competition Authority (2014a). Position Paper, Long Term Framework for SEQ Water Retailers – Weighted Average Cost of Capital (WACC), p.1.

> However, the approaches and methodologies outlined in this paper are intended to inform water retailers on the approach the QCA considers appropriate for the determination of the WACC when monitoring retailers' performance.

Accordingly, while the WACC is not prescribed, the implications of the business adopting a different WACC remain unclear. Section 26 of the *Queensland Competition Authority Act 1997* (the QCA Act), provides that a price monitoring investigation may consider "the appropriate rate of return on assets". Other matters that it may have regard to include (amongst other things):

- the need for efficient resource allocation;
- the need to promote competition;
- the protection of consumers from abuse of monopoly power;
- social welfare and equity considerations; and
- the need for pricing practices not to discourage socially desirable investment or innovation by government agencies and persons carrying on non-government business activities.

We would presume that for the purpose of setting WACC, a key consideration would be whether a different (higher) WACC could be seen as an abuse of monopoly power by allowing the business to earn above-normal profits. It is not clear if the QCA would make this assessment against its own benchmark WACC, or how this would be done.

1.3 Approach

For the purpose of assessing the indicative WACC, it is necessary to form a view on:

- the approaches and parameters that are not industry-specific (or 'market wide' parameters), which includes the market risk premium, the debt beta, gamma and the methodology used to estimate the return on debt;
- parameters that are specific to GAWB, being gearing and beta.

We can assume that the QCA's approach to the market-wide parameters will be based on its recent Final Decisions for its WACC methodology review. The starting point for gearing and beta has been the values previously determined for GAWB for its 2010-15 pricing period. We have considered whether there has been any material changes to GAWB's risk profile or relevant market evidence that would warrant a different value.

The balance of this report addresses the key WACC parameters and approaches.

2 Term to maturity for the risk free rate and debt margin

The QCA's recent WACC Final Decisions and Position Paper for the SEQ water retailers reaffirmed its practice of aligning the term of the risk free rate to the length of the regulatory period. We note that in the case of the SEQ water retailers, it is proposing a term to maturity of one year, given:

- the proposed long-term regulatory framework consists of annual performance reviews, although no specified regulatory or monitoring review period; and
- the water retailers set their prices annually.

In our view, the concept of a finite 'regulatory period' is not relevant to a price monitored business. We note that in GAWB's case, the QCA has previously adopted a 20-year planning period, with prices set so that the NPV of forecast revenue equates to target revenue over that time horizon. Its relevant pricing horizon is therefore at least twenty years.

In any case, we do not agree with the QCA's approach. Noting that this is an issue that has already been subject to numerous submissions that have been rejected by the QCA (having regard to the advice of its consultant, Martin Lally), we briefly summarise our position below.

2.1 Approach applied by other regulators

The QCA maintains the view that its practice is necessary in order to achieve a NPV=0 outcome. It also states that this is necessary to meet the objectives of the QCA Act[2], including the objects clause, which promotes the efficient utilisation of, and investment in, the relevant infrastructure[3]. The objects clause is a feature of all third party access regimes in Australia.

The QCA has also stated that:[4]

> …the NPV = 0 Principle is not a new development in the practice of economic regulation. The Building Blocks Model applied by the QCA and economic regulators in Australia follows directly from the NPV = 0 Principle.

[2] Queensland Competition Authority (2014b). Final Decision, Cost of Capital, Market Parameters, August.

[3] Section 69E

[4] Queensland Competition Authority (2014b). p.6.

The QCA and the Economic Regulation Authority (ERA) in WA are the only Australian regulators that adopt a term to maturity equal to the regulatory period[5]. Most regulators adopt the more conventional approach of a ten year term to maturity. These regulators include:

- the Australian Competition and Consumer Commission (including its 2014 State Water decision);
- the Australian Energy Regulator (AER);
- the Independent Pricing and Regulatory Tribunal (IPART);
- the Essential Services Commission (ESC); and
- the Essential Services Commission of South Australia (ESCOSA).

IPART's decision to revert from aligning with the QCA's practice, to adopting a ten year term to maturity, was only made relatively recently as part of its cross-industry WACC methodology review.

