

South Australian Council of Social Service
47 King William Street
Unley SA 5061

24 February 2016

Attention: Bronwyn Colby

Dear Bronwyn

Provision of Advice to SACOSS

Background

Further to our recent discussions we have set out an approach to assist SACOSS in the preparation of their response to the SA Water Regulatory Determination 2016. This approach is based on the following background history as we understand it:

- SA Water's Regulatory Business Proposal (RBP16) was submitted to the Essential Services Commission of SA (ESCOSA) in September 2015 with interested parties invited to make submissions
- ESCOSA considered these submissions and issued a draft Regulatory Determination in February 2016 for public consultation
- Further submissions were then invited over a six week period closing on March 24th

It is understood that SACOSS wish to ensure that all potential efficiencies have been identified, and where practicable, realised by SA Water. To this end they have requested that Beca Pty Ltd provide an independent assessment of the SACOSS submission particularly with respect to the Capex and Opex savings proposed, with a view to ascertaining the potential for further savings. In particular SACOSS are seeking comment to SA Water's response in the following three areas:

- The inclusion or otherwise of the Orroroo township water supply upgrade project in the total capital works budget
- The potential to realise a 5.5% reduction in total opex. (Note a detailed review of SA Water's opex costings is a substantial task. In view of SA Water's response that 50% of their opex costs are fixed, we propose to undertake a high level review of the sub-components that make up the opex costs with a view to identifying areas that have the potential for reduction)
- The post project review (PPR) process to assess actual costs of completed projects and how over-runs and under-runs are recognised.
- We have also allowed to do a high level review of the capex budget within the context of the fact that ESCOSA advised they had reviewed 18 of the 130 projects listed. We would seek to understand whether or not this represents a realistic proportion of the total capital works budget, and if not what other projects should be reviewed in terms of their prudence and efficiency

This work is within the broader context of SACOSS concerns, specifically

- The impact of high water prices for all households as well as the acute impact on vulnerable households in our community is deeply concerning. These households are already burdened by major cost of living pressures and because they struggle to meet high prices for essential services, they are at high risk of losing unrestricted access to the basic and essential service of water and,
- South Australian businesses, like other water consumers, have also had to contend with significant water price rises over the past decade, placing cost pressures on small and large businesses. This is concerning given the current poor economic conditions in SA;

Scope of Services

The scope of services to be undertaken by Beca is to specifically review the three areas of interest including the Orroroo project in terms of prudence and efficiency, and the total opex costs in the light of SA Waters response.

In order to undertake this review we would need access to all relevant SA Water documentation, in particular specific project details for the Orroroo works and full details of their opex costings. Note that we will not be providing any financial assessment or comment on the costings provided.

We are conscious both of the timeframe for the work that we would undertake and in particular that our contribution needs to align with the overall six week timeframe for responding to the draft determination, and also of the need for us to adopt a cost effective approach. Accordingly our input will draw on the experience of our key personnel and will involve a high level review of SA Water documentation rather than a detailed or in depth review. We expect to be able to examine SA Water documentation and form a view regarding the clarity of project justifications and also the process that SA Water has implemented with regard to the identification and assessment of options on their capital works projects generally. We note that both of these matters are relevant to the consideration of prudence and efficiency with regard to capital expenditure on projects.

We also anticipate that some of our experience in other jurisdictions in Victoria and Queensland may be relevant in terms of providing comment on the matters that you have identified for our input.

We will provide you with a written report, suitable for inclusion with a formal SACOSS response.

Fees

Until we see the level of detail available it is hard to assess the fee required to deliver this task. We suggest an allowance of \$9,600 plus GST which will cover 32 hours of input. We will not exceed this amount without agreement with SACOSS. Disbursements such as local travel (if required) will be charged at cost.

Key Personnel

The work will be delivered by Paul Collier and Chris Callander. Paul and Chris have undertaken similar reviews in Queensland (for QUU) and Victoria (review of Water Plan 3 for the ESC). CV's are attached to this proposal

Potential Conflict of Interest

Beca has not undertaken any technical work for SA Water in recent years. In 2015 we were engaged to undertake a review of the business process undertaken by SA Water to deliver major developments that is works that are facilitated by SA Water and delivered by external parties. Our review and subsequent recommended changes, was solely focused on the business process followed by SA Water and not on any assessment of the specific projects delivered by the process.

As such we do not see this creating a conflict of interest in providing advice to SACOSS.

Conditions of Engagement

The conditions that will apply to our Services are the Beca Short Form Conditions of Engagement for Professional Services (Rev 6, 17 November 2011) ("the Conditions"), a copy of which is attached.

Please read the terms of this letter ("Terms") and the Conditions and indicate your company's acceptance of them by signing this letter in the space provided below and returning one copy to us. Until receipt of your signed acceptance, your request for us to commence work will be taken as your acceptance of these Terms and Conditions, which will replace all or any previous oral or written agreement. Should you have any queries please contact the undersigned.

