Australian Water Recycling
Centre of Excellence

Project Report

Case Study #1 (of 3) – South East Queensland Western Corridor Recycled Water Project

A report of a study funded by the
Australian Water Recycling Centre of Excellence

Rod Carr, Dr John Marsden and Peter Jacob, November 2012

Case Study #1 (of 3) – South East Queensland Western Corridor Recycled Water Project

This report has been prepared as part of the National Demonstration, Education and Engagement Program (NDEEP). This Program has developed a suite of high quality, evidence-based information, tools and engagement strategies that can be used by the water industry when considering water recycling for drinking purposes. The products are fully integrated and can be used at different phases of project development commencing at "just thinking about water recycling for drinking water purposes as an option" to "nearly implemented".

Project Leader

Dr John Marsden, Director
Rod Carr, Associate Director
Marsden Jacob Associates
3/683 Burke Rd
Camberwell VIC 3124 AUSTRALIA
Telephone: +61 3 9882 1600

Contact: Dr John Marsden [jmarsden@marsdenjacob.com.au]
Rod Carr [rcarr@marsdenjacob.com.au]

About the Australian Water Recycling Centre of Excellence

The mission of the Australian Water Recycling Centre of Excellence is to enhance management and use of water recycling through industry partnerships, build capacity and capability within the recycled water industry, and promote water recycling as a socially, environmentally and economically sustainable option for future water security.

The Australian Government has provided $20 million to the Centre through its National Urban Water and Desalination Plan to support applied research and development projects which meet water recycling challenges for Australia's irrigation, urban development, food processing, heavy industry and water utility sectors. This funding has levered an additional $40 million investment from more than 80 private and public organisations, in Australia and overseas.

ISBN 978-1-922202-10-9

© Australian Water Recycling Centre of Excellence

This work is copyright. Apart from any use permitted under the Copyright Act 1968, no part of it may be reproduced by any purpose without the written permission from the publisher. Requests and inquiries concerning reproduction right should be directed to the publisher.

Date of publication: [November 2012]

Publisher:
Australian Water Recycling Centre of Excellence
Level 5, 200 Creek St, Brisbane, Queensland 4000
www.australianwaterrecycling.com.au

This report was funded by the Australian Water Recycling Centre of Excellence through the Australian Government's National Urban Water and Desalination Plan.

Disclaimer

Use of information contained in this report is at the user's risk. While every effort has been made to ensure the accuracy of that information, the Australian Water Recycling Centre of Excellence does not make any claim, express or implied, regarding it.

CASE STUDY

November 2012

Governance, Decision Processes and Pricing: Implications for Potable Water Recycling

Case Study #1 (of 3) – South East Queensland Western Corridor Recycled Water Project

Research undertaken for the Australian Water Recycling Centre of Excellence

MARSDEN JACOB ASSOCIATES

Contents

Authors: Rod Carr, Dr John Marsden and Peter Jacob

Executive Summary

Project background

The Western Corridor Recycled Water Project (WCRWP) is a $2.4 billion water supply augmentation project built over 2007 and 2008 calendar years in South East Queensland (SEQ). The WCRWP is a component of the $6.9 billion SEQ water supply network and has the capacity to deliver 232 megalitres per day of purified water.

The WCRWP commenced as a small non-potable recycled water project but was transformed into a purified water project of substantial scale as an emergency response to prolonged drought which saw SEQ's largest water storage, Wivenhoe, falling between 2001 and 2007 from 100 to 15 percent of full supply level.

Because the drought broke in 2008, the WCRWP has never been used at full capacity. For instance, as dams are now full across SEQ the WCRWP is currently only operating at about 5 percent of full capacity.

Scope and objectives of the research

The Australian Water Recycling Centre of Excellence has commissioned a research consortium to help examine, understand and remove impediments to the acceptance of potable purified water in Australia.

The aim of the Marsden Jacob Associates research (Stream 2, Sub-Stream 2.4: Governance, Decision Processes and Pricing) is to identify the legislative framework, institutional arrangements, power and decision-making, pricing and other factors impeding or facilitating investment in potable purified water facilities.

The inform the evidence base on these issues Marsden Jacob Associates' research involves three case studies showing the decision-making timeline, storyline and narrative to identify:

- When key decisions were taken?
- Who made the decisions and how were they informed?
- When and how did impediments and facilitating factors to implementation arise?
- How were impediments resolved and positive factors enhanced?
- How can pricing and governance arrangements be improved?

This is the first case study report and it focuses on the WCRWP in Queensland.

Executive Summary

Key findings: Governance

The analysis of the decision-making timeline and storyline revealed that:

- prior to 2000, the traditional model saw each local government being responsible for its own water supply, so "*no one was responsible for regional planning*";
- over the period 2000-06 water planning was led by an all inclusive committee responsible for developing the SEQ Regional Water Supply Strategy (identified the WCRWP as priority infrastructure);
- in late 2005, responsibility for the development of a WCRWP business case transferred from Ipswich Water to Seqwater, a newly formed state government corporation;
- in early 2006, the state government increasingly took charge of the WCRWP; and
- in July 2006 responsibility for construction of the WCRWP moved to the Queensland Coordinator-General (in the Department of Infrastructure).

These significant changes in governance arrangements occurred because :

- the governance structure for the period 2000-06 was at best inclusive but unwieldy with unclear accountabilities and authorities. While the arrangement saw the State Government play an increasing role, the SEQ Regional Water Supply Strategy committee comprised 19 parties, including the Council of Mayors for SEQ, Regional Coordination Committee (State Government Ministerial committee), Departmental Steering committee and various task groups. The planning arrangements were described by one interviewee as "*a complete shambles that needed to be fixed*".
- in early 2006 it became clear that internal approvals could not be achieved within Seqwater because there were concerns about the cost implications of the infrastructure, particularly when the State Government wouldn't guarantee or underwrite Seqwater's balance sheet.

Executive Summary

Key Findings: Governance	➢ the mounting water emergency necessitated action. In July 2006 the State Government formally took control of the project and made the Queensland Coordinator-General (in the Department of Infrastructure) responsible for construction of the WCRWP. This change coupled with expediting provisions of the *State Development and Public Works Organisation Act 1971* enabled the "*quick delivery of the project*".
Key findings: Governance (Regulatory Approvals)	**Health Regulations – Impacted on project implementation** The case study identifies that health regulations were an unexpected contributor to project costs and could have been a significant impediment to project success, because: ➢ the need for new health regulations only became a priority in mid 2007, when the Queensland Government started developing the water quality regulatory framework. ➢ it wasn't until 30 June 2008 that the Queensland Government produced the *Water Supply (Safety and Reliability) Act 2008* (the Act). The Act regulated both drinking and recycled water supply and quality within the State of Queensland. The Act also relied upon Schedule 3B in the *Public Health Regulation 2005*. This new legislation came into effect nine months after completion of the first (Bundamba) advanced water treatment plant and three months before the other two plants were completed. The health standards specified in the legislation "*incorporated all of the Australian Drinking Water Guideline values as well as additional standards*". Consequences of this new legislation included: ➢ At the time of signing the alliance agreements, to construct the project, there was no regulatory framework in place. So contractual terms were aligned with the drinking water guidelines. When the legislation came into force the Queensland Government had to negotiate new requirements into contracts, which necessarily had cost implications.

Executive Summary

Key findings: Governance (Regulatory Approvals)

- The Act required the owners of the infrastructure (QLD Government – WaterSecure) to assume ultimate responsibility for risk management and not the operators. And, "*these obligations could not easily be transferred through formal contractual arrangements*" as the agreements had already been signed. This was problematic as it had already been agreed that Veolia would operate the facilities, whereas the new regulatory requirements necessitated closer than anticipated collaboration between distribution service providers, operator of the drinking water storages, construction alliances and WCRWP operator (Veolia Water).

Environmental Regulations

- Case study interviewees noted that there was limited assessment of environmental impacts was required and no environmental impact assessment was needed for the pipelines. However, there was a voluntary Environmental and Social Impact Assessment (ESIA) report prepared as part of the WCRWP.

Executive Summary

Key findings: Pricing

The literature phase of our research did not identify any significant pricing impediments to potable standard purified water. This perspective was confirmed by case study interviewees who stated that *"pricing came six months after the decision to build"*. Pricing arrangement were considered in 2007, when the Queensland Water Commission (QWC) was asked: *"how are we going to pay for the new water grid and manufactured water?"*.

