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Queensland Competition Authority

Review of SunWater's Network Service Plans

Toowoomba Cluster - Operational and Capital Expenditure

August 2011

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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- *did not include those items listed in section 3.3 of the Report.*

The opinions, conclusions and any recommendations in this Report are based on assumptions made by GHD when undertaking the services and preparing the Report ("Assumptions"), including (but not limited to):

- *Data and information requested by GHD and provided by SunWater was assumed to be complete, free from errors and not misleading;*
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Executive Summary

GHD has been commissioned by the Queensland Competition Authority to review the operational expenditure (Opex) and capital expenditure (Capex) listed in SunWater's Network Service Plans (NSPs) for seven schemes. The schemes included in this review are:

- Chinchilla Weir Water Supply Scheme;
- Cunnamulla Water Supply Scheme;
- Macintyre Brook Water Supply Scheme;
- Maranoa River Water Supply Scheme;
- St George Water Supply Scheme;
- St George Distribution System; and
- Upper Condamine Water Supply Scheme.

GHD's review has been limited to the following:

- The prudency and efficiency of SunWater's proposed operating costs (except administration, insurance, indirect and overhead costs), and renewals and rehabilitation expenditures; and
- The appropriateness of the methodology used for the attribution of operating costs to irrigation schemes and customers.

The approach to reviewing the NSPs involved a desktop review of information and data, meetings with QCA, SunWater, Stakeholders, and verification of information in the NSPs by site inspection at selected Schemes (Macintyre Brook WSS, St George WSS, and St George Distribution System).

The Opex and Capex review concluded that:

- SunWater has valid and sound methodologies for developing their forward cost estimates, but the information and data provided by SunWater did not allow a full evaluation of their forward costs. Although additional requests for information of sufficient detail for proper evaluation were made of SunWater by the Authority on behalf of all reviewing consultants, provision of the required information was not timely, not in sufficient detail and hence, hindered the evaluation process.
- While SunWater's escalation factors for labour cost are considered prudent and efficient, the escalation factor of 4% for contractors and materials could not be justified.
- SunWater has escalated Electricity at CPI, in lieu of Benchmark Retail Cost Index (BRCI), citing that the BRCI is not stable or consistent. SunWater's argument does not provide sufficient justifiable reason for GHD to accept this approach.
- The information and data provided by SunWater did not allow a full evaluation of the forward costs.
- For the Macintyre Brook Water Supply Scheme, GHD would refer whether the cost over-runs on the Whetstone Weir rehabilitation project should be included in the opening renewals balance to the Authority for consideration.

- For the St George Water Supply Scheme, GHD would recommend SunWater adjust projected Capex expenditure for Jack Taylor Weir to include the repairs to the balustrades and revise the cost estimate for the restoration of the wing walls and flood damaged rock pitching.
- For the St George Water Distribution Scheme, GHD would recommend SunWater review of the design option for the St George Pump Station Refurbishment Project and review of the need for retention of the Buckinbah Pump Station.
- GHD would recommend some efficiency gains could be made by implementing electronic water ordering, reducing the number of water products and have customers read and enter their meter readings via the SunWater Online Customer accounts and SunWater reduce their own meter reading routine to quarterly.

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List of Abbreviations

AMTD	Adopted Middle Thread Distance
Capex	Capital Expenditure
CPI	Consumer Price Index
DERM	Department of Environment and Resource Management
GAWB	Gladstone Area Water Board
GHD	GHD Pty Ltd
GOC	Government-owned Corporation
IVR	Integrated Voice Recognition
km	Kilometres
ML	Megalitres
NSP	Network Service Plan
Opex	Operational Expenditure
ORC	Optimised Replacement Cost
QCA	Queensland Competition Authority
QR	Queensland Rail
R&R	Renewals and Rehabilitation
ROL	Resource Operating Licence
ROP	Resource Operating Plan
SAP	Enterprise Computer System
SAP PM	Enterprise Computer System – Project Management Module
ToR	Terms of Reference
WAE	Water Access Entitlement
WDE	Water Delivery Entitlement
WMS	Work Management System
WSS	Water Supply Scheme

1. Introduction

1.1 Background

Queensland Competition Authority

The Queensland Competition Authority (the Authority) is an independent pricing and access regulator responsible for ensuring that specified monopoly infrastructure-based services in Queensland comply with the principles of national competition policy.