Yours sincerely



Paul Collier

Principal - Business Performance

on behalf of

Beca Pty Ltd

Direct Dial: +61-3-9272 1476
Email: paul.collier@beca.com

I confirm that I am authorised to accept, and accept, on behalf of the South Australian Council of Social Service, the Terms and Conditions referred to above.

Signature

Name Title Date

Conditions of Engagement for Professional Services

Short Form Conditions – Australia

1. The Consultant shall perform the services ("Services") as described in the accompanying letter and any attached documentation (together the "Documents") and, in doing so, shall exercise reasonable skill, care and diligence.
2. The Client shall provide to the Consultant, promptly and free of cost, all information reasonably required by the Consultant to perform the Services. The Consultant shall be entitled to rely on the accuracy and completeness of the information. Neither party shall disclose or use any information provided by the other and identified as confidential, without that other party's prior consent, unless: (a) such disclosure or use is for the purposes of the Project; or (b) required to do so by law; or (c) required to be disclosed to that party's insurer or professional advisors; or (d) the information is already in the public domain otherwise than as a result of a breach by the recipient party.
3. The Client acknowledges that any cost estimates provided as part of the Services are not a statement of absolute cost, and rather will have an accuracy range commensurate with, amongst other things, all relevant information provided by the Client, the certainty of data and the level of detail available at the time of preparation. When cost estimates are to be used in critical financial planning decisions or are of material commercial significance, the Client should consider a third party peer review to confirm the accuracy of the estimates prepared by the Consultant.
4. The Client shall pay to the Consultant the Fee and Expenses relating to the Services plus GST, as set out in the Documents. Where this Agreement has been entered by an agent (or by a person purporting to act as agent) on behalf of the Client, the agent and Client shall be jointly and severally liable for payment of all amounts due to the Consultant under this Agreement.
5. The Consultant may purchase such incidental goods and/or services as are reasonably required for the Consultant to perform the Services. The cost of obtaining such incidental goods and/or services plus any specified margin shall be payable by the Client in addition to the Fee and Expenses (unless indicated otherwise in the Documents).
6. All amounts payable by the Client under this Agreement shall be paid within thirty (30) days of the relevant invoice being mailed to the Client, without set-off or deduction. Late payment shall constitute a default, and the Client shall pay default interest on overdue amounts from the date payment falls due to the date of payment at the rate of the Consultant's overdraft rate plus 2% and in addition the costs of any actions taken by the Consultant to recover the debt.
7. The Consultant shall use reasonable endeavours to maintain professional indemnity insurance for an amount not less than A\$300,000 while providing the Services and for three years after completion of the Services ("Period of Liability").
8. Subject to paragraph 10 and to the maximum extent permitted by law, the liability of the Consultant to the Client, whether for breach of contract, tort or otherwise:
 - a. shall be reduced proportionally to the extent any act, error or omission of others (including, without limitation, the Client, its agents, its other contractors and/or their respective employees) contributed to the liability, loss, damage, death or injury;
 - b. is subject to a maximum aggregate liability for all claims in connection with the Project being the lesser of A\$300,000, or five times the Fee (excluding GST); and
 - c. is limited to liability for direct loss or damage suffered by the Client. The Consultant shall not be liable for indirect, consequential or special loss, or for loss of profits or business opportunity, or liquidated damages.
9. To the maximum extent permitted by law, the Consultant shall be deemed to have been discharged from all liability in respect of the Services whether under contract, in tort, in equity, under statute or otherwise, on the expiry of the Period of Liability.
10. If and to the extent that any part of clauses 8 or 9 is void as a result of section 64 of the Competition and Consumer Act 2010 (Cth), then the Consultant's liability for a breach of its obligations under this Agreement is limited to supplying the relevant Services again or paying the reasonable costs of having a third party supply the relevant Services again.
11. The Client and the Consultant may (in the event the other party is in material breach or insolvent) terminate this agreement by 30 days written notice to the other party. Termination shall not prejudice or affect the accrued rights or claims and liabilities of the parties, including the Consultant's right to payment for all Services performed to the date of termination.
12. Ownership of copyright and intellectual property rights (including all drawings, reports, software, bills of quantity, calculations, specifications and other documents created or produced by or on behalf of the Consultant) arising out of the provision of the Services vests in, and shall remain the property of, the Consultant at all times. Upon receipt of payment in accordance with clause 6, the Client may reproduce drawings, specifications and other documents in which the Consultant has copyright, as reasonably required in connection with the Project but not otherwise.
13. The Consultant has not and will not assume any obligation as the Client's agent, principal contractor or otherwise which may be imposed upon the Client from time to time pursuant to any health and safety legislation and arising out of this engagement. The Consultant and the Client agree that for health and safety purposes the Consultant is not the person who controls the place of work and work processes.
14. Disputes shall be referred to the respective Chief Executive Officers of the parties to resolve. If within 30 days the dispute remains unresolved, then either party may by notice in writing to the other party refer the dispute to mediation for settlement by a mediator acceptable to both parties or, failing agreement, to a mediator nominated by the Chairperson for the time being of the Chapter of the Institute of Arbitrators & Mediators, Australia. This clause shall not prevent the Consultant from instituting legal action at any time to recover moneys owing by the Client to the Consultant.
15. Neither party may assign or transfer any obligations under this Agreement without the written consent of the other which shall not be unreasonably withheld. Unless stated in writing to the contrary, no assignment or transfer shall release the assignor from any obligation under this agreement. If the Consultant considers it appropriate to do so, it may engage other consultants to assist the Consultant.
16. These conditions (including the Documents) constitute the entire Agreement between the parties relating to the Services and no variation shall be binding unless in writing and signed by a duly authorised officer of the party affected. The Client may order changes to the Services, to be confirmed in writing either by the Client or the Consultant.
17. This Agreement is governed by the laws of the State of Victoria, unless agreed otherwise. The Victorian courts have jurisdiction in respect of this agreement, and all amounts are payable in Australian Dollars.