Despite this, the case study has highlighted some critical current and ongoing price implications for future water supply augmentation projects:

- In times of water emergency water customers and governments are not concerned about the price of water. When the emergency ends the focus of customers quickly comes back on prices.
- The current state of membrane technology means very high fixed and operating costs and lack of throughput flexibility when rainfall returns and refills traditional water sources. This stands in contrast to electricity generation, where base-load (in the absence of carbon prices) is cheap coal-fired generation and peaking generation is high-cost.
- The crucial financial issue is that most costs are fixed, apart from the variable energy component and some chemical costs (similar to a desalination plant). The significant and high fixed costs necessarily increase water prices, which can make private sector participation difficult.

In support of these finding, interviewees noted that:

- *"the WCWRP was designed to deliver 232 ML/day of purified water"* and has high fixed costs;
- the facility could be shutdown, however, this will result in significant costs when the plant is reopened; and
- The coincidence of a return to high rainfall with the realisation of the major cost burden on water bills incurred by the investment, has led to reduced willingness to pay and some shifting of the cost burden to tax and ratepayers.

Executive Summary

Overarching lessons for future purified water infrastructure development

In simple terms drought pushed recycled water and the breaking of the drought allowed its rejection. However, the magnitude of the investment means that manufactured water facilities cannot be planned and developed quickly. So they need to be part of a systematic supply augmentation planning process ahead of any emergency situation.

This case study highlights a number of key governance and pricing related lessons for governments and water utilities who are considering purified water as a supply augmentation solution, including:

1. Water planning and supply is a critical responsibility and function. In addition to ensuring clarity of objectives and roles, accountability and authority must be adequate and matched.
2. Planning needs to be based on a robust understanding of supply risks including stochastic supply modelling and subsequent development of drought contingency planning and contingency supply strategies;
3. The decision process should be mapped early in the process, to confirm that there is role clarity and stability across key decision-makers and institutions. The mapping process should ensure that role clarity and stability is available at both intra and inter organisational levels. It should also clearly identify who holds legislated decision-responsibilities (eg project, environmental, health approvals) as well as non-regulatory decision-influencers (eg guidelines).
4. Emergency driven decision-making is unlikely to result in resource optimising solutions. Investment in long-term water planning that considers climate extremes and worst case water scenarios would inform when responses need to be implemented and thus avoid crisis based decision-making. This will permit a structured and ordered development response, which is likely to be considerably more resource efficient.
5. Infrastructure planning and design should carefully consider short, medium and long-term scenarios. New water infrastructure is considerably more expensive to operate than traditional water supplies (dams). As a result, infrastructure design and project communication should build in operational flexibility and make customers aware of the cost implications of improved water security.

Section 1: Case Study Background

Governance, Decision-making and Pricing: Research Project

In September 2010, the Australian Water Recycling Centre of Excellence commissioned a research consortium to help examine, understand and remove impediments to the acceptance of potable water recycling in Australia.

The research, which commenced in November 2011, examines the extent that local policies and public perceptions prevent recycled water from being considered for potable use.

Another key aim of the research is to work with the water industry to develop a national demonstration education and engagement program that supports successful public engagement and addresses stakeholder concerns (in particular the media, policy makers, community and politicians) through the provision of contemporary information on potable reuse as a viable water supply option.

The aim of the Marsden Jacob Associates research (Stream 2, Sub-Stream 2.4: Governance, Decision Processes and Pricing) is to identify governance (ie power and decision-making, both formal and informal) and pricing related impediments to investment in potable reuse facilities, compared with alternative water supplies. A central part of the Marsden Jacob Associates research is three case studies that involve developing a decision-making timeline, storyline and narrative, for each case study location, with a view to 'as clearly as possible' identifying:

- When key decisions were taken?
- Who made the decisions and how were they informed?
- When and why did impediments to implementation arise?
- How were impediments resolved?
- How can pricing and governance arrangements be improved?

The research will identify directions to address impediments and thus facilitate more balanced, rational and transparent governance, decision processes and pricing arrangements.

This is the first case study report and it focuses on the South East Queensland, Western Corridor Recycled Water Project.

Approach

This research project is being undertaken in three phases: phase one involved a literature review; phase two involves three case studies; phase three will involve a high-level review of the policy implications.

Governance Best Practice Framework and Research Questions

In the literature review phase of this research project:

1. The following working definition of governance was adopted for this project : *Governance encompasses political, regulatory, policy and institutional arrangements at all levels of water resource planning (both formal and informal) in Australia*.
2. Five best practice principles were selected to provide a focus for the subsequent research. These criteria are based on best practice governance frameworks developed by the ANAO, Global Water Partnership and OECD, :
    - **Transparency**: Governance arrangements should operate in an open manner, using language which is accessible. In addition all decisions and decision-making processes should be transparent to insiders and outsiders.
    - **Accountability**: obligation to answer for a responsibility conferred upon all agents, namely political, regulatory and institutional decision-makers.
    - **Efficiency**: Actions needs to be balanced based on their economic, social and environmental efficiency.
    - **Coherent and integrated**: Regulations, policies and decision-making processes need to be coherent and integrated.
    - **Responsive and sustainable**: Regulatory and policy settings deliver what is needed on the basis of current demand and future impact. Institutions should be built with an eye to longer term sustainability.
3. Research questions were developed (Appendix B) against each of these principles.
4. The framework provided by the above principles was supplemented by criteria relating to institutional arrangements, namely:
    - Clarity of objectives/roles;
    - Adequate and matched authority and accountability;
    - Financial (and organisational) capacity and sustainability; and
    - Appropriate incentives.

Approach (continued)

Pricing and Willingness to Pay

The literature phase of the project did not identify any significant pricing impediments to potable standard purified water. However, questions were asked as to whether:

- If prices do not reflect a commercial return on existing (sunk) assets, does this affect investment in new infrastructure?
- Do inefficient tariff structures (eg inclining block tariffs) affect revenue raising to support new infrastructure?
- Can less than full-cost pricing for demonstration purified water projects be justified, to help prove the technology?

Based on these findings research questions were developed to further explore each of these questions.

What became clear early in the case study research was the price implications of customers shifting "willingness to pay", depending on water availability. Subsequently, we enhanced the research questions to explore this issue with interviewees as this clearly has important implications for all future purified water investment decisions.

The research methods used to inform this case study are discussed below.

Case study – research method

This is the case study report for the South East Queensland, Western Corridor Recycled Water Project. In developing this case study Marsden Jacob:

- reviewed the publically available published and considerable 'grey' literature on the SEQ Western Corridor Recycled Water Project;
- identified interview candidates: based on our previous experience (including developing the funding submission and numerous versions of the business case for the SEQ Western Corridor Recycled Water Project);
- consulted with key parties to identify additional interview candidates;
- developed a semi-structured interview questionnaire to guide the interviews;
- conducted 11 face-to-face semi-structured interviews. To enable frank and open insights, all quotes in the case study are unattributed. Our thanks go to all interviewees for participating in the project:
  - David Stewart – former, Deputy Coordinator General
  - John McEvoy – former, CEO, Western Corridor Recycled Water Pty Ltd
  - Warren Traves – GHD, project leader
  - Richard Priman – formerly with Department of Natural Resources, Mines and Water (Water Taskforce)
  - Barry Dennien – Water Grid Manager, formerly with Brisbane City Council
  - Dan Spiller – Water Grid Manager, formerly with Queensland Water Commission
  - Owen Droop – Director, Gilbert and Sutherland
  - Brett Salisbury – Seqwater, Contract Management Coordinator
  - Don Alcock – Australian Water Recycling Centre of Excellence
  - Mark Askins – Queensland Water Commission
  - Paul Rees – Queensland Government Department of State Development, Infrastructure and Planning
- reviewed additional information provided by interviewees.

Western Corridor Recycled Water Project: Overview

The Western Corridor Recycled Water Project (WCRWP) is a $2.4 billion water supply augmentation project that was undertaken in South East Queensland (SEQ). The WCRWP is a component of the $6.9 billion SEQ Water Grid (see dark green lines in Figure 1).