SunWater

As a Queensland Government-owned Corporation (GOC), SunWater provides a range of services including infrastructure ownership, water delivery, operation and maintenance of infrastructure and engineering consultancy services. Over the last 80 years, SunWater has built and now owns and operates water supply infrastructure throughout Queensland which supplies water to irrigated agriculture, mining, power generation, industry and local government. Irrigators contribute nearly 30% of SunWater's revenue and use 81% of the water.

SunWater's water storage and distribution infrastructure includes 19 major dams, 63 weirs and barrages, 80 major pumping stations, and more than 2500 kilometres of pipelines and open channels. The existing price paths that apply to the 22 water supply schemes (WSSs) are due to expire on 30 June 2011.

The water supply schemes are supported by four regional operation centres and SunWater's head office located in Brisbane.

Ministerial Direction

The Premier and the Treasurer (the Ministers) directed the Authority to develop irrigation prices to apply to 22 SunWater WSSs from 1 July 2011 to 30 June 2016. An Amended Ministers' Referral Notice (the Notice) now directs the Authority to recommend irrigation prices to apply to SunWater water supply schemes from 1 October 2011 to 30 June 2016.

The Ministers' Referral Notice requires, among other things, that bulk water supply and channel prices/tariff structures are set so as to provide a revenue stream that allows SunWater to recover the prudent and efficient costs associated with:

- Its operational, maintenance and administrative activities; and
- Renewing and rehabilitating existing assets using a renewals annuity methodology.

1.2 Purpose and Requirements of the Consultancy

As part of the process of developing irrigation prices, SunWater has submitted to the Authority its Network Service Plans (NSPs), and associated supporting documents, for each of the 22 water supply schemes covered by the Ministerial Direction. For some schemes SunWater has provided NSPs for both bulk and distribution water services.

Among other matters, these NSPs and supporting documents contain SunWater's estimates of the costs to be shared by irrigators and recovered in irrigation prices. Scheme service costs relevant to irrigators, comprise the following elements:

- Projected costs for operational, maintenance and administration activities for the five-year period commencing 1 July 2011; and
- Forecast expenditure for renewing and rehabilitating existing assets for the period 1 July 2011 to 30 June 2036 (i.e. a 25-year period in order to develop a 20-year rolling annuity).

The Authority's role is to review the prudency and efficiency of the irrigators' allocated expenditure for each water supply scheme.

For expenditure to be prudent there must be an identified need. That is, the expenditure must be necessary to operate and administer the particular service being priced, fulfil regulatory obligations, or provide for the renewal or rehabilitation of existing infrastructure. For expenditure to be efficient, it must represent the least-cost means of providing the requisite level of service within the relevant regulatory framework.

Accordingly, the Authority engaged four consultancy firms to provide independent advice in relation to:

- The prudency and efficiency of SunWater's proposed operating costs (except administration, indirect and overhead costs), and renewals and rehabilitation expenditures; and
- The appropriateness of the methodology used for the attribution of operating costs to irrigation schemes and customers.

The scope of the consultancy does not include an assessment of SunWater's administration costs (i.e. indirect and overhead costs), or the appropriateness of their attribution, return on capital, or the methodology used to allocate renewals expenditures to individual bulk water and distribution systems, as these are subject to separate independent reviews.

The 22 bulk water schemes and eight channel systems have been grouped into the following four clusters with each cluster assessed by a separate consultant.

The Authority has commissioned GHD to assess Cluster 1 (Toowoomba Cluster).

Table 1 Water Supply Scheme Clusters

Cluster Designation	Water Supply Schemes
1 (Toowoomba)	Cunnamulla, Maranoa River, St George, Chinchilla Weir, Macintyre Brook, Upper Condamine.
2 (Bundaberg)	Boyne River and Tarong, Upper Burnett, Barker Barambah, Lower Mary, Bundaberg.
3 (Biloela)	Nogoa Mackenzie, Lower Fitzroy, Dawson Valley, Callide Valley, Three Moon Creek.
4 (Mackay/Ayr/Mareeba)	Eton, Pioneer River, Bowen Broken Rivers, Proserpine River, Burdekin Haughton, Mareeba Dimbulah.