There are three main reasons cited.[6] First, IPART argued that a ten year term to maturity is more consistent with its objective of setting the WACC for an efficient benchmark entity operating in a competitive market. This objective is similarly relevant to the QCA's assessment of a benchmark WACC for GAWB.

Second, it accepted that similar firms in a competitive market are likely to raise funds for longer periods. Investors also have horizons of ten years or longer. The QCA has acknowledged this in relation to debt funding, but not for equity (where the implication of its approach is that an equity investor's horizon equates to the relevant regulatory period, or in the case of the SEQ water retailers, one year). Third, IPART accepted an argument that NPV neutrality is less relevant to it given its new methodology sets the WACC with reference to both short term estimates (reflecting the cost of a new entrant) and long term averages.

The QCA has inferred its approach is a necessary feature of the application of the building blocks methodology, which all Australian regulators use. As noted above, all third party access regimes in Australia are governed by the same objects clause. In terms of current Australian regulatory practice, more Australian regulators apply a ten year term to maturity than align it to the length of the regulatory period. The implication of

[5] The ERA does not apply this in rail. It has applied ten years here because this is seen as compliant with the relevant legislation, which refers to the WACC as being "long term".

[6] Independent Pricing and Regulatory Tribunal (2013). Review of WACC Methodology – Research, Final Report, December.

the QCA's reasoning is that other Australian regulators are knowingly applying a practice that would result in above-normal returns being earned.

The QCA clearly has a different view on this issue to other Australian regulators (it acknowledges that it disagrees with IPART's position, for example[7]). However, this different view has a direct practical consequence as it will lead to lower rate of return outcomes for the businesses it regulates compared to similar network businesses in other states (assuming a normal yield curve). Holding all other variables constant, this in turn will result in the QCA's WACC being under-estimated, which will not promote the objects clause as it could result in under-investment in necessary infrastructure. It is also means that businesses will recover something less than the efficient benchmark costs of providing their service.

Accepting that this difference in view exists, the key point we would make is that if the QCA applies a term to maturity of less than ten years in setting the benchmark WACC, and the price monitored business assumes a ten year term to maturity for pricing purposes, it is not reasonable to suggest that this business is misusing its market power. Not only is that business applying an assumption that is widely adopted in commercial practice, it is also currently supported by the weight of Australian regulatory practice.

If the QCA was to adopt its proposed practice – and use a term to maturity reflecting the price monitoring period – then the QCA would need to consider the relevance of the five years (2015-2020) stated in the Direction Notice. Consistent with past QCA reviews, GAWB has continued to adopt a 20 year timeframe for pricing and cost recovery. Accordingly it could equally be argued that in applying the QCA's approach, a 20 year period should be adopted.

2.2 Conclusion

We therefore recommend the application of a ten year term to maturity for the risk-free rate and debt margin for GAWB's indicative prices. To calculate the indicative WACC, we have averaged the ten year Commonwealth Government bond yield over the twenty days ending 31 July 2014 (using Bloomberg data). This has been converted to an annual effective rate. The resulting estimate is 3.53%. We understand that these estimates will be updated when prices are finalised for the next period.

[7] Queensland Competition Authority (2014b). p.13.

3 Gearing

In the 2010-15 pricing review the QCA approved a capital structure of 50% with an associated BBB credit rating, consistent with GAWB's proposal. In arriving at this decision it referred to a 2005 report produced by the Allen Consulting Group, which highlighted that GAWB was exposed to more demand and weather-related risks than other water businesses. A report by PwC, commissioned by the QCA for the 2010-15 review, also considered that GAWB had a higher risk profile than comparable metropolitan water businesses given those businesses have a more diverse industrial and commercial customer base. This was seen as supporting a capital structure of 50%.

Reference can be made to the average gearing levels maintained by the listed US and UK water businesses that have been used in the beta analysis (refer Table 1 below). For example, over the last five years:

- the average debt to total capital ratio for 12 US firms was 38% (or 45% if two firms with extremely low gearing compared to the rest of the sample are excluded);
- the average debt to total capital ratio for the four UK firms was considerably higher, at 71%.

Caution must be exercised in drawing any firm conclusions from the above given jurisdictional differences that could affect borrowing conditions (including bankruptcy laws[8]), noting the significant difference between the UK and US firms. We would also note that most of the firms in this sample are large metropolitan water networks that provide services to a diverse customer base (i.e. residential, commercial and industrial demand).