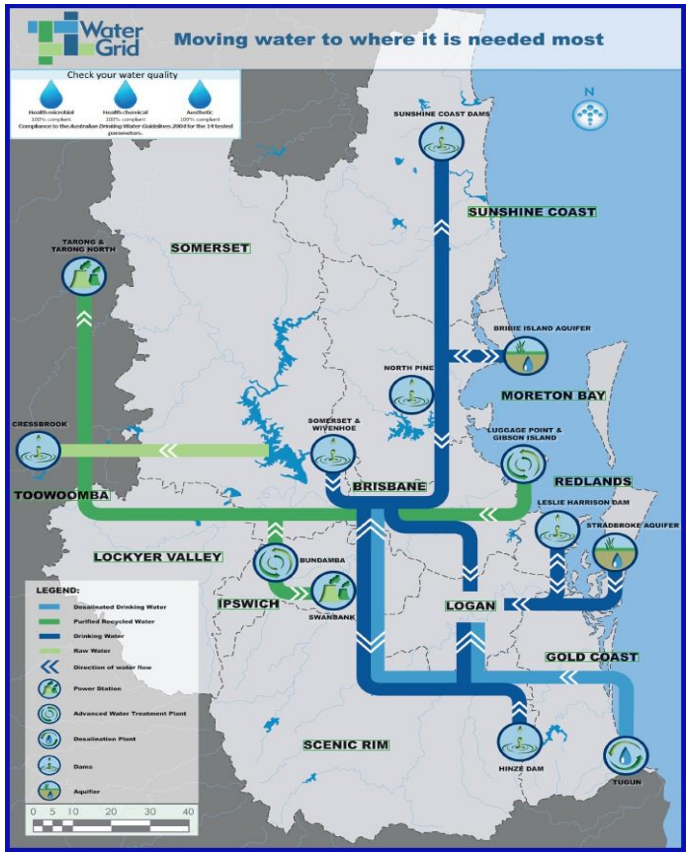
The WCRWP was designed to produce and deliver 232 megalitres per day (ML/d) of purified water.

The WCRWP comprises:

- Three advanced water treatment plants (Bundamba, Gibson Island and Luggage Point) that source water from six existing wastewater treatment plants (WWTPs) in Brisbane and Ipswich;
- An extensive water delivery network, with more than 200 kilometres of large-diameter underground pipeline, 12 major pumping stations and nine balance tanks.

As discussed, in this case study, the WCRWP was developed in response to worst drought in SEQ's recorded history, with the previous six years rainfall well below average. At the same time, the region continued to experience the fastest population growth in the country.

Figure 1 – Map of SEQ Water Grid



Source: SEQ Water Grid Manager

Western Corridor Recycled Water Project: Overview

The WCRWP was built in two stages over 2007 and 2008 calendar years (see Appendix C).

The three advanced water treatment plants take secondary treated wastewater and use microfiltration, reverse osmosis and advanced oxidation to produce purified water.

The pipeline to carry the water (see Figure 1):

1. begins at the Luggage Point advanced water treatment plant,
2. connects with the Gibson Island advanced water treatment plant,
3. connects with the Bundamba advanced water treatment plant (from where there is also a dedicated pipeline to Swanbank electricity generator),
4. connects with an offtake which can supply water to Wivenhoe Dam, for indirect potable reuse, and
5. connects to a pre-existing water pumping station from Wivenhoe Dam (at Caboonbah) to supply water to Tarong and Tarong North electricity generators.

Table 1 - Project Stages and Timelines

Advanced Water Treatment Facilities	Capacity ML/d	Delivery Date
STAGE ONE		
Bundamba 1A	20	August 2007
Bundamba 1A & 1B (combined)	66	June 2008
STAGE TWO		
Luggage Point 2A	66	October 2008
Gibson Island 2A	50	October 2008
Gibson Island 2B	50	December 2008

Section 2: Decision timelines

Decision timelines

The case study review identifies six major stages between 1999 and 2012. These are:

- **Prior to 2000**: Local government was responsible for its own water supply, so "no one was responsible for regional planning";
- **2000 to 2006**: Strong population growth and a growing awareness of drought in eastern Australian led to the formation of a committee, with local and state government representation, to develop the SEQ Regional Water Supply Strategy.
- **Late 2005 to August 2006**: The SEQ Water Board, a state-owned corporation, was charged with lead responsibility for implementation of the South East Queensland Regional Drought Strategy. But, SEQ Water's institutional arrangements were quickly found to lack the authority and financial capacity to executive these responsibilities without State Government guarantees.
- **March/April 2006**: The state government decided that WCRWP design should now focus on potable standard purified water: "*there was a 180 shift in government position on indirect potable reuse*".
- **August 2006 to October 2008**: Planning and decision making was centralised by the State Government under the Coordinator General with the Western Corridor project one of several major water supply augmentation and delivery projects developed as part of the $6.9 billion SEQ Water Grid.
- **2008 – 2012**: It began to rain with the result being that the urgency and unquestioning willingness-to-pay and acceptance of potable recycled water began to recede. The consequence was a series of decisions to reduce and potentially shift the cost burden through small rebates ($80 per household) from state budget and local government and consideration of the potential to decommission the WCRWP.

As summarised in Table 2:

- the environmental legislation was unchanged over the course of the case study,
- water governance legislation evolved and was centralised, and
- new health legislation was brought in after the first plant was commissioned and only three months before the WCRWP was completed.

Legislative instruments

Table 2 summarises the relevant legislative instruments governing decision-making on the WCRWP.

Table 2 – Key Legislative Instruments

Legislative Instrument	Discussion
Environmental Protection Act 1994, Environmental Protection Regulation 1998 Schedule 1	Sewage treatment plants are considered an environmentally relevant activity. Department of Environment and Resource Management is responsible for development approvals. (There were no major environmental issues)
South East Queensland Water Board (Reform Facilitation) Bill 1999	Governing legislation for the SEQ Water Board (1999-2007).
State Development and Public Works Organisation Act 1971, State Development and Public Works Organisation (Water Infrastructure Project Board) Regulation 2006	Legislation used by the Coordinator-General in the oversight, program management and coordination of Water Special Purpose Vehicles (including Western Corridor Recycled Water Pty Ltd).
Water Amendment Regulation No.6 2006, under the Water Act 2000	Emergency legislation implemented to fast track development of the SEQ Water Grid by the Coordinator-General (Department of Infrastructure).
South East Queensland Water (Restructuring) Act 2007	New entity 'Seqwater' established in 2007.
Water Supply (Safety and Reliability) Act 2008 **Public Health Act 2005, Public Health Regulation 2005, Part 6A**	These Acts regulates water that is being reused and supplied to a third party. Regulator is the Office of the Water Supply Regulator of the DERM (Chief Executive)

Section 3: Governance

Who was responsible for water planning and infrastructure decision-making?

The case study shows that institutional and governance arrangement relating to water supply planning were subject to change, complicated and lacked transparency. Key issues included:

- Prior to the SEQ Regional Water Supply Strategy there was no regional planning being undertaken;
- Accountability, authority and financial capacity for water planning and supply were unclear and inadequate to the emerging challenge. For instance, state and local government entities on the committee often had conflicting incentives where urban water supply is concerned. For many the primary incentive was revenue maximisation through increased sales of water, so conservative use of the resource was not a priority.
- Construction of new infrastructure was funded by local government with matching funding from the state government through a 40% headworks subsidy. As emergency water supply conditions emerged and infrastructure development costs became more significant the state government became more heavily involved in and ultimately took over decision-making responsibility.

Table 3 (over the following three pages) summarises the key entities, their activities and when they were involved in decision-making on the WCRWP.

Table 3 – SEQ Water Planning and Infrastructure Decision-Making

Overarching Project Governance Entity	Membership	Activities	When was the entity involved?
Regional Co-ordination Committee (RCC)	Qld Government Ministers and Mayors of Moreton Bay, Sunshine Coast, Ipswich City, Brisbane City, and Scenic Rim Regional Council.	To ensure that all local governments in the study area would be able to meet their water supply needs to 2020	circa 2000 to 2006
Director Generals Water Reform Steering Committee	CEOs from state and local government entities, chaired by the Coordinator-General	State water reform policy matters	circa 2000 - 2006

Who was responsible for water planning and infrastructure decision-making? (continued)

Overarching Project Governance Entity	Membership	Activities	When was the entity involved?
Regional Water Supply Strategy Steering Committee	Senior representatives from state and local government, comprising the RCC and COMSEQ	Develop a Regional Water Supply Strategy (RWSS) for SEQ.	circa 2000 - 2006
Council of Mayors in SEQ (COMSEQ), formerly SEQ Regional Organisation of Councils (SEQROC).	11 local governments in SEQ: Brisbane, Gold Coast, Ipswich, Logan and Redland City Councils and Lockyer Valley, Moreton Bay, Scenic Rim, Toowoomba, Somerset and Sunshine Coast Regional Councils.	Independent advocacy organisation to represent the interests South East Queensland (SEQ).	SEQROC established 1995, Council of Mayors in SEQ established 2005
Ipswich City Council	Mayor and Councillors	Ipswich Recycling Project (this became the WCRWP)	2005-06
Brisbane City Council	Mayor and Councillors	Investigated sending water from Oxley water treatment plant to Ipswich and Lockyer Valley	2005-06
SEQ Water Board	Corporations Law company owned by Brisbane City Council, State Government and other Local Governments	Briefly responsible for the development of non-potable and then potable business case.	2005-06