1.3 Structure of the Report

This report deals exclusively with the Toowoomba Cluster and is structured as follows:

- Section 2 – Overview of SunWater's Network Service Plans: This section details information that is common to all schemes. This includes SunWater's policies and procedures, risks and constraints and how the business forecasts and generates costs.
- Section 3 – Scope and Methodology: This section details GHD's approach to review SunWater's NSPs against recorded operating, renewals and rehabilitation expenditure.
- Section 4 – This section provides an assessment of the elements that are common to each scheme.
- Sections 5 to 11 –These sections provide a detailed assessment of each Water Supply Scheme and Distribution System in the Toowoomba Cluster and include:
  - Overview of the scheme;
  - Analysis and assessment of prudency and efficiency of proposed operating expenditures and recommendations on identified issues; and
  - Analysis and assessment of proposed renewals and rehabilitation expenditures and recommendations on identified issues.
- Section 12 – Conclusion: This section provides a summary of the review, observations and recommended actions.

2. Overview of SunWater's Network Service Plans

2.1 Description of Schemes

The Toowoomba region includes the areas as outlined in the figure below.

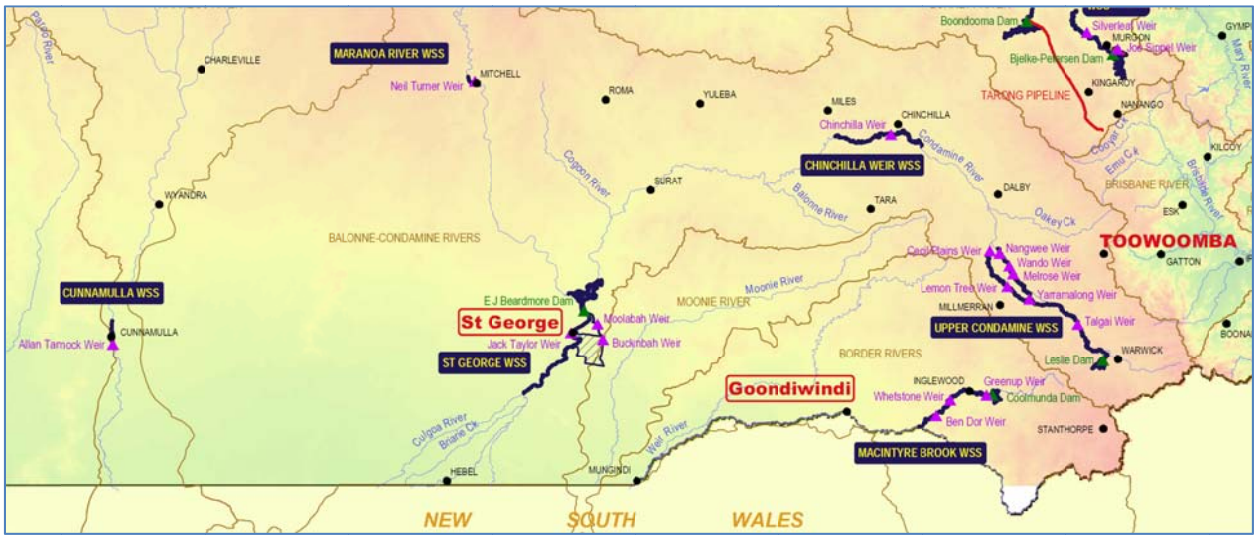


Figure 2.1 Overview of the Toowoomba Cluster

2.1.1 Operational Requirements and Management

Under the Toowoomba Cluster, SunWater manages, operates and maintains six water supply schemes and one distribution system. SunWater has contracts with all its bulk customers and is required to release water to satisfy the likely demand of the customer, subject to:

- Resource Operations Plans and SunWater's Resources Operation Licences;
- Customer Water Allocation Entitlements (WAEs) and available water;
- Estimates of likely demand of other customers;
- Capacity of the bulk water assets; and
- Provisions of the *Water Act 2000.*

To manage the day-to-day water supply and the delivery of the programmed works to these schemes, Senior Operators or Service Managers are stationed at local depots. Within the Toowoomba Cluster, there are three depots - located at Pittsworth, St George and Toowoomba. As part of the day-to-day scheme management, operators must comply with the requirements of the relevant Resource Operation Plan. There are three Resource Operations Plans in the Toowoomba Cluster:

- The Warrego, Paroo, Bulloo and Nebine Resource Operations Plan – Cunnamulla Water Supply Scheme;
- The Condamine Balonne Resource Operations Plan – Chinchilla Weir, Maranoa, St George and Upper Condamine Water Supply Schemes and St George Distribution System; and
- The Border Rivers Basin Resource Operations Plan – Macintyre Brook Water Supply Scheme.

Specialist operations staff with expertise in key operational areas such as communication systems (SCADA), electrical, mechanical and civil engineering are located centrally with resources shared across all schemes. These personnel are located in Brisbane, Ayr and Bundaberg and support local operators in dealing with technical problems. These specialist operations staff are also responsible for setting standardised work practices and procedures.