Paul Collier

**Technical Director,
Principal Business Performance**

Bachelor of Engineering - University of Canterbury, NZ

Six Sigma Green Belt Villanova University

FIEAust CPEng Eng Exec RPEQ

Paul has some 40 years' experience in the infrastructure sector. He acts as client adviser particularly in terms of strategic planning, business performance and critical project delivery. He has a particular interest in assisting companies to improve operational performance through a structured approach to business process change. He has successfully delivered process improvement projects including new service delivery models, for clients including Airservices Australia, Lion, Simplot, Bluescope Steel, Coliban Water, Unitywater, SA Water and Melbourne Water. He has also undertaken operational performance and capital program reviews for utility clients in SA, Queensland and Victoria and, as audit team leader, has completed more than 30 Regulatory Audits and Review of Expenditure Forecasts for the Essential Services Commission.

Citizenship

Australian, New Zealand

Membership

- n Fellow of Engineers Australia, Chartered Professional Engineer, Eng Exec
- n Member of the Australia Water and Wastewater Association - 1998
- n President Engineers Australia (Victorian Division) - 2011
- n Member of judging panel for Engineers Australia Excellence Awards since 2005

Special competence

Business Improvement and Strategic Planning, Project Management and Co-ordination, Water Supply Schemes, Water Treatment Schemes and Environmental Studies. Technical Adviser, Auditor and Probity Adviser to Infrastructure Clients

Relevant experience

Business Management and Strategic Advice

Baselining of Current Service Delivery Model, Bureau of Meteorology – 2015

Establishing a detailed understanding of the BOM's current approach to the delivery of routine and severe weather services across Australia. Included the preparation of a large number of process maps, and work flow diagrams based on extensive stall interviews and workshops. Identified waste in the process and recommended options for an improved approach to service delivery.

Asset Condition Assessment and Valuation, Coliban Water 2014 – 2015

Visual inspection and independent valuation of 11,000 above ground assets for all of Coliban Water's major plant installations including water, wastewater and recycled water treatment plants, pumping stations, reservoirs, lagoons, tanks, open channels and all associated buildings.

The project resulted in a more accurate asset depreciation schedule and facilitated improved planning of maintenance activities. A master schedule of assets was obtained, and installation dates for equipment were

identified by interrogating as-built/ as-installed data in project and site records. Where gaps in information were identified, 'best fit' dates were allocated based on similar installations or asset hierarchy, as agreed with Coliban Water. A detailed valuation and asset assessment of the above ground assets was then undertaken in order to prepare a robust depreciation schedule for financial accounting purposes.

The improved quality of asset data held by Coliban Water allowed them to optimize their forward spend, both capital and operational, and resulted in a substantial reduction in maintenance costs.

Business Process Review, Melbourne Water 2015

Lean Review of internal delivery processes including the development of a delivery framework and training in Lean tools

Business Process Review, SA Water 2015

Identification and implementation of improvements within the major developments application process by undertaking and end to end process review including extensive stakeholder engagement and interviews

Operations and Maintenance Outsourcing Contract, Coliban Water 2012 - 2013.

Led team of advisers (technical, commercial and legal) assisting Coliban Water to optimise the content and form of a major O&M outsourcing contract. Included the development of a full cost industry comparator used to evaluate tenders, and a suite of technical and performance (KRA/KPI and payment mechanisms) documentation. Project included a number of stakeholder workshops.

Review of Operations and Maintenance Services, Unitywater, Queensland, 2013

Using Lean processes, undertook a review of all maintenance activities. Reviewed existing processes both documented and undocumented, in order to identify process efficiencies and developed new organisational structure to reflect the recommended changes. Developed a revised approach to improve ratio of planned / predictive to reactive maintenance tasks. Undertook a number of stakeholder liaison sessions in order to obtain buy-in of the proposed changes.

Review of Water Plans, Essential Services Commission 2012 – 2013.