Who was responsible for water planning and infrastructure decision-making? (continued)

Overarching Project Governance Entity	Membership	Activities	When was the entity involved?
Water Infrastructure Project Board	Coordinator-General, Under Treasurer, Director-General Department of Natural Resources and Water, Deputy Coordinator-General, External Member Established under *State Development and Public Works Organisation Act 1971*	Oversight, program management and coordination of Water Special Purpose Vehicles, including Western Corridor Recycled Water Pty Ltd	28 July 2006 – October 2008: construction completed and facility management handed to Veolia Water
Seqwater	Minister for Energy and Water Supply, and Treasurer and Minister for Trade Queensland Government authority established under the *South East Queensland Water (Restructuring) Act 2007*	Seqwater catches, stores and treats water through ownership and management of catchments, storages and water treatment plants throughout SEQ	2007 - 2012

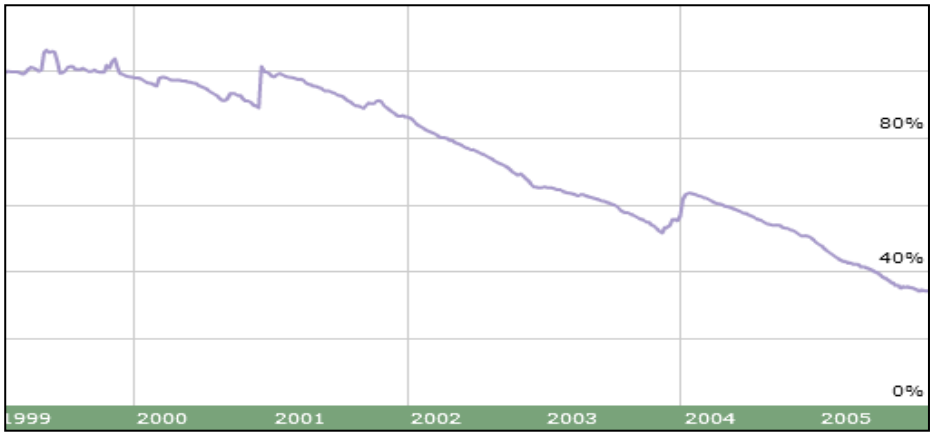
SEQ Regional Water Supply Strategy (2000-06)

Before 2000, the institutional framework meant local government had responsibility for water planning and supply within its boundaries.

In early 2000s there was a significant shift in water planning when local and state governments in Queensland began investigating future water resources for South East Queensland (SEQ).

In 2000, a Steering Committee including state and local government, and other stakeholder representatives was established to develop the SEQ Regional Water Supply Strategy (see Figure 5).

Figure 2 – Wivenhoe storage (Mar 1999 - Dec 2005)



Source: Seqwater

2004: Wivenhoe Storage falls from 100% to 52% by Dec 2004. Stage 1 of the *SEQ Regional Water Supply Strategy* is completed. Key recommendations in the strategy, include:

- additional water supply is needed for Gold Coast and Toowoomba;
- existing major supplies adequate until 2020, but significant reductions in historically determined yields; and
- the region is highly dependent on Wivenhoe Dam, diversification of supply should be considered, including purified and desalinated water.

2005: Drought impacts water supplies, Wivenhoe storage falls from 52% to 34% by Dec 2005. Water restrictions commence in May 2005.

- *SEQ Regional Drought Strategy* implemented (known as "waterforever"). Measures include: increase water delivery efficiency, recycled water to industry, reduce residential water consumption, build the water grid, augment water supplies (desalination and dams).
- SEQ Water Board takes over investigation of purified water (non-potable standard).
- Recycled water investigations focus on non-potable water supply.
- Gold Coast wants to connect to Wivenhoe, but there were growing concerns, from Department of Natural Resources, Mines and Water, about Wivenhoe's water security.

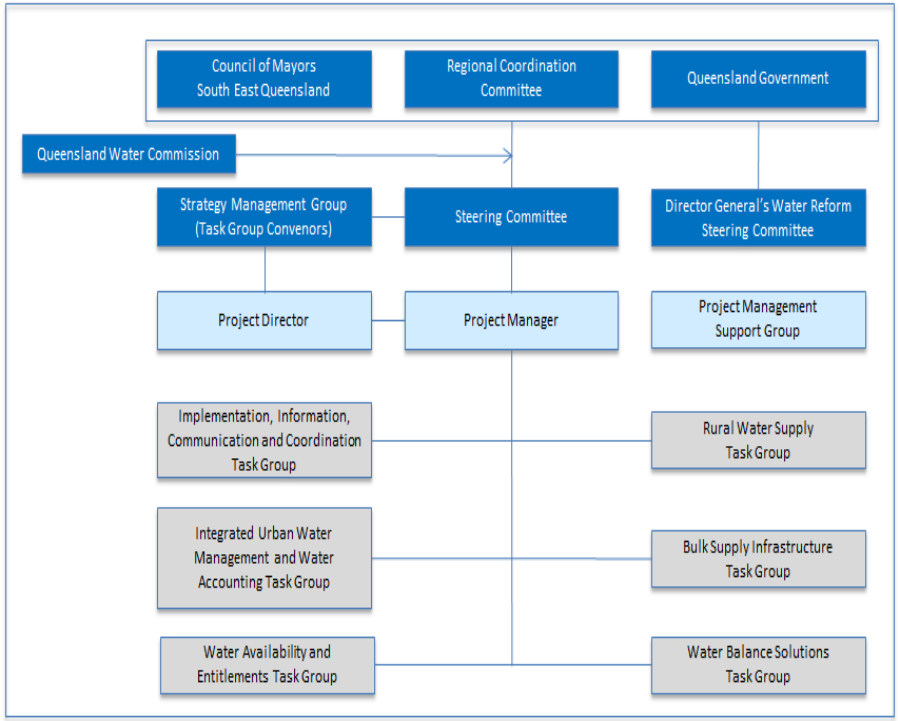
SEQ Regional Water Supply Strategy: Governance Arrangements (2000-06)

From 2000-06 the water supply planning was led by the SEQ Regional Water Supply Strategy. As detailed in Figure 5, the governance structure for the strategy comprised the Council of Mayors for SEQ, Regional Coordination Committee (State Government Ministerial committee), Departmental Steering committee and various task groups.

While superficially this group appears to be a relatively stream-lined and clearly structured group, the decision group comprises at least 19 parties:

- 11 local government Mayors: Brisbane, Gold Coast, Ipswich, Logan and Redland City Councils and Lockyer Valley, Moreton Bay, Scenic Rim, Toowoomba, Somerset and Sunshine Coast Regional Councils.
- 8 state government Ministers: Infrastructure and Planning, Treasurer and Employment and Economic Development, Natural Resources, Mines and Energy, and Trade, Main Roads, Primary Industries, Fisheries and Rural and Regional Queensland, Transport, Community Services and Housing and Women, Climate Change and Sustainability.

Figure 3 – Governance Structure: SEQ Regional Water Supply Strategy



Source: Natural Resources, Mines and Water (2006)

Why was the SEQ Regional Water Supply Strategy Committee arrangement abandoned?

A Committee of this size (19 parties) unfortunately was ill-suited to respond to the emergency water supply situation which arose in SEQ and resulted in the Coordinator General taking over the project (discussed later). However, in addition to the large committee size being an inhibiting factor, case study interviews noted concerns with:

- **Accountability:** For instance, interview participants noted that "*local government utilities initially took the lead on water planning, however, as drought conditions worsened they withdrew from this responsibility. They were able to do this because this responsibility had not been formed conferred upon them.*"
- **Efficiency:** State and local government decision-makers had perverse incentives and conflicting objectives where urban water supply is concerned. For instance, "*the primary incentive for most was revenue maximisation through increased sales of water*".
- **Responsiveness and Sustainability**: Regulatory, policy settings and institutional arrangements were basing on historical information and struggled to recognise the water reliability implication, ie "*it was a commonly held belief that Wivenhoe Dam would never run dry*".

Despite these short-coming some case study interviewees noted that the arrangement promoted:

- **Transparency and Integrated solutions**: Deliberations and decisions involved all of the key parties with responsibilities for water management, water supply and related infrastructure, and services.
- **Efficiency**: Decision-making carefully balanced the economic, social and environmental efficiency implications. Some case study interviewees even noted that this Committee would probably have best optimised the water supply augmentation decision-making.