We agree that GAWB's risk profile is fundamentally different to the other water businesses regulated or monitored by the QCA (and most other regulated water utilities in Australia), with industrial customers accounting for around 80% of its demand in volume terms. We consider that the assessment made in the 2010-15 pricing review remains appropriate and have therefore applied a gearing assumption of 50% to calculate the indicative WACC. We have no evidence to suggest that this is no longer consistent with a notional credit rating of BBB.

[8] As noted by Lally in: M. Lally (2011). The Estimated WACC for the SEQ Interim Price Monitoring.

4 Return on equity

4.1 Model

The QCA continues to apply the Sharpe-Lintner Capital Asset Pricing Model (SL CAPM). It is noted that the limitations of the SL CAPM have received more prominence in regulation, particularly following the Global Financial Crisis (GFC).

In the context of recent changes made by the Australian Energy Market Commission (AEMC) to the framework used to regulate energy network businesses (the National Electricity Rules and the National Gas Rules (the Rules)), there has been increased recognition of the limitations of the SL CAPM and the outcomes it has been producing when applied in a prescriptive, formulaic way, as has been the practice of most Australian regulators.[9] One of these limitations is that it has been shown to under-estimate the return on equity for low beta stocks, which is particularly relevant to a water network.

The Rules now provide that 'all relevant estimation methods, models, financial market data and other evidence' must be taken into account by the AER in determining the allowed rate of return. However, the AER's Rate of Return Guideline that was produced following these Rule changes still retains SL CAPM as its core 'foundation model', while using other models to inform its parameter estimates.

While we are of the view that other relevant asset pricing models could be given more prominence in estimating the required return on equity, we accept that the QCA would not adopt such a fundamental change in approach outside of a broader WACC methodology review (noting that the alternatives to the SL CAPM were not within the scope of the review that it recently concluded). We have therefore applied the SL CAPM here.

4.2 Risk free rate

For the reasons outlined above, we have estimated the risk free rate based on a ten year term to maturity.

[9] Australian Energy Market Commission (2012). Final Position Paper, National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012.

4.3 Market risk premium

While we have concerns with some of the evidence relied upon by the QCA to estimate the MRP, as well as its decision to give very limited weight to relevant evidence such as the Wright approach, we endorse its recognition of the need to apply a more flexible approach to estimate the MRP, having regard to prevailing market conditions. We are assuming that in setting GAWB's benchmark WACC, it will apply its most recently assessed estimate of 6.5%. We have applied that value for GAWB in setting the indicative WACC.

4.4 Beta

In the 2010-15 review the QCA approved an asset beta of 0.4 for GAWB. Based on a debt beta of 0.11, gearing of 50% and a gamma of 0.5, this equated to an equity beta of 0.65. We note that the QCA's decision to apply an asset beta of 0.4, which was consistent with its 2005 review, was based on an assessment that its systematic risk has remained unchanged. This remains slightly higher than the betas it has applied to metropolitan water networks and irrigation schemes.

We consider that there is a fundamental difference between GAWB's risk profile compared to a metropolitan water network. As noted above, around 80% of GAWB's volumes are accounted for by industrial customers. This contrasts with a metropolitan water network, which will have a significant component of residential demand as well as a more diverse industrial and commercial customer base.

Despite the existence of term contracts with industrial customers, this only provides GAWB with revenue protection for the term of that contract, and then only while that customer remains solvent. This is not just a credit risk issue, as the profitability (and viability) of its industrial customers will be correlated with domestic economic activity. Accordingly, it is not considered appropriate to equate GAWB's risk profile with a metropolitan water network, which has a more diversified customer base, with a portion of this demand (i.e. residential) being largely insensitive to domestic economic activity over the very long run.

The QCA has also previously assessed irrigation schemes to have even lower systematic risk based on a number of factors that are seen to result in a low correlation with domestic economic activity, which also depends on the extent to which demand is influenced by the availability of water.[10]

[10] Queensland Competition Authority (2013). Final Report, Seqwater Irrigation Price Review 2013-17, Volume 1.