In conjunction with PricewaterhouseCoopers (PWC) undertook review of expenditure forecasts for Water Plan 3 (2013 - 2018) for Melbourne Water, Yarra Valley Water, South East Water, City West Water and Western Water. Reviewed proposed expenditure in terms of key obligations and drivers, robustness of project selection, risk sharing arrangements, robustness of costing and ability to deliver program within regulatory period.

State Government of Victoria, Essential Services Commission Operational Audits of Water Authorities, January 1998 – July 2009

Project Director and Lead Auditor for the operational and performance audits of a number of Victorian Water Authorities. The audits reviewed technical and management compliance against a regulatory framework and were undertaken on an annual basis. Audits were completed for

| | |
|-------------------------|--------------------------|
| n Yarra Valley Water | 1998 – 2007, 2013 - 2015 |
| n South East Water | 2013 - 2015 |
| n City West Water | 2003 – 2007 |
| n Goulburn Valley Water | 2005 – 2009 |
| n Melbourne Water | 2005 – 2009 |
| n Western Water | 2005 – 2007 |
| n Gippsland Water | 2008 |

State Government of Victoria – Department of Sustainability and Environment Asset Management Audit and ICT Security Audit of Water Authorities

Project Director and Lead Auditor for asset management audits undertaken on Melbourne Water, Yarra Valley Water, City West Water, Goulburn Valley Water and Western Water and ICT Security audits undertaken on Yarra Valley Water and South East Water.

SA Power Networks, Field Services Despatch Operations Review, 2014

Review of process used to despatch work across the SAPN network. Used Lean methodology to identify opportunities to refine the process, particularly during periods of high demand. Project looked at both documented and undocumented processes which were analysed through a combination of documentation reviews and structured interviews. Managed Process and Kaizen workshops with affected stakeholders.

Various Business Process Improvements, SA Power Networks, 2012 - 2013.

Project Director for a number of Lean Six Sigma business process improvement projects for SA Power Networks including Line Management, Network access, Standardised design template. Work included a full review of existing processes (both documented and undocumented), development of the desired future state process, and then preparation of a “road map” to reach the desired future state.

Melbourne Water, Water Resources Alliance, 2008 – 2013

Bid manager and then start-up Alliance Program Manager for the Water Resources Alliance (WRA). The Alliance is a partnership between Melbourne Water, Boulderstones, United Group, MWH and Beca, which delivered more than \$500M of capital works for Melbourne Water over a 5 year period 2008 – 2013.

As APM, responsible for overall management of the team (up to 150 staff and contractors), performance management and succession planning, development of management systems and management plans, establishment of KPIs, performance spectrum and measurement methodologies, and leadership of team culture development.

Queensland Urban Utilities, Review of Operational Performance 2010

Strategic review of operational performance for newly formed regional water authority. Review addressed performance across the areas of service delivery, customer responsiveness, command and control especially relating to planned activities and emergency management capabilities, and resource deployment. Final report included the provision of high level advice in terms of upcoming regulatory environment and associated audit framework.

Queensland Urban Utilities, Flood Impact and Major Project Review, 2011

In light of the 2011 floods in Brisbane, a review of the planned major projects to determine the impact that flooding may have on project drivers. Also included an independent review of prudence and efficiency of 16 major projects. The focus of the major project review was similar to a review completed by Beca in the previous year.

Queensland Urban Utilities, Major Projects Review, 2011

Review of the major capital works projects planned by QUU. The review was to assess the need for the project, whether alternative solutions appropriately considered non-capital options, the project delivery timing, whether the level of analysis and planning undertaken to date was appropriate, the estimated cost of the project and whether the project was the right solution.

Korumburra Leongatha Regional Wastewater Treatment Plant, South Gippsland Water

Strategic Adviser to South Gippsland Water during the planning stages of their proposed regional trade waste treatment plant and related domestic plant and ocean outfall upgrades. Reviewed alternate delivery options and recommended DBO. Assisted in negotiations with stakeholders including trade waste customers and State Government. Subsequently appointed as Project Manager to oversee delivery of the complete project.

Epsom Spring Gully Recycled Water Project, Coliban Water, 2006 - 2009

Client Manager for the planning, design, procurement and construction of this project that treats and reuses wastewater from the Bendigo Wastewater Treatment Plant. The project involves Chlorination and UV disinfection to Class A water quality; dual membrane treatment to Class A+ standard for use as environmental river flows; two pumping stations and 18km of 500mm diameter pipeline with several offtakes to irrigation channels and storages.