Further case study interviewees perspectives on the committee included:

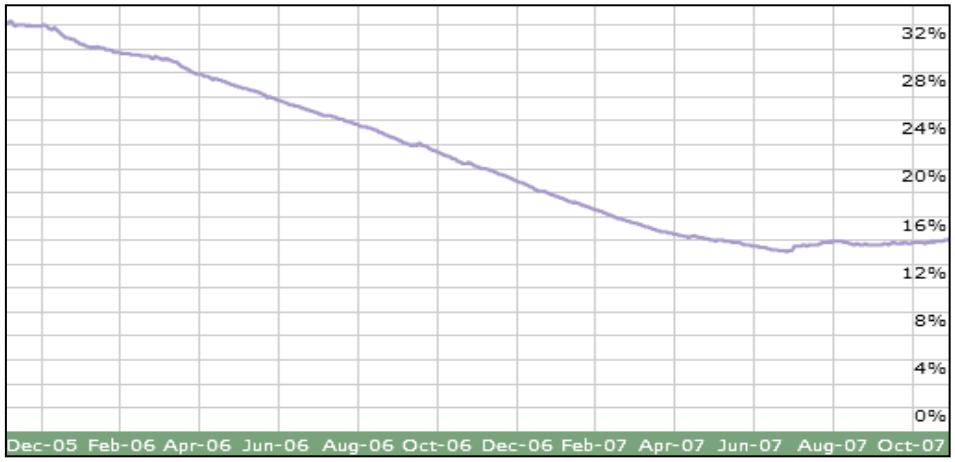
- before the committee "*there was no regional planning so it was a step in the right direction*";
- it was "*a complete shambles and needed to be fixed*"; and
- "*the large size and slow decision pace of this group motivated the creation of the Queensland Water Commission (QWC) and the decision to transfer responsibility for project construction to the Coordinator-General*" (see over).

Planning and construction responsibilities are transferred to the Coordinator-General (2006)

2006: Spring/Summer wet season fails, worst year on record (Wivenhoe storage falls from 34% to 22%, Dec 2006):

- Early 2006: SEQ Water Board executive want to implement the construction of a non-potable water purification facility. However, according to case study interviewees the SEQ Water Board couldn't approve the project because there were no contracted customers for high cost manufactured water.
- **March/April 2006: <u>Queensland Government shifts focus from non-potable to purified drinking water recycling;</u>**
- **July and August 2006: Emergency legislation implemented to fast track development of the SEQ Water Grid by the Coordinator-General** (Department of Infrastructure): July 06 *State Development and Public Works Organisation (Water Infrastructure Project Board) Regulation 2006* and August 06 *Water Amendment Regulation No.6 2006, under the Water Act 2000*
- August 2006: *Water for SEQ: A long-term solution* published.

Figure 4 – Wivenhoe storage (Dec 2005 - Dec 2007)



Source: Seqwater

2007: Wet season fails again, worst year on record (Wivenhoe storage falls from 22% to 15%, Aug 2007):

- **29 January 2007: Premier Beattie drops plans for a March 2007 plebiscite on water recycling and decides to construct the WCRWP.**
- April 2007: Australian Government provides $408 million from the Water Smart Australia Fund.
- August 2007: Construction of Bundamba (Stage 1A) completed and delivery of purified water to industrial users commences.

WCRWP construction completed (2008)

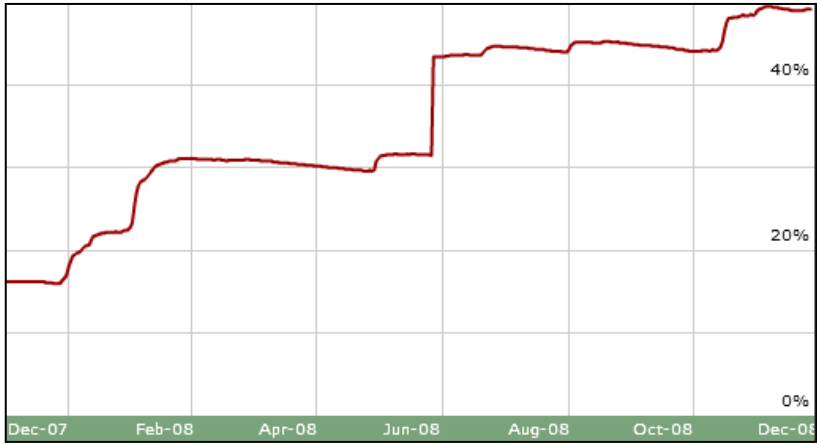
2008: Rainfall returns, Wivenhoe storage increases from16% to 49% by Dec 2008. Stages 1 and 2 of the WCRWS are completed, but indirect potable reuse capability is not implemented:

- June 2008: Bundamba 1B is completed. The Bundamba Advanced Water Treatment Plant is supplying power stations at Swanbank and Tarong with up to 41 megalitres of purified recycled water each day.
- 30 June 2008: The water quality regulatory framework is released six months after Bundamba 1A is completed. The *Water Supply (Safety and Reliability) Act 2008* which relies upon Schedule 3B in the *Public Health Regulation 2005* specifies standards including the Australian Drinking Water Guidelines values and additional standards which were not previously foreseen. Unforeseen requirements required additional upgrades to the advanced water treatment plants.
- October 2008: Luggage Point 2A (advanced water treatment facility) completed.
- October 2008: Gibson Island 2A (advanced water treatment facility) completed.
- **2008: Media campaign against purified water ramps up!**
- December 2008: Gibson Island 2B (advanced water treatment facility) is completed.

The Courier Mail
Warning over recycled water
by: *Greg Roberts of The Australian*
November 09, 2008

The Australian
Queensland Premier Bligh in backflip on recycled water
by: *Greg Roberts*
November 26, 2008

Figure 5 – Wivenhoe storage (Dec 2007 – Jan 2009)



Source: Seqwater

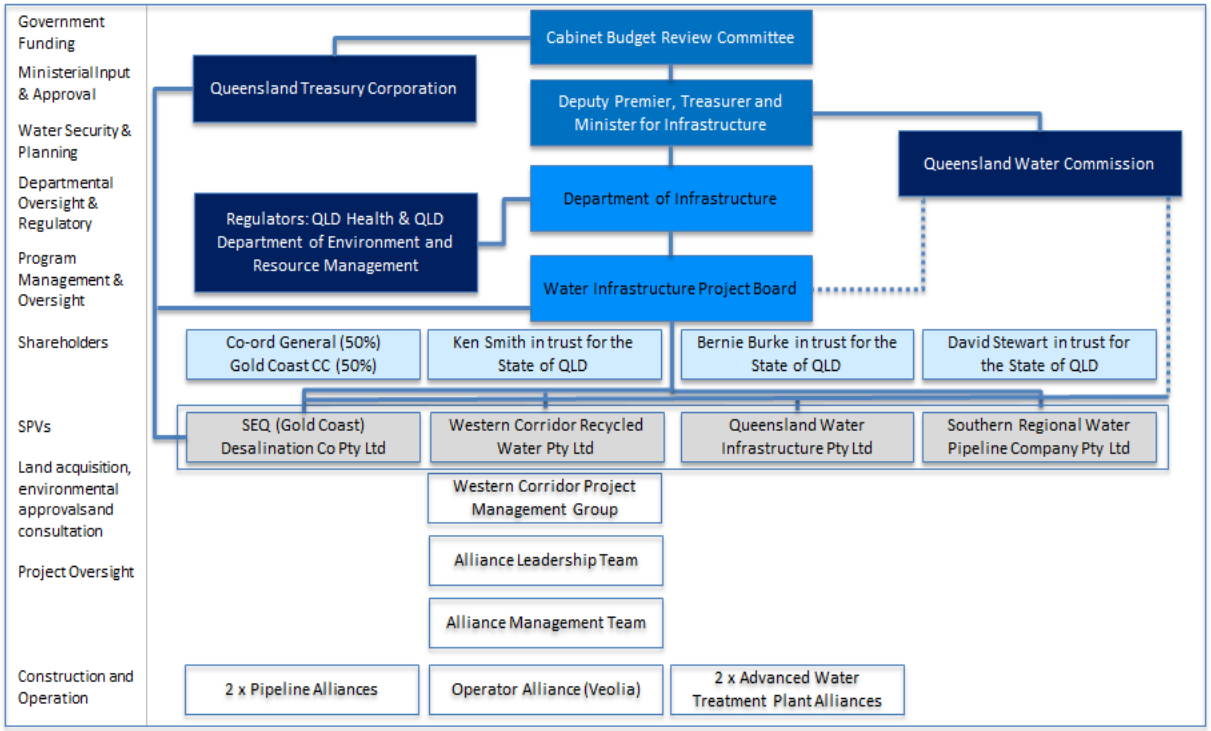
Coordinator-General: Governance Arrangements (2006-08)