4.4.1 Comparable companies analysis

Consistent with the approach that is typically applied by the QCA, we have also undertaken an updated comparable companies assessment. As there are no listed Australian water businesses we have looked at overseas firms in developed economies, primarily in the US and UK (which have also been examined by Australian regulators, including the QCA and IPART).

The initial pool of comparator firms from which the final sample was derived was selected using the Global Industry Classification Standard (GICS) function available through Bloomberg. In total, 102 water utility companies were identified from around the world.

The sample was then limited to firms that are primarily involved in the transportation, storage, treatment and/or distribution of water. Companies in developing economies were excluded, as well as firms that operate in a very different regulatory environment (such as China). Using this methodology, only 24 firms of the initial 102 were identified as possible comparators.

Monthly returns data for the five years from 31 August 2009 to 31 July 2014 was used for the calculation of the equity betas for the remaining firms. Returns data for four of the firms was either unavailable or only partially available. As a result, three of the firms were excluded from the comparator sample at this stage, while one firm (Eaux de Douai) was provisionally included as only two months of returns data was unavailable. Each firm's returns were regressed against the major sharemarket index in their jurisdiction.[11]

The beta estimates were calculated using the Ordinary Least Squares (OLS) method. Estimates which had a t-statistic of less than two or an R-squared of less than 0.1 were excluded as they were considered too unreliable. This resulted in eight firms, including three of the UK based firms, being excluded from the sample.

Annual debt to equity data for the five years from 31 July 2009 to 31 July 2014 was used to calculate the average debt to equity ratio. This average ratio was then used in the Conine de-levering formula for the calculation of the asset betas, given this is the preferred approach of the QCA. A gamma of 0.5 and a debt beta of 0.11 was assumed for this analysis. (Subsequently the QCA's lower gamma of 0.47 does not have a material impact on the analysis and will increase the betas very slightly).

[11] US: S&P500, UK: FTSE, Canada: S&P/TSX, France: CAC40, Italy: FTSEMIB, Greece: ASE

The final sample used in the beta analysis is summarised below. For completeness, estimates which were excluded from the sample on the basis of being not statistically significant have also been included in the table.

Table 1 Comparator companies

Firm	Description	Equity Beta	t-Stat	R-squared	Average D/E	Asset Beta
Statistically Significant						
AMERICAN WATER WORKS CO. INC. (US)	American Water Works Co., Inc. provides drinking water, wastewater and other water-related services in multiple states and Ontario, Canada. The Company's primary business involves the ownership of regulated water and wastewater utilities that provide water and wastewater services to residential, commercial and industrial customers.	0.3319	2.7366	0.1144	1.2161	0.2191
AQUA AMERICA INC. (US)	Aqua America Inc. is a water utility company. The Company supplies water to residential, commercial, industrial, and public customers. Aqua America serves residents through its water and wastewater operations in the Northeastern Southeastern, and Midwestern United States.	0.4874	3.5024	0.1746	1.1476	0.3010
CALIFORNIA WATER SERVICE GROUP (US)	California Water Service Group is the parent company of several water utility companies. The Company provides regulated and nonregulated water utility services to customers in California, New Mexico, and Washington.	0.5570	4.7069	0.2764	0.9005	0.3632
AMERICAN STATES WATER COMPANY (US)	American States Water Company purchases, produces, distributes, and sells water. The Company also distributes electricity in one community. American States operates within various customer service areas in California.	0.7065	3.7770	0.1974	0.7857	0.4677
SJW CORP (US)	SJW Corp. is a holding company for San Jose Water Company and SJW Land Company. San Jose Water is a regulated California water utility providing water service to customers in the metropolitan San Jose area. SJW Land owns and operates a parking facility adjacent to the San Jose Arena, as well as several undeveloped real estate parcels in San Jose.	0.8177	5.8550	0.3715	1.0926	0.4769
CONNECTICUT WATER SERVICE INC. (US)	Connecticut Water Service, Inc. is a holding company for The Connecticut Water Company. The Company supplies water to residential, commercial, industrial, and municipal customers located throughout Connecticut.	0.6226	3.9768	0.2143	0.9836	0.3892
ARTESIAN RESOURCES CORPORATION (US)	Artesian Resources Corporation, through its wholly-owned subsidiary Artesian Water Company, Inc., provides water utility service to customers primarily in New Castle County, Delaware. The Company sells its water services to	0.4385	3.2383	0.1531	1.0334	0.2849