Chris Callander

Projects Director - Water

Bachelor of Engineering (Civil), University of Auckland, 1977

Chris Callander has over 30 years of experience with the investigation, design and construction monitoring of a broad range of infrastructure projects. He has acted in a client advisor role on a number of projects where the focus has been on providing advice to clients regarding project delivery, and then has been involved in the successful implementation of these projects.

| | |
|---------------------------|---|
| Citizenship | New Zealand |
| Membership | n Member, Institute of Professional Engineers, New Zealand |
| Special competence | n Investigation and design for civil infrastructure projects n Project management and design coordination of infrastructure projects. n Construction and contract management of civil infrastructure projects n Investigation and design for water supply, and wastewater treatment and disposal schemes |
| Background | 2007 - Present Projects Director – Water, Beca Pty Ltd, Brisbane, Australia 1984 - 2007 Engineer, Associate, Projects Director, Beca Carter Hollings & Ferner Ltd, Beca Infrastructure Ltd, New Zealand 1977 - 1984 Site Engineer, Design Engineer, Hauraki Catchment Board, Te Aroha, New Zealand |

Relevant experience

Water & Wastes

Kooralbyn WTP Disinfection Byproducts Project, Seqwater, Australia 2014 – 2015

Job Director for a project to investigate treatment options to address a problem with the formation of disinfection byproducts at the Kooralbyn WTP. Treated water produced by the Kooralbyn WTP has exceeded the THM notification limit, particularly during summer months, and Seqwater was seeking to implement improvements to the treatment process (or other non treatment options).

The original scope of the project involved an options assessment, preliminary design, and business case. Following confirmation of the preferred option, Beca was commissioned to undertake the detailed design.

Kawana STP Integrated Planning and Approvals Study, CH2M Hill, Australia 2013 - 2014

Job Director for the Beca input to an integrated planning study related to the upgrade of the Kawana STP. The Kawana STP will over a number of stages be developed from a 90,000 EP plant to an ultimate capacity of 500,000 EP. The component of work undertaken by Beca was to assess the hydraulic capacity of the existing ocean outfall as part of the need to consider the need for and timing of a new ocean outfall that would be required at some time in the future. The work involved coordinating a dive inspection of the existing outfall, undertaking hydraulic assessment of the existing outfall and reporting the outcomes progressively in workshop forums and reports.

Canungra WTP Upgrade Detailed Design, Seqwater 2013 - 2014

Project Manager for the detailed design of the Canungra WTP to a new capacity of 1.5 MLD, from its current 0.4 MLD. The project involves the implementation of membrane technology and has been progressed through milestone steps of Design Basis, Preliminary Design, and Detailed Design.

Capalaba WTP PAC Dosing Upgrade, Zinfra Group, Australia 2013 – 2014

Jo Director for the detailed design undertaken as part of a design and construct contract to upgrade the PAC dosing facilities at the Capalaba WTP.

Gateway Reviews, Queensland Urban Utilities 2013 – 2014

Job Director for independent third party reviews of project feasibility studies undertaken by Queensland Urban Utilities (QUU). The Gateway Review process is part of the QUU project delivery framework and is a requirement on certain projects following completion of the project feasibility study. The reviews involve conducting interviews with project stakeholders, generally over a two day period, and then drafting and presenting a report on the outcome of the review.

East Nogoia Water Treatment Plant, Tenix, Australia 2012 – 2013

Job Director for the bid phase design being undertaken by Beca for a design and construct contract for a greenfields water treatment plant of 8-10MLD for Emerald. The ultimate project client is Central Highlands Regional Council. Beca has been engaged by Tenix to undertake the bid phase design that follows on from the evaluation of sixteen EOI submissions to a shortlist of three tenderers invited to submit a formal tender.

The scope of bid phase design work covers process, civil, structural electrical and controls inputs, and involves working in close collaboration to develop a robust and comprehensive tender design.

Major Project Audit 2012, Queensland Urban Utilities, Australia 2012 – 2013

Job Director for a review of major projects, planned to be implemented by Queensland Urban Utilities. The review covers 14 major projects planned for implementation by QUU, and has a specific focus on the feasibility investigations undertaken by QUU from the regulatory perspective of prudence and efficiency. The work involves assessment of project documentation, interviews with QUU project and design managers, and compilation of a report.

Regional Lagoons Upgrade, Queensland Urban Utilities, Australia 2012

Job Director for a project that initially involved an assessment of a concept for the upgrade of six regional sewage treatment plants that utilised a lagoon based treatment technology. Following the initial assessment, Beca undertook the concept design of an alternative concept for the upgrade of the lagoons. The concept involved improving the aeration in the lagoons by using pontoon mounted surface aerators, and also with the addition of a membrane filtration plant to provide additional treatment that would enable discharge licence conditions to be complied with.

Following acceptance of the concept design by QUU, Beca undertook the detailed design which included completion of performance specifications for the microfiltration and aerator supply, 'For Construction' documentation, and capital cost estimates. The estimated capital cost of the project was in the order of \$6M.

Northern Pipeline, Confidential Client, Adelaide Australia 2012

Job Director for a project where Beca provided assistance to resolve a clash of existing services with the alignment of a new water main that was being constructed for SA Water. The job involved the need to undertake accurate site measurements and then devise a solution to enable laying of a new water main to continue with minimal disruption to existing services. A structural assessment of a new fabricated section of the water main was required as was careful detailing and dimensioning to avoid clashing with the existing services. The project was undertaken to a tight timeframe where a close working relationship with the contractor was an essential aspect of the work undertaken.