2.1.2 Physical Location

Chinchilla Weir Water Supply Scheme

The scheme is located near the town of Chinchilla. It extends from the Condamine River at 643.7 km Adopted Middle Thread Distance (AMTD) to its upstream extent at 743.6 km AMTD.

Cunnamulla Water Supply Scheme

The Scheme is located near the town of Cunnamulla. It extends from the Allan Tannock Weir on the Warrego River at 124.8 km AMTD to the upstream limit of its ponded area at 142.0 km AMTD.

Macintyre Brook Water Supply Scheme

The scheme is centred on the town of Inglewood. The major bulk water assets are located on the regulated section of the Macintyre Brook from the upstream ponded area of Lake Coolmunda to the junction with the Dumaresq River on the Queensland Border.

Maranoa River Water Supply Scheme

The Scheme is located near the town of Mitchell in Central South Queensland. It extends from the Neil Turner Weir on the Maranoa River at 222.2 km AMTD to the upstream limit of its ponded area at 229.2 km AMTD.

St George Water Supply Scheme

The scheme is located on the regulated section of the Balonne River from the upper reaches of Lake Karajabie at AMTD 305 km to the bifurcation of the Culgoa River and the Balonne Minor River at AMTD 164 km and the regulated section along the Thuraggi water course to AMTD 27.4 km.

Thuraggi water course is a defined water course under the *Water Act (2000).* SunWater has no tenure over this water course.

St George Distribution System

The system is located near the town of St George. This system includes 112 km of channels and 99 km of drains.

The distribution system utilises the Thuraggi water course, which is a defined water course under the *Water Act 2000*. SunWater has no tenure over the Thuraggi water course.

Upper Condamine Water Supply Scheme

The scheme is located on the regulated section of the Sandy Creek from the upper reaches of Lake Leslie to the bifurcation of Sandy Creek and the Condamine River down to the downstream limit of Cecil Plains Weir on the Condamine river at AMTD 891.1 km and the regulated section along the North Channel from the outlet of the Yarramalong Pipeline at AMTD 97.0 km down to AMTD 10.0 km

The scheme utilises Sandy Creek, the Condamine River and the Condamine North Branch, which are defined water courses under *the Water Act (2000).* SunWater has no tenure over these water courses.

2.1.3 Description of Bulk Assets

A number of bulk water assets make up the schemes in the Toowoomba Cluster. The table below lists the assets in each scheme.

Table 2 Bulk Water Assets

Asset	Capacity when Full	Optimised Replacement Cost At 1 July 2011
Chinchilla Weir WSS		
Chinchilla Weir	9,780 ML	$ 16,176,841
Cunnamulla WSS		
Allan Tannock Weir	4,770 ML	$ 7,227,211
Macintyre Brook WSS		
Coolmunda Dam	69,000 ML	$ 196,033,584
Greenup Weir	370 ML	$ 1,420,965
Whetstone Weir	506 ML	$ 2,567,000
Ben Dor Weir	734 ML	$ 7,643,257
Maranoa River WSS		
Neil Turner Weir	1,960 ML (originally)	$ 17,454,229
St George WSS		
Beardmore Dam	81,700 ML	$ 94,806,447
Jack Taylor Weir	10,100 ML	$ 16,145,454
Moolabah Weir	3,950 ML	$ 4,142,967
Buckinbah Weir	Not Available	$ 449,010
St George Distribution		
St George Pump Station	-	Not Available
Buckinbah Regulator and Pump Station	-	Not Available
Buckinbah Main Channel	-	Not Available
St George Low Level Pump Station	-	Not Available
Upper Condamine WSS		
Leslie Dam	106,300 ML	$ 150,590,241
Talgai Weir	640 ML	$ 3,110,790
Yarramalong Weir	390 ML	$ 3,225,843
Nangwee Weir	80 ML	$ 3,030,226
Lemon Tree Weir	300 ML	$ 1,254,924
Cecil Plains Weir	700 ML	$ 1,590,008
Melrose Weir	160 ML	$ 647,967
Wando Weir	310 ML	$ 1,470,395

2.2 SunWater's Service Framework and Obligations

The following provides a brief overview of SunWater's service framework and obligations under this framework.

Service obligations between SunWater and its customers are governed by:

- Customers' water entitlements;
- Contracts between SunWater and its customers; and
- Obligations specified under state water planning instruments (e.g. a Resource Operations Licence - ROP).