Firm	Description	Equity Beta	t-Stat	R-squared	Average D/E	Asset Beta
	residential, commercial, industrial, utilities, and municipal customers.					
CONSOLIDATED WATER CO. LTD (US)	Consolidated Water Co., Ltd. develops and operates water production and distribution systems in the Caribbean region and in other locations. In addition to its water production and distribution business in the Cayman Islands, the Company is also reviewing opportunities to build and/or operate reverse osmosis or other types of water production and distribution facilities in the Bahamas.	1.0671	3.5269	0.1766	0.0932	0.9969
YORK WATER COMPANY (US)	The York Water Company impounds, purifies, and distributes water throughout York County, Pennsylvania.	0.4399	2.9119	0.1275	0.9228	0.2949
MIDDLESEX WATER COMPANY (US)	Middlesex Water Company treats, stores, and distributes water for residential, commercial, industrial, and fire prevention purposes. The Company operates in New Jersey and Delaware. Middlesex also provides contract water and wastewater management services to municipalities in New Jersey.	0.6297	5.3896	0.3337	0.7805	0.4224
PENNON GROUP PLC (UK)	Pennon Group Plc operates and invests primarily in the areas of water and sewerage services and waste management. Their principal subsidiary, SouthWest Water Limited, holds the water and sewerage appointments for Devon, Cornwall and parts of Somerset and Dorset. Viridor Waste Limited operates a waste treatment and disposal businesses in the United Kingdom.	0.4536	2.9963	0.1340	3.0871	0.2048
ACQUE POTABILI S.P.A (IT)	Acque Potabili S.p.A. is involved in the transport and distribution of drinking water. The Company operates primarily in the Italian regions of Alessandria, Aosta, Asti, Cuneo, Mantova, Savona, Torino, and Novara. Other activities also include the distribution of gas.	0.5909	2.9586	0.1311	0.1760	0.5283
THESSALONIKI WATER & SEWAGE (GR)	Thessaloniki Water & Sewage collects, treats, and distributes drinkable water in the region of Thessaloniki. The Company recycles water and drains it to the sea.	0.6054	4.9998	0.3012	0.0067	0.6026
EYDAP ATHENS WATER SUPPLY SA (GR)	EYDAP Athens Water Supply and Sewage Company SA collects, treats and distributes drinkable water in the Attica region. Athens Water Supply recycles water and drains it to the sea.	0.8151	7.4611	0.4897	0.0000	0.8151
Not Statistically Significant						
TWO RIVERS WATER & FARMING CO. (US)	Two Rivers Water & Farming Co distributes water in the western United States. The Company acquires develops, and distributes water in the State of Colorado.	0.5418	0.7318	0.0091	0.6241	0.3921
PURE CYCLE CORPORATION (US)	Pure Cycle Corporation provides water and wastewater services to customers located in Denver, Colorado. The Company operates water and wastewater systems, including designing,	0.7327	1.4125	0.0333	0.0143	0.7252

Firm	Description	Equity Beta	t-Stat	R-squared	Average D/E	Asset Beta
	constructing, operating, and maintaining systems serving customers in the Denver metropolitan area. Pure Cycle also owns water recycling technologies which process wastewater into pure potable drinking water.					
SEVERN TRENT PLC (UK)	Severn Trent plc supplies water, waste, and utility services throughout the United Kingdom, Europe, and the United States. The Group offers a range of water purification, sewage treatment and disposal, and recycling services. Severn also provides utility companies with a range of information technology services and software solutions, as well as engineering consultancy services.	0.3694	2.2217	0.0784	4.4336	0.1644
UNITED UTILITIES GROUP PLC (UK)	United Utilities Group PLC manages and operates the regulated electricity distribution, water and wastewater networks in North West England. The Company also manages other infrastructure assets in the United Kingdom and overseas.	0.3443	2.2638	0.0812	3.2275	0.1726
DEE VALLEY GROUP PLC (UK)	Dee Valley Group plc is the holding company for Dee Valley Water plc, a drinking water supply company. Dee Valley Water plc provides its services to customers predominantly in Chester and North East Wales.	-0.0391	-0.2899	0.0014	2.1185	0.0568
EAUX DE ROYAN S.A. (FR)	Eaux de Royan S.A. is a utility service that distributes water.	0.3226	1.7457	0.0499	Capital structure data not available	Capital structure data not available
SOCIETE DEX EAUX DE DOUAI (FR)	Societe des Eaux de Douai distributes water and related services such as water treatment to its users in the city of Douai.	0.0995	0.3337	0.0020	Capital structure data not available	Capital structure data not available