North Pine WTP Chemical Dosing Upgrade, Seqwater, Australia 2012

Job Director for a project to assess options for a chemical dosing upgrade at the North Pine Water Treatment Plant. The project involved working with the client to identify suitable chemical dosing options, undertaking an assessment of the selected options and recommending a preferred option. Following client acceptance of the recommendation, a

preliminary design was undertaken followed by completion of a draft business case. The project also included undertaking cost estimates at both the options assessment stage and the preliminary design stage.

Strategy Overflow Abatement Strategy, Unitywater, Australia 2011

Job Director for the development of a Sewer Overflow Abatement Strategy, which is being prepared as an overarching document relating to inflow and infiltration performance of the Unitywater sewerage network. The strategy includes documenting key aims and drivers, and will include a high level prioritisation of investigations and capital works. The strategy document includes a program covering near to mid-term investigation works and also a capital works budget, and also addresses the important regulatory perspectives of prudence and efficiency.

Blackall – Bluff Water Supply Pipeline Upgrade, Central Highlands Regional Council, Australia 2011 – 2012

Job Director for a project to assess leakage issues on the 22km Blackwater to Bluff water supply pipeline which is being progressed as a number of distinct phases. The initial phases of the project have included a site assessment to scope and confirm the extent of the issues relating to performance of the pipeline. An investigations phase is in progress as of October 2011.

Minor Wastewater and Water Projects for Central Highlands Regional Council, Central Highlands Regional Council, Australia 2011

Job Director for the design of a pad to support a standby generator at the Blackwater WWTP

- n Job Director for the preparation of performance specifications for the upgrade of switchboards at the Tieri and Capella Water Treatment Plants

QUU Major Project Review 2011, Queensland Urban Utilities, Australia 2010 – 2011 (Beca Pty Ltd)

Job Director for a review of major projects, planned to be implemented by Queensland Urban Utilities. The review covered 16 major projects planned for implementation by QUU, and had a specific focus on the feasibility investigations undertaken by QUU from the regulatory perspective of prudence and efficiency. The work involved assessment of project documentation, interviews with QUU project and design managers, and compilation of a report. The final report detailed the review process undertaken by Beca, and presented key conclusions from an experienced and independent perspective.

- n A specific additional task included an overview assessment of whether the major flood event in Brisbane in January 2011 impacted on the project drivers for the nominated major projects. The review was requested by QUU as part of their initial assessment of the flood impact and as part of an ongoing review process regarding their major projects.

Winnaleah Irrigation Scheme D&C Tender Design, Fulton Hogan, Australia 2010 (Beca Pty Ltd)

Job Director for the tender phase design for an upgrade of the Winnaleah irrigation scheme. The work was undertaken for Fulton Hogan as part of their D&C bid tender for a Tasmanian Irrigation Development Board project. The scope of work undertaken included pipeline alignment review and assessment of options for improvement, concept design of a boost pump station, and production of concept level designs including drawings and specifications sufficient for preparation of a lump sum tender price. Project value was in the order of \$30M.

Victorian Desalination Project, Design Review Team, Thiess Degrement JV, Australia 2010 (Beca Pty Ltd)

Member of the independent design review team on the Victorian desalination project. Undertook the role of hydraulics discipline lead for the design review of the 80km x 2m diameter transfer pipeline, and the intake and outlet arrangements. The review included consideration of designs relating to pipeline alignment, transfer and boost pump station hydraulics and surge mitigation measures, intake and diffuser details for a large and complex hydraulic system.

Eastern Pipeline D&C Tender Design, Fulton Hogan, Australia 2010 (Beca Pty Ltd)

Job Director for the tender phase design for a water supply pipeline augmentation. The work was undertaken for Fulton Hogan as part of their D&C tender for an SA Water project. The scope of work undertaken included alignment review and assessment of options for improvement, production of concept level designs including drawings and specifications sufficient for preparation of a lump sum tender price. Project value was in the order of \$20M.

pH Correction Alternatives Study, Seqwater, Australia 2010 (Beca Pty Ltd)

Job Director for a study into alternatives for pH correction at various operating Seqwater water treatment plants.

- n Seqwater operates 46 water treatment plants (WTPs) across South East Queensland (SEQ). The challenge faced by Seqwater was that chemical types and delivery mechanisms used for pH correction at these WTPs differed across the sites. Seqwater wanted to develop a policy that would guide future upgrade and replacement decisions at existing WTPs, and would guide future selection decisions for new WTPs. The intention was that the report would be used by Seqwater to assist in the development of this policy.
- n This report prepared by Beca focused on three chemical types; hydrated lime (calcium hydroxide), sodium hydroxide, and soda ash. The overall aim of the report was to provide Seqwater with a resource to enable the selection of an appropriate chemical to adjust treated water pH, and to provide design guidance to enable Seqwater to progress chemical dosing system design to a concept design level.