SunWater service obligations are as follows:

- SunWater provides bulk water, water channel (network) services and water drainage services; and
- SunWater is obliged to supply available water to customers in accordance with their entitlements at a given point in time.

Bulk Water

SunWater as a bulk water service provider is obliged to store and deliver water to a customer, in accordance with the customer's water entitlements. The customer's water entitlements are not the responsibility of SunWater; however, SunWater can only supply water to water entitlement holders.

SunWater is obliged to abide by the conditions set out in the associated ROP including:

- Operating conditions for water storages (e.g. minimum storage levels, environmental release rules and constraints on rates of release;
- Water sharing rules (such as announced allocation or continuous sharing rules);
- Environmental monitoring and reporting requirements; and
- Recording and reporting water use by entitlement holders.

Water Channel (Network) Services

In Water Channel Networks, SunWater's obligations are as follows:

- SunWater is obliged to divert and deliver available water to a customer's offtake, where water entitlements are measured; and
- SunWater is obliged to account for distribution losses in the channel system so customers' water allocation is delivered to their offtake.

In networks when water demand exceeds supply, SunWater may ration water supply in accordance with flow rate limitations or on a roster.

Water Drainage Services

Drainage services exist to take and dispose of excess irrigation water or large rainfall runoff from lands. SunWater is obliged to maintain the capacity of the drainage infrastructure for the serviced land, with the drainage rates set under state regulation.

Qualifications to the Obligations

- SunWater is not obliged to manage customers' demand-supply requirements – customers are responsible for determining their own requirements, procuring needed water rights themselves;
- SunWater is not obliged to undertake water supply planning, to set or manage water supply Levels of Service or respond to supply shortages;
- SunWater is not obliged to recover water supply planning or drought mitigation costs (as it should not incur them) – customers are responsible for managing supply risks;
- SunWater is not obliged to control water quality or treat water to a specified quality (however ROP operating requirements may seek to optimise water quality to the benefit of the environment, but not customers); and
- SunWater is not obligated to take account of future water demands from the network or plan augmentation for future demands (although SunWater may enter a commercial arrangement with existing or new users to undertake this planning).

2.3 Operating Cost Program Planning and Generation Process

SunWater uses a thorough planning process to plan, program and generate Direct Operational Costs. The work is managed in the SAP software system and tasks are assigned through work orders. Time and cost is captured in the SAP software system. The SAP software system has the delegations and authorities built into the process to maintain governance requirements. A team member schedules the work program and is responsible for managing the work within the restricted pool of internal resources supported by contracted services.

Work tasks are driven predominately by the compliance requirements specified in the Resource Operating Licence (ROL) and Resource Operating Plan (ROP). Additionally, the SAP software system generates Preventative Maintenance Programs (planned activity) that reflect the requirements of SunWater Asset Management Policy. All of these tasks form work orders that are scheduled and assigned to resources.

Budget and risk constraints are considered as the program is developed. High risk work is completed as a priority, while low risk work may not be completed in as timely a manner as SunWater would prefer. An example of this was discussed during the site inspections at the Beardmore Dam with SunWater representatives. A particular piece of infrastructure that is obsolete and not in service remains in place in a safe and low risk state. It has not been removed as the budget and resource have not been available and the infrastructure will remain until resources become available.

Corrective Maintenance (reactive activity) costs are captured via the SAP software system work order process. These costs are by their very nature unpredictable. However, SunWater have historical information of Corrective Maintenance costs and have made a valid estimation of the likely costs for Corrective Maintenance going forward.

The Network Service Plan Operational Costs are derived from the planned and responsive activities for the period of the price path.

2.4 Renewals Forecast Planning and Generation Process

SunWater uses an Asset Management Approach to renewals forecast program planning. Their approach is "…to manage our assets in a sustainable manner to meet SunWater's business objectives of safeguarding asset integrity and ensuring continuing asset serviceability".[1] Their policy and procedures are set out in a series of Asset Management documents and managed through the SAP software system. The Asset Management System is based on a defined asset hierarchy, which includes a decomposition of the assets, asset attribute details, useful life, and replacement values, condition appraisals and risk assessments. The SAP software also includes maintenance planning modules which forecast recurrent refurbishment works needed to maintain the assets functionality.

The renewals forecasts in the NSPs are generated from an annual program of projects from SAP. These projects are based on the prediction of when assets need to be replaced, forecast refurbishment works generated from condition appraisals, planned maintenance tasks where the activity frequency exceeds twelve months, and studies to investigate problems with the infrastructure, systems or required for legislative compliance (e.g. Public and Dam Safety).