Source: Bloomberg, Synergies analysis

Ultimately, only one of the estimates for the UK firms was statistically significant, which was Pennon Group PLC (asset beta of 0.2). There were ten statistically significant US firms.[12] The key descriptive statistics for these firms are as follows:

- the average asset beta of all ten firms was 0.42. However, one of the firms had a much higher beta than the others (around 1). If that potential outlier is excluded, the average falls to 0.35;
- the asset beta range was 0.22 to 0.48 (excluding the outlier); and

[12] There was one Italian firm and two Greek firms, but we are not of the view that any material weight should be placed on those estimates.

- the median asset beta was 0.36 (excluding the outlier).

Given these are large metropolitan networks servicing a mix of residential, commercial and industrial customers, we would expect them to have a lower systematic risk profile than GAWB.

4.4.2 Conclusion

Based on the above analysis, we consider that GAWB's asset beta of 0.4 remains appropriate. This is because:

- we understand that GAWB's risk profile has not materially changed since the previous review;
- it has a fundamentally different risk profile than other water networks that are regulated or monitored by the QCA, with GAWB's predominantly industrial customer base resulting in higher systematic risk; and
- this would appear reasonable having regard to the updated betas of US water networks, which also have a large and more diversified customer base (including more residential customers).

Based on a debt beta of 0.11, gearing of 50% and the QCA's recently updated gamma estimate of 0.47, this results in a slightly lower equity beta for GAWB of 0.64.

5 Return on debt

There are a number of issues to consider in estimating the return on debt, including:

- the term to maturity
- the notional credit rating assumption
- the debt management approach
- the method used to estimate the debt risk premium (DRP)
- debt raising costs.

5.1 Term to maturity

As discussed above, we have assumed a ten year term to maturity. We have therefore not applied a refinancing allowance given this is only necessitated by the application of a term to maturity that is shorter than the term of the funding.

5.2 Notional credit rating assumption

As stated previously, we consider that BBB remains an appropriate assumption for GAWB assuming 50% gearing.

5.3 Debt management approach

The QCA is currently considering changing from the current 'on the day' approach to estimate the return on debt, to a trailing average. In a Draft Decision released at the end of August 2014, it is proposing to reject the trailing average approach.

In contrast, we endorse the application of the trailing average approach for the purpose of estimating the benchmark return on debt. As has now been acknowledged by the AER, this approach reflects a more efficient debt management strategy as it allows for the progressive refinancing of term debt through time. This is far more preferable than periodically refinancing the entire debt portfolio over a short averaging period.

A key benefit of the trailing average approach is via the periodic updating of the average return on debt for prevailing market rates. In this regard, we agree with QTC's proposal to weight-average this depending on forecast new borrowings. We note that GAWB does not intend to implement this update via annual price adjustments, but through an unders and overs mechanism that is amortised over a longer timeframe.

This is a more effective means of allowing firms to manage the interest rate risk on borrowings undertaken during the regulatory period. Under the current 'on the day'

approach, the only way that this risk can be managed is to hedge it over the market averaging period. Given the precise amounts and timing of future capital expenditure is often uncertain, it is not always feasible to hedge this risk. This can also be less efficient given it results in the business incurring costs that would otherwise not be incurred if the (weighted average) trailing average approach was applied.

As already noted in submissions made to the QCA, the trailing average approach will result in a comparatively smoother price outcome for customers, at least in relation to changes in the return on debt. Currently, both the business and customers are 'at the mercy' of market conditions over the short averaging period prior to each reset. Under the trailing average, the business receives at least some compensation if interest rates increase during the regulatory period, while consumers similarly benefit if interest rates fall.