Figure 6 presents the governance arrangements that surrounded the special purpose vehicles (SPVs) that were established under the *State Development and Public Works Organisation Act 1971* and *State Development and Public Works Organisation (Water Infrastructure Project Board) Regulation 2006*

This analysis identifies that at least 18 parties were involved in the Coordinator-General led governance arrangements for the WCRWP:

- Two levels of Ministerial involvements,
- Five Government Departments/Agencies,
- Water Infrastructure Project Board, and
- Shareholder,
- Special Purpose Vehicle,
- Western Corridor Project Management Group,
- Alliance Leadership Team
- Alliance Management Team
- Five Alliances (involving 21 organisations)

Figure 6 – Governance Structure: Water Infrastructure SPVs



Source: Marsden Jacob analysis, based on case study interviews, KPMG (2007), Roux, Robillot, Walker and Hester (2010), AWA (2008)

Note: In late 2008, Sure Smart Water and WCRWP Pty Ltd were merged to create WaterSecure

Coordinator-General Led Construction (2006-08)

Delegation of responsibility for planning and construction of the WCRWP to the Coordinator-General accelerated and simplified the construction phase of the project, as the powers under the *State Development and Public Works Organisation Act 1971* could be exercised. However, interviewees noted that this was only necessary because:

- of "*systemic failure of institutional design around long-term planning*"; and
- alternative water sources (dams) such as Traveston Dam were not an option as it would take too long to obtain necessary regulatory approvals (particularly Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999*) and to build. For instance, it took until 2009 for the EPBC decision on Traveston dam to be finalised and the project was not approved.

From a 'best practice' governance perspective, the delegation of the project to the Coordinator-General appears to have:

- **Clarified accountability**: Responsibility for construction of the project was clearly identified. However, subsequently detailed and highly structure governance arrangements were established;
- **Reduced transparency**: Some interviewees noted that "*the decision process was mysterious at best*" and they "*often found out about scope changes in the Courier Mail*";
- **Improve short-term but reduced long-term efficiency**: The speed of construction was definitely accelerated, however, the emergency scenario meant that decisions had to be taken without clearly and carefully balancing the short and long term economic, social and environmental efficiency; and
- **Improve responsiveness but not necessarily sustainability**: The arrangement meant that the project could be delivered quickly and thus respond rapidly to emergency conditions. However, the facility is now only operated at a fraction of its capacity, but is difficult to either shutdown, or run at small throughput volumes, or supply water to other users (eg agriculture). As discussed in the Pricing Section (Section 4) this has significant financial implications for government. residents and industry in SEQ.

Coordinator-General Led Construction (2006-08)

It should be noted that feedback from interviewees on the new governance arrangements was highly favourable, for instance:

- *"the State Development powers enabled quick delivery of the projects";*
- *"Coordinator-General's leadership was critical to quick implementation";* and
- *"this was a massive project delivered in record time".*

However, interviewees did raise questions around:

- the need for special purpose vehicles: *"SPVs were not necessarily the right vehicle".* The project could equally have been developed using more typical contractual arrangements;
- whether drawing together different entities would change decision-making: *"drawing together operation areas did not necessarily change: incentives, culture and information";*
- the need for alliances: *"Alliances led to gold plating as the incentive was to make the projects bigger and more expensive"*, and *"the structure was very efficient at spending lots of money very quickly"*; and
- The plans was designed and constructed so quickly that the Bundamba facility was completed *"several months before the health regulations"* were completed.

It should also be noted that given the emergency status of water supply in SEQ it would have been very difficult to implement the project using 'best practice' governance arrangements.

From Implementation to Closure (2009-12)

2009:

- Unseasonal autumn/winter (2009) rain events lifted Wivenhoe's storage level from 32% to 64%.
- Purified water is supplied to industrial users. WCRWP continues to operate well below full capacity, supply averages around 50-55 ML per day.

2010-12:

- Brisbane floods (Jan 2011)
- Seasonal rain maintains Wivenhoe storage stable (minimum 75%)
- Purified water is supplied to industrial users. WCRWP continues to operate well below full capacity. Water use from WCRWP is around 7-10 ML per day by power stations, under contract.
- The Queensland Government is now shutting down the WCRWP (2012)

The Courier Mail
Water Minister seeks "*advice on the future of the $2.5 billion recycled water plant".*
by: *Tuck Thompson, Mark Solomons*
October 15, 2012

Figure 8 – Wivenhoe storage (Jan 2000 – Oct 2012)

Source: Seqwater

Wivenhoe flood releases (Jan 2011)

Source: Khan 2012

Political Processes – What influence?

Over the course of the project planning, construction and implementation phase there were several federal, state and local government elections (Figure 9). The influence of these elections cannot be under-estimated, for instance:

- Just months ahead of the 2006 State Government election, emergency legislation was implemented to fast track development of the SEQ Water Grid by the Coordinator-General (Department of Infrastructure);
- Six months before the 2007 Commonwealth election, funding of $408 million, from the Water Smart Australia was awarded. This funding was awarded contrary to National Water Commission advice that only partial funding ($247.6 million) be provided and before the final Business Case was submitted;
- Just one month ahead of the election, in August 2006 the Queensland Government published *Water for South East Queensland: A long term solution*. This strategy marked a change in strategy for the Beattie Government. It introduced the 'water grid' terminology and announced: Gold Coast desalination facility (45 000 ML/a); Western Corridor recycling scheme (30,000 ML/a); and several other projects; and
- October 2008 (when the WCRWP was completed) activation for potable use was delayed by the Bligh Government who was facing a renewed media attack on potable recycling and an election in March 2009.

Figure 9 – Political Timeline

	2003-4	2004-5	2005-6	2006-7	2007-8	2008-9	2009-10	2010-11	2011-12
QLD Government Elections	Feb 04 (QLD)			Sept 06 (QLD)		Mar 09 (QLD)			Mar 12 (QLD)
Commonwealth Government Elections and Other		Oct 04 (C'th)		Apr 07 $408 m grant (C'th)	Nov 07 (C'th)			Aug 10 (C'th)	
Local Government Elections and Other	Mar 04 (Local Govt)			Jul 07 (Toowoomba Referendum)	Mar 08 (Local Govt)				Mar 12 (Local Govt)

Regulatory Approvals

Health Regulations

Health regulations were an unexpected contributor to project costs and could have been a significant impediment to project success:

- Despite construction having commenced the need for appropriate health regulations only became a priority in mid 2007, when the Queensland Government started developing the water quality regulatory framework.
- On 30 June 2008, the Queensland Government produced the *Water Supply (Safety and Reliability) Act 2008*. The Act regulated both drinking and recycled water supply and quality within the State of Queensland. The Act also relied upon Schedule 3B in the Public Health Regulation 2005.

This new legislation came into effect nine months after completion of the first (Bundamba) advanced water treatment plant and three months before the other two advanced water treatment plants were completed. Most importantly they deviated from Australian Drinking Water Guidelines by including additional standards, that had not previously been envisaged.

As a consequence:

- At the time of signing the alliance agreements, to construct the sub-projects, there was no regulatory framework in place so contractual terms were aligned with the Australian Drinking Water Guidelines. The new legislation meant the Queensland Government had to negotiate new requirements into contracts, which necessarily had cost implications; and
- The *Water Supply (Safety and Reliability) Act 2008* required the owners of the infrastructure (QLD Government through WaterSecure) to assume the ultimate responsibility for risk management and not the operators. And, "*these obligations could not easily be transferred through formal contractual arrangements*" as the agreements had already been signed. This was problematic as it had already been agreed that Veolia would operate the facilities and the new regulator requirements necessitated close collaboration between distribution service providers, operator of the drinking water storages, the construction alliances and the scheme operator (Veolia Water).

Environmental Regulations

Case study interviewees noted that there was limited environmental impact assessment undertaken for the treatment plants and none for the pipelines. For instance, while not mandated there was a voluntary Environmental and Social Impact Assessment (ESIA) report prepared.

Section 4:
Pricing and Willingness to Pay

Pricing: Background

Water Price Regulation

Price regulation in Queensland is the responsibility of the Minister for Energy and Water Utilities. Over 2006-12, the Queensland Water Commission (QWC) had an advisory role to the price regulator.

The case study interviewees confirmed that pricing arrangements were not an impediment to the development of the WCRWP. In fact, pricing matters were not considered until 2007, when the question was asked: "*how are we going to pay for the new water grid and manufactured water*?".