QUU Operations Review of Field Services East, Queensland Urban Utilities, Australia 2010 (Beca Pty Ltd)

Job Director for a review of operations of Field Services East. The review focussed on specific aspects of the operations of the Field Services East team including the roles and responsibilities of internal teams, the interface between teams, procedures and systems relating to responsiveness with respect to repairs, training and upskilling of personnel. The review process involved working closely with team leaders and senior management of Field Services East, with the final outcome being a report with recommendations for ongoing actions, plus a final presentation to a wider group of Field Services personnel.

Development of an Inflow and Infiltration Strategy, Sunshine Coast Water and Unitywater, Australia, 2010 (Beca Pty Ltd)

Job Director for the development of an inflow and infiltration strategy, for Sunshine Coast Water. The strategy development has a number of components including a benchmark review of current industry practice, an assessment of the performance of the existing sewerage network during rainfall events, and implementation of field investigations for catchments that have historically performed poorly during low to moderate rainfall events.

Cost Estimate for New Pump Station at Burpengarry East WWTP, Moreton Bay Regional Council, Australia, 2010 (Beca Pty Ltd)

Job Director, for the preparation of a cost estimate for Moreton Bay Regional Council, for a new final effluent pumping station at the Burpengarry East WWTP. The estimate was based on a detailed design prepared by others, with the Beca input being required to provide an independent view on the estimated cost

Major Project Review, Queensland Urban Utilities, Australia, 2009 (Beca Pty Ltd)

Job Director for a review of major projects, planned to be implemented by Queensland Urban Utilities. The review covered projects that had been investigated and planned by Brisbane City Council, Ipswich Water, Somerset Regional Council, and Lockyer Valley Regional Council. The aim of the review was to provide an independent perspective on the investigations and assessments previously undertaken by the respective Councils, as part of the process of Queensland Urban Utilities developing its capital works program.

SEQ Fluoridation Stage 2- D&C Tender Bid, Seqwater, Australia, 2009 (Beca Pty Ltd)

Job Director for the preparation of a Design and Construct tender phase submission for an upgrade to a number of existing Seqwater water treatment plants. The project involved preparation of design information to be used preparation of a tender price by the Beca Pty Ltd client. Project value was in the order of AUD 11M.

Queensland Regional Fluoridation, Department of Infrastructure and Planning, Australia, 2008 – ongoing (Beca Pty Ltd)

As Job Director for Beca input on this project the role includes:

- n Preparation Expression of Interest documents for professional services, plant and equipment suppliers, construction contractors, and evaluation of responses
- n Preparation of benchmark designs
- n Cost estimates
- n Advice to Councils (including documented procedures) regarding the process of seeking subsidy applications

- n On-going advice and technical support to Department of Infrastructure and Planning

SEQ Fluoridation Project, Seqwater, Australia, 2008 – 2009 (Beca Pty Ltd)

Job Director for Beca input to this project. Work undertaken included initial advice and input regarding chemical selection, operator briefings, and concept design for the purpose of preparing cost estimates. Also included input into development of the contracting strategy, preparation of tender documentation, tender administration and evaluation of tenders, and contract administration.

- n Acted as Superintendent to the contract.

Updating of Capital Works Program, and Review of Master Plans, Ipswich Water, 2007 (Beca Pty Ltd)

Job Director for a review and updating of the Ipswich Water 15 Year Capital Works Program.

- n Undertook reviews of Master Plans for various water and wastewater infrastructure works as assistance to Ipswich Water internal review processes.

Trade Waste Design, Bundamba Advanced Water Treatment Plant, Brisbane, Australia, 2007 (Beca Pty Ltd)

Peer review role as Project Director in trade waste design for the Bundamba advanced water treatment plant

Job Director, Beca Pty Ltd, Brisbane, Australia 2007

Water audits undertaken in the Brisbane office

Masterton Sewerage Infrastructure Upgrade Project, New Zealand, 1999 – 2007 (Beca Infrastructure Ltd & BCHF)

- n The project involved investigations and evaluation of options for upgrading the sewerage infrastructure for the Masterton urban area. The focus included the assessment of a number of treatment and disposal scenarios and included consideration of all associated civil infrastructure aspects of the proposed upgrade.
- n The work included investigations and assessments of options for upgrading the Masterton Sewage Treatment Plant which comprised an oxidation pond system treating an average flow of 13 MLD, and also assessment of treatment and disposal at an alternative site. A range of treatment upgrade options were considered, with disposal of treated effluent by discharge to river, or to ground by rapid infiltration. The work also included flow analysis of the sewerage reticulation system, investigations to define the scale of infiltration into the sewerage network, and assessment of the potential for rehabilitation to be undertaken.
- n The selected option involves an upgrade of the existing oxidation ponds to deliver an improved effluent quality, combined with land irrigation over approximately 75ha plus provision for storage within the existing oxidation ponds.
- n Consultation as part of the Resource Management Act requirements formed a major part of this project, and has involved extensive briefings of the public and interested parties, and the preparation of an Assessment of Environmental Effects to support resource consent applications.