In our view, the 'on the day' approach is a key example of regulation driving commercial behaviour. Indeed, it is now explicitly acknowledged by the QCA (and other regulators) that refinancing the entire portfolio is the practical consequence of having the return on debt subject to periodic regulatory resets. If refinancing is not feasible, the interest rate risk needs to be hedged via swap contracts, which is not feasible for the DRP component. The QCA has stated:[13]

> QCA's existing 'on the day' approach is based on an implicit debt management strategy that the efficient firm will manage refinancing risk by issuing longer term debt and mitigate interest rate risk by undertaking the required swap contracts to effectively align the term of debt issues with the term of the regulatory cycle. However, this debt strategy cannot be fully implemented in practice due to the lack of available credit default swaps to allow regulated firms to align the debt premium component of their debt with the term of the regulatory cycle. **Given that the existing approach estimates the benchmark cost of debt at prevailing interest rates, the only way for the regulated firm to closely align the allowed and actual debt risk premium component of the cost of debt is to refinance the entire debt portfolio at the start of each regulatory period.** {emphasis added}

We do not consider the consequences of the 'on the day' approach to be an intended outcome of regulation. Regulation should complement efficient market behaviour, rather than drive a less efficient outcome. The QCA has stated that "it is not necessarily

[13] Queensland Competition Authority (2014c). Draft Decision, Trailing Average Cost of Debt, p.iii.

the role of the regulator to attempt to fully replicate competitive behaviour."[14] The ACCC, on the other hand, in describing its core functions, has stated that:[15]

> Economic regulation focuses on replicating, **as far as possible**, the outcomes of a competitive market where competition is not feasible. Economic regulation thus creates a system of incentives to drive economically efficient conduct. Through economic regulation, competition in related markets is promoted and the long term interests of users are protected where the supplier has market power. {emphasis added}

We do not agree that the 'on the day' approach promotes economically efficient outcomes. Indeed, we consider that it does the opposite.

Finally, we do not agree that the approach is unnecessarily complex. It can be implemented and managed via a transparent spreadsheet model that is approved at the start of the relevant period. This contrasts with the QCA's in-house methodology that it is proposing to use to estimate the DRP, discussed below, which not all businesses and stakeholders will be able to replicate.

We therefore support the application of the trailing average approach.

5.4 Method used to estimate the DRP

5.4.1 The QCA's proposed in-house methodology

As part of its WACC methodology review, in 2013 the QCA published a report prepared by PwC on an alternative methodology that could be used to estimate the return on debt. The PwC approach is an 'in house' method. That is, rather than rely on an estimate produced by a third party provider such as Bloomberg or the RBA, the QCA will develop its own estimates. This will involve constructing its own sample of bonds that meet certain pre-defined characteristics, collecting the bonds and their yields from Bloomberg and UBS (we note that the latter is only available to UBS clients). A curve or 'line of best fit' will then be fitted to these yields using linear regression. The yield for the relevant term to maturity can then be determined from that curve.

In the QCA's Final Decision on the Return on Debt it has concluded that it will apply this approach.[16] The only other regulator that applies a similar approach is the ERA in

[14] Queensland Competition Authority (2014c). p.23.

[15] Australian Competition and Consumer Commission (2014). Reinvigorating Australia's Competition Policy, Australian Competition and Consumer Commission Submission to the Competition Policy Review, p.131.

[16] Queensland Competition Authority (2014d). Final Decision, Cost of Debt Estimation Methodology, August.

WA, although it estimates the return on debt using a weighted average of this sample rather than fitting a curve to the data.

Since PwC produced its report, the RBA has commenced publishing corporate bond yields for non-financial entities. The QCA has given this data source relatively brief consideration in its Final Decision. One of the key limitations it notes is that it currently only produces estimates at the end of each month. We agree that this is an issue, however, this can be addressed by taking an average of the two or three most recent months, or interpolating between month-ends to produce daily estimates. The RBA does intend to publish daily estimates at some point in the future.

The QCA notes that Bloomberg's underlying methodology remains unknown. Bloomberg has also recently ceased publishing its fair value curves and will now rely on its BVAL series. While this applies a different approach to the fair value estimates, there is no reason to consider that the BVAL series cannot be relied upon. It is still designed to produce robust indicative market prices for corporate debt. It is also independent. We also consider it reasonable to assume that both Bloomberg and the RBA have the requisite skills, experience and resources to produce robust estimates with the limited corporate bond market data available.