In 2008, the Queensland Government announced the outlook for bulk water prices for SEQ, following analysis and recommendations by the QWC. The outcome was a price path for bulk water in SEQ that resulted in annual price increases over a 10-year period (from 2008-9) with cost reflective pricing to be achieved at the end of the price path period. This meant that over the first several year the Government would provide bulk water at a loss which was being funded by debt.

SEQ Bulk Water Prices (2007-08 to 2017-18)

Table 4 details the first bulk water price path which was set in 2008. Reduced water consumption coupled with the development of the water grid and manufactured water facilities (purified water and desalination) can be seen to substantially increased the real price of bulk water across SEQ:

- As a simple average prices were forecast to increase by nearly 250 percent; and
- Region specific prices were forecast by between 130 percent (Somerset) and 403 percent (Redlands).

Table 4 – Bulk Water Price Path 2007-08 to 2017-18 ($2007-08)

	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Percentage Increase
Scenic Rim	929	1,195	1,148	1,688	1,915	2,130	2,333	2,526	2,707	2,755	2,755	**197%**
Brisbane	628	902	1,162	1,409	1,643	1,864	2,074	2,273	2,461	2,638	2,755	**339%**
Logan	954	1,220	1,472	1,711	1,938	2,152	2,355	2,547	2,728	2,755	2,755	**189%**
Ipswich	564	839	1,101	1,349	1,584	1,808	2,019	2,219	2,408	2,586	2,755	**388%**
Gold Coast	796	1,066	1,322	1,565	1,795	2,013	2,219	2,415	2,599	2,755	2,755	**246%**
Redland	548	548	676	866	1,113	1,348	1,570	1,781	1,981	2,170	2,755	**403%**
Lockyer Valley	821	1,090	1,346	1,588	1,817	2,035	2,241	2,435	2,619	2,755	2,755	**236%**
Somerset	1,198	1,458	1,704	1,938	2,159	2,368	2,566	2,752	2,755	2,755	2,755	**130%**
Sunshine Coast	683	683	807	994	1,238	1,469	1,689	1,897	2,094	2,280	2,755	**303%**
Moreton Bay	763	1,034	1,290	1,534	1,765	1,984	2,191	2,387	2,572	2,746	2,755	**261%**
Average Bulk Price	**788**	**1,004**	**1,203**	**1,464**	**1,697**	**1,917**	**2,126**	**2,323**	**2,492**	**2,620**	**2,755**	**249%**

Source: Queensland Water Commission

Revised Price Path: SEQ Bulk Water (2010)

In December 2010, when all SEQ dams were full, the Queensland Government brought forward a review of the bulk water price path and "*passed on the benefits of the efficient operation of the Water Grid to residents*". Table 5 presents the price reductions, by region.

Table 5 – Reductions in Bulk Water Prices 2010-11 to 2017-18 ($/ML)

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Scenic Rim	-	26	193	212	231	87	155	155
Brisbane	-	26	50	73	95	116	136	155
Logan	-	26	50	74	95	126	155	155
Ipswich	-	25	50	73	96	116	135	155
Gold Coast	-	26	50	73	95	116	155	164
Redland	-	26	50	73	95	116	136	155
Lockyer Valley	-	25	49	73	95	115	155	155
Somerset	-	26	50	73	152	155	155	155
Sunshine Coast	-	26	50	73	95	116	135	155
Moreton Bay	-	26	50	73	95	116	145	155

Source: Queensland Water Commission

Further Price Reductions (2012-13)

In 2012 there was a change in Government in Queensland with the Liberal National Party (LNP) elected into office. Since the election:

- In April 2012, the new Government asked the Queensland Water Commission to review bulk water prices in SEQ. The outcome of the review was to provide short-term price reductions to SEQ households, with the Government aiming to deliver a reduction of up to $80 per household in 2012-13, by providing SEQ households with a one-off water rebate.
- The State Government committed to contributing $70 per household towards this rebate and requested that SEQ councils contribute the remaining $10 per household. It is anticipated that this rebate will be a direct reduction on a household's water bill and will apply in the first quarter of 2013. (Source: http://www.qwc.qld.gov.au/reform/bulkwaterprices.html)
- A more detailed review of the longer term bulk water prices and the need for new a price path is also being considered by the Government in early 2013, with a new bulk water price to be applied from July 2013. The review will include the cost saving measures implemented by the Government and will also have consideration to the price impact of observed changes in water consumption patterns.

Pricing Implications: Looking Ahead

The literature phase of our research did not identify any significant pricing impediments to potable standard purified water. This perspective was confirmed by case study interviewees who stated that pricing arrangements were consideration of *"pricing came six months after the decision to build"*. Pricing arrangement were considered in 2007, when the QWC was asked: *"how are we going to pay for the new water grid and manufactured water?"*.

The case study has highlighted some critical current and ongoing price implications for supply projects:

- While *"pricing was a non-event"* at the time of project construction, the coincidence of a return to high rainfall with the realisation of the major cost burden on water bills incurred by the investment, has led to reduced willingness to pay, because: *"When dams are full the cost of manufactured water is huge!"*
- The current state of membrane technology means very high fixed and operating costs and lack of flexibility in reducing output when rainfall returns refills traditional water sources. Table 6 identifies that this contrast significantly to electricity generation, where base-load (in the absence of carbon taxes or prices) is cheap coal-fired generation and peaking generation is high-cost.

Table 6 – Electricity versus Water: cost and flexibility Comparison

	Low Cost Supply	High Cost Supply	Supply Flexibility	Political Issues
Water	Dams and Groundwater	Manufactured Water (purified water and desalination)	Low – not readily turned off and on	Yes – concerns about source of water
Electricity	Coal-fired Generation	Peaking Gas	High – readily turned off and on	No

Pricing Implications (continued)

- The crucial financial issue is that most costs are fixed, apart from the variable energy component and some chemical costs (similar to a desalination plant). The significant and high fixed costs necessarily increase water prices and they make private sector participation very difficult (see Figure 9).
- The construction of manufactured water facilities require significant capital outlays, which means that future prices need to pay-off the debt used to finance these fixed costs, let alone fund a return on capital. This is particularly pertinent as aside from the Australian Government grant the WCRWP was "*100 percent debt funded*".
- When the decisions are made on this type of project - in conditions of increasing emergency – limited consideration is given to how it will operate when other supply sources are full which inevitably will happen.

In support of these finding, interviewees noted that:

- "*The WCWRP was designed to deliver 200 ML/day of purified water*" and has high fixed costs;
- The facility can be shutdown, however, this will result in significant costs when the plant is reopened; and
- The coincidence of a return to high rainfall with the realisation of the major cost burden on water bills incurred by the investment, has led to reduced willingness to pay and some shifting of the cost burden to tax and ratepayers (through an $80 per household rebate).

Appendices

Appendix A: Bibliography

Auditor-General of Queensland (2007) South East Queensland – Towards a Short-Term Water Balance

Australian Water Association (2008) Water: Western Corridor Project, Vol 35, No 4

Beattie defends recycled water decision 29 January 2007, accessed 24 October 2012, **www.abc.net.au/water/stories/s1835571.htm?backyard**

Beattie rules our water vote 28 January 2007, accessed 24 October 2012, www.theage.com.au/news/national/beattie-scraps-water-plebiscite/2007/01/28/1169919196676.html

Council of Mayors : South East Queensland (2011) SEQ Water Reform: Why Water Prices are Rising, accessed 23 October 2012, www.goldcoast.qld.gov.au/attachment/factsheets/**seq-water-prices**.pdf

Khan, S 2012, 'Recycled water could have stopped Brisbane floods' ABC Environment 11 May 2012, accessed 9 November 2012, www.abc.net.au/environment/articles/2012/05/11/3500512.htm

KPMG (2007) Department of Infrastructure: Governance Review – Final Report

Marsden Jacob Associates (2000) Water Corporation: Commercial and Regulatory Preparedness

Marsden Jacob Associates (2006) Securing Australia's Urban Water Supplies: Opportunities and Impediments, A discussion paper prepared for the Australian Government Department of the Prime Minister and Cabinet

Moore, T 2009, 'Bligh pulls 'wagging' ministers into line, accessed 24 October 2012, www.brisbanetimes.com.au/queensland/bligh-pulls-wagging-ministers-into-line-20090625-cy64.html#ixzz2BhZMZ

McCullough Robertson (2008) Water Resource Law and Management, Water Supply (Safety and Reliability) Act 2008, accessed 31 October 2012 www.maculrob.com.au/publications/publications.aspx?p=47&itm=2219

Natural Resources, Mines and Water (2006) Water for South East Queensland: A long-term solution