Porirua Wastewater Treatment Plant, Porirua City Council, New Zealand, 2004 – 2006 (Beca Infrastructure Ltd & BCHF)

Job Director on a range of projects relating to various assessments and upgrades at the existing Porirua WWTP, which has an ADWF of 24, 000m³/day. Projects undertaken were; sludge dewatering upgrade at a capital cost of \$1.0M, upgrade of the existing milliscreens at capital cost \$0.7M, review of the treatment capacity of the existing WWTP, concept review of the option of implementing a new thermal drying thermal drying facility.

Masterton Raw Water Pipeline, Masterton Water Treatment Plant, New Zealand, 2005 – 2006 (Beca Infrastructure Ltd & BCHF)

Job Director for the upgrade of approximately 400m of the raw water pipeline that feeds Masterton Water Treatment Plant.

- n The pipeline is 700mm dia. clms pipeline, with a siphon system abstraction from the Waingawa River at a design flow of 45, 000m³/day. Construction value of the works was \$0.8M.

Suva Nausori Water Supply and Sewerage Augmentation Package 4, Fiji, 2004 – 2006 (Beca Infrastructure Ltd & BCHF)

Job Director for the Erasito Beca Consultants Ltd project to upgrade the Kinoya Sewage Treatment Plant that services the Suva Nausori area. The scope of work involves investigations, preliminary and detailed design, and construction monitoring services.

- n The project involved the assessment of options for upgrading the KSTP, with the selected option being to convert the existing SBR process to an activated sludge process. The estimated cost of the full upgrade is approximately FJD19M, which is planned to be implemented in a staged manner, with the first stage comprising a new inlet works, new primary clarifier, and new sludge digester.
- n Suva Nausori Water Supply and Sewerage Augmentation Package 5, Fiji, 2004 – 2006 (Beca Infrastructure Ltd & BCHF)

Job Director on an Erasito Beca Consultants Ltd project to undertake investigations, design, and construction monitoring for various parts of the Suva Nausori sewerage reticulation system.

- n The project is divided into eight sub-packages, with a total estimated construction value in the order of FJD25M. The scope of work included pipeline and pump station upgrades, development of a network model, and assessment of pipeline condition by CCTV analysis.

Continuing Services, Hutt Valley WWTP, New Zealand, 2003 – 2006 (Beca Infrastructure Ltd & BCHF)

Job Director for the provision of on-going design services for the Hutt WWTP. Services related to the operations phase of the treatment plant and sewerage reticulation network, and included investigations and design of, sewerage reticulation improvements, plus mechanical, electrical, controls and process improvements at the treatment plant.

Upgrade Investigations and Detailed Design, Navutu Sewage Pump Station, Fiji, 2003 – 2006 (Beca Infrastructure Ltd & BCHF)

Job Director for the investigations and detailed design of an upgrade to the existing Navutu Pump Station, which is the terminal sewage pump station for the Lautoka area. The design flow for the pump station was 620 l/s. The adopted solution, which proceeded to detailed design and tender documentation, was to construct a new pump station adjacent to the existing pump station. The estimated capital cost of the upgrade was FJD 5M.

Natadola Water Supply Augmentation, Fiji 2002-2006 (Beca Infrastructure Ltd & BCHF)

Job Director on a project for the Public Works Department of the Fiji Government to augment an existing water supply system in order to provide potable water to the Natadola Beach area.

- n The project involved connecting to the existing water supply system at Sigatoka and laying 29 km of 375 mm dia. mPVC pipeline. The works also included connections to an existing intermediate reservoir and two boost pump stations.
- n The works also included a new 3ML terminal reservoir adjoining the new Natadola resort development.
- n All investigation, preliminary design, detailed design and construction supervision was undertaken by Beca in conjunction with Erasito Consultants Ltd of Fiji. The estimated cost of the capital works is NZD13m.

Vaturu Nagado Raw Water Pipeline Upgrade, Public Works Department, Fiji, 2002-2005 (Beca Infrastructure Ltd & BCHF)

Job Director on a project for the Public Works Department of the Fiji Government, as part of the augmentation of the Nadi-Lautoka Regional Water Supply Scheme.

The project involves upgrading the hydraulic capacity of the 16 km raw water pipeline from the Vaturu water supply dam to the Nagado Water Treatment Plant. The upgrade is being carried out in two stages which are to increase the capacity from 72 MLD to 82 MLD, and then to an ultimate flow (to be undertaken in the future) of 150 MLD. The project also required provision to be made for the installation of an in-line turbine to generate hydro-electricity. The pipeline ranges in diameter from 500 mm dia. to 900 mm dia. and is subject to a maximum static head of 490 m. The high operating head and in-line turbine required a detailed analysis of high pressure surge scenarios, and the design of a pressure relief system. All investigations, preliminary design, detailed design and construction supervision is being undertaken by Beca in conjunction with Erasito Consultants Ltd of Fiji.