The QCA's proposed in-house approach adds considerable complexity to the process and will not be readily replicable by regulated businesses and stakeholders (presuming that all of the necessary data can be accessed). We do not consider that this additional cost and complexity is outweighed by the benefits, particularly when there are independent data sources already available.

5.4.2 Preferred approach

Overall, we consider that both the RBA and Bloomberg data series represent an independent, credible and reliable data source. We also consider that it is more practical, particularly in the context of price monitoring, where the QCA is assessing GAWB's proposed WACC against the Benchmark WACC rather than prescribing the WACC itself.

On the basis that the RBA's estimates are the longest available, we have used this data to estimate a ten year DRP for GAWB in setting the indicative WACC. In any case, even if we wanted to apply the QCA's approach, we cannot apply it given we do not have access to the necessary UBS data.

There are two issues that need to be addressed in the use of the RBA's data:

- *single day end of month estimate*: as the estimates are currently only produced on the last day of each month, there is a risk that this particular day was 'atypical' or

influenced by a one-off event or perturbation in the market. This can be addressed by taking an average of the most recent three month-ends (May, June and July), which has been done previously by the AER[17];

- *average tenor less than ten years*: as noted above, to the extent that the 'ten year' estimate reflects an average bond tenor of less than ten years, it is not a ten year estimate. Accordingly, it should be extrapolated to a ten year estimate. We have done this by using all of the RBA's data (i.e. the three, five, seven and ten year estimates) to approximate the slope of the RBA's yield curve. This is consistent with the concept of extrapolating Bloomberg's seven year yield using the paired bonds approach.

The resulting DRP is 2.34% per annum (annual effective).

5.5 Debt raising costs

We note that in the recent Final Decision on the return on debt the QCA has revised the allowance for debt raising costs from 12.5 basis points to 10.8 basis points per annum. We have applied the revised allowance in the indicative WACC.

[17] Australian Energy Regulator (2014a). Ausgrid, Endeavour Energy, Essential Energy, Actew AGL, Transitional Distribution Determination, 2014-15, April; Australian Energy Regulator (2014b). Transgrid, Transend, Transitional Transmission Determination, 2014-15, March.

6 Gamma

In its recent Final Decision on market parameters, the QCA has revised the value of gamma from 0.5 to 0.47, based on the advice of Lally. This is a function of the following inputs:

- a distribution rate of 0.84, which Lally has estimated from the financial statements of the 20 largest ASX companies from 2000-2013. This departs from the market-wide estimate of 70% that has been generally well accepted by regulators and practitioners;
- a value of franking credits (theta) of 0.56 based on the equity ownership approach (assuming domestic investors fully value franking credits), which has also been relied on by the AER. We disagree with the QCA's (and AER's) reliance on this approach as it does not value theta from the perspective of investors.

We retain the view that the value of gamma is more likely to be somewhere between zero (as we previously submitted for GAWB in the 2010-15 review) and 0.25 (as assessed by the Australian Competition Tribunal). However, this range is materially below the 0.47 value that the QCA has determined that it will now apply and what we expect it will apply in the benchmark WACC. We have therefore applied a gamma of 0.47 for GAWB.

7 WACC estimate

Applying the above inputs, the indicative WACC for GAWB as at 31 July 2014 is shown in the following table.

Table 2 Final 2010-15 WACC and Updated WACC for 2015-20

Parameter	Final 2010-15 WACC	Updated 2015-20 WACC
Risk free rate	5.04%	3.53%
DRP	3.64%	2.34%
Debt raising costs	0.125%	0.108%
Refinancing allowance	0.975%	n/a
Gearing	50%	50%
MRP	6%	6.5%
Asset beta	0.4	0.4
Debt beta	0.11	0.11
Equity beta	0.65	0.64
Gamma	0.5	0.47
Return on debt	9.78%	5.98%
Return on equity	8.92%	7.72%
Post tax nominal (vanilla) WACC	**9.35%**	**6.85%**

This results in a materially lower WACC for the 2015-20 period.

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Gladstone Area
Water Board