Appendix A: Bibliography

PMSEIC Working Group (2007) Water for Our Cities: building resilience in a climate of uncertainty

Premier backflips, 4bc, accessed 22 October 2012, www.4bc.com.au/breakfast-archive-08

Queensland Water Act 2000: Water Regulation 2002

Queensland Water Commission, Bulk Water Prices, accessed 31 October 2012, www.qwc.qld.gov.au/reform/bulkwaterprices.html

Roux, Robillot, Walker and Hester (2010) Regulatory approval process for a large indirect potable reuse scheme in Australia – lessons learnt on the Western Corridor Recycled Water Scheme, Conference paper for 2010 Water Reuse and Desalination Conference, Sydney

Roberts, G 2008, 'Queensland Premier Bligh in backflip on recycled water', 26 November 2008, accessed 24 October 2012 www.theaustralian.com.au/news/bligh-backflip-on-recycled-water-plan/story-e6frg6oo-1111118141584

Roberts, G 2008, 'Warning over recycled water', 9 November 2008, accessed 25 October 2012, www.couriermail.com.au/news/queensland/warning-over-recycled-water/story-e6freoof-1111117991202

Spearritt and Head (2010) Water Politics, in A Climate for Growth: Planning South-East Queensland

Spearritt, P (nd) The water crisis in Southeast Queensland: How desalination turned the region into carbon emission heaven, in Troubled Waters Confronting the Water Crisis in Australia's Cities , accessed 30 October 2012, epress.anu.edu.au/troubled_waters/mobile_devices/index.html

Thompson, T 2012, 'Water Minister Mark McArdle denies plan to ease water restrictions despite statement saying review underway, 15 October 2012, accessed 15 October 2012, www.couriermail.com.au/news/newman-government-turns-taps-back-on-to-raise-cash/story-e6freon6-1226495751510

Uhlmann and Head (2011) Water Recycling: Recent History of Local Government initiatives in South East Queensland, Urban Water Security Research Alliance Technical Report No.46

Appendix A: Bibliography

Waterforever, www.waterforever.com.au/, accessed 30 October 2012

Water Supply (Safety and Reliability) Act 2008

Western Corridor Recycled Water Project Pty Ltd (2008) 2007-08 Annual Report

Western Corridor Recycled Water Project Pty Ltd and Empathieia (2008) Community Engagement Review: Final Report

Western Corridor Recycled Water Project Pty Ltd (2009) Quarterly Report January to March 2009

Western Corridor Recycled Water Project Pty Ltd (2009) Quarterly Report April to June 2009

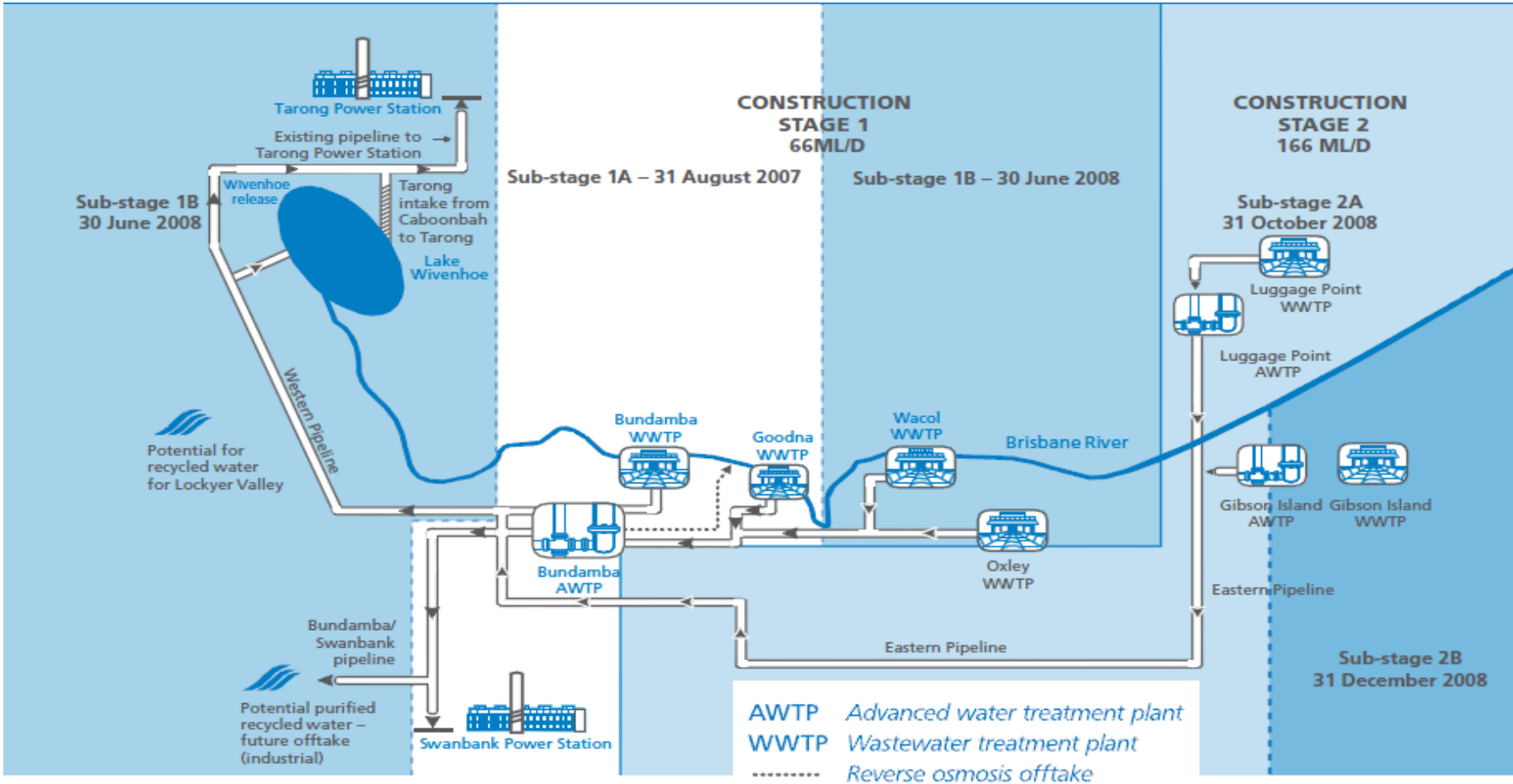
Appendix B: Governance Research Questions

Principle	Overarching Research Questions	Preliminary Research Questions
Transparency	What could be done to facilitate and drive balanced, rational and transparent governance and pricing arrangements?	Are political decision-making processes regarding new and existing potable recycled water projects readily identifiable? Are political decision-making processes regarding new and existing potable recycled water projects transparently reported? Are regulatory arrangements regarding new and existing potable recycled water projects openly communicated? Are policy decisions and decision-making processes regarding new and existing potable recycled water projects transparently detailed? Can institutional arrangements regarding new and existing potable recycled water projects be readily identified?
Accountability	What are policy and decision makers concerns? What roles do these concerns play in project decision-making and what factors influence these concerns?	Is there role clarity between political, regulatory and the executive in institutions? Are there any conflicting roles and responsibilities? Do the accountabilities support the achievement of the most efficient water supply outcome?

Appendix B (continued): Governance Research Questions

Principle	Overarching Research Questions	Preliminary Research Questions
Efficiency	What are policy and decision makers concerns? What roles do these concerns play in project decision-making and what factors influence these concerns? What could be done to both facilitate and drive balanced, rational and transparent governance and pricing arrangements?	If potable recycling is the most efficient water supply alternative, when balancing environmental, social and economic considerations, how readily can decision-makers exercise discretion to block implementation of the project? Are decision-makers exercising this discretion? Why? What could be done to facilitate and drive more efficient decision-making? What degree of influence on the cost-effectiveness of potable recycling, is being exerted by 'independent' regulators and advisory committees, eg health and economic? Is this adversely affecting the cost-effectiveness of potable recycling compared to other sources?
Coherency & integrated	What could be done to both facilitate and drive balanced, rational and transparent governance and pricing arrangements?	Are current decision-making arrangements, including policies and regulations coherent and integrated? Do stakeholders believe that decision-making processes are accessible and understandable?
Responsiveness & sustainability	What could be done to both facilitate and drive balanced, rational and transparent governance and pricing arrangements?	Are regulatory and policy settings designed to consider, balance and deliver optimal solutions over both short and long terms?

Appendix C: Western Corridor Recycled Water Project, Project Map



Source: Western Corridor Recycled Water Project Pty Ltd, 2007-08 Annual Report