For replacement assets, the forecast costs in the annuity program are based on the replacement value of the current asset (held in SAP Asset Register). Refurbishment costs, planned maintenance and studies cost estimates are calculated using a Bill of Materials method (bottom up estimate). The estimates are calculated at current value and escalated by 2.5% per annum.

Renewals projects beyond year 2 (2013) are approximate costs, which have not been subjected to detailed management scrutiny or engineering options assessment. Projects in year 1 (2012) are reviewed and a more comprehensive cost estimate is prepared for projects greater than $50,000. Options analysis, engineering designs and detailed cost estimates are completed for the more complex and high value projects. Once a project has been approved to proceed, the procurement processes, as detailed in SunWater's "Purchasing Guide, Aug 2010" and "Delegations Policy and Delegations Matrixes, 27/10/2010", are followed. Each project goes through a series of ten Project Management steps, including approvals, planning, purchasing, construction/purchasing, completion and project close-out.

2.5 Renewals Annuity Methodology

SunWater is proposing a 20 year rolling annuity for the ongoing accounting for renewals expenditure. As such, SunWater accounts for the balance of these annuity transactions through an Asset Restoration Reserve (ARR). In the NSPs, SunWater presents the ARR and renewals expenditure for the whole scheme, not just those charges attributable to the irrigation sector.

Under the rolling annuity approach SunWater forecasts the renewals expenditure required for the next 20 years. The present value of this expenditure is calculated and then deducted from the opening balance (ARR). This net present value is then annuitized to calculate the income required to cover these capital costs.

This process is followed for each year of the price path. The annuity is calculated in the dollar value for each respective year and then deflated at the end to present the annuity in 2011 dollars for the purpose of the NSP. This deflation then allows the annuity to be indexed at a later date.

[1] SunWater (February 2004), Asset Management Policy, Standard No: Am.01, Revision 1, 12/02/04

A proportion of the renewals annuity is attributed to the irrigation sector; SunWater has developed Headworks Utilisation Factors and proposes to use these to attribute costs to customers. This attribution of the renewals expenditure is outside the scope of this review. The discount rate used to calculate the present value and the interest rate applied to the asset restoration reserve are also outside the scope of this review.

3. Scope and Methodology

3.1 Definitions

Direct Attributable Costs

Where time and expenses are incurred directly in activities benefiting a specific asset/activity, these “direct costs” are assigned directly to each asset or activity. Direct attributable costs can be operational or capital costs.

Indirect Costs

Indirect costs are those costs that are attributable to a type of activity or asset, but it is difficult to establish a direct causal link to a particular activity/asset. Indirect costs are excluded from this review.

Overhead Costs

Overhead costs are those costs where there is no direct causal relationship with individual or types of assets or activities. These costs not only include administration or corporate costs, but all residual costs that cannot be allocated as direct or indirect costs. Overhead costs are excluded from this review.

3.1.1 Direct Operational Expenditure

For this review, direct operational expenditure includes the activities and expenditures listed below, while excluding insurance costs and revenue offsets.

- Operating Costs - The day-to-day costs of delivering water and meeting compliance obligations;
- Electricity;
- Preventive Maintenance - Preventive maintenance is defined as maintaining the ongoing operational performance and service capacity of physical assets as close as possible to their designed performance standard. SunWater classifies preventive maintenance as cyclical in nature with a typical interval of 12 months or less;
- Corrective Maintenance – There are two types:
  - Emergency breakdown maintenance which refers to maintenance that has to be carried out immediately to restore normal operation or supply to customers, or to meet a regulatory obligation (e.g. rectify a safety hazard); and
  - Non-emergency maintenance, which refers to maintenance, that does not have to be carried out immediately to restore normal operations, but needs to be scheduled in advance of the planned preventative maintenance cycle.

3.1.2 Capital Expenditure (Renewals Expenditures)

For this review, capital expenditure is the expenditure defined under the renewals program in the NSPs. The forward five year renewals program and projects completed between 2007 and 2011 are within the scope of this review. Renewals projects include activities related to refurbishment works and studies.

3.2 Scope

GHD has undertaken the following scope of works, as defined in and summarised from the QCA's Terms of Reference[2] (ToR), to review SunWater's proposed operation, renewals and rehabilitation expenditure for prudency and efficiency.

3.2.1 Operational Expenditure (Opex)

The Opex review comprised:

- An assessment of whether SunWater's policies and procedures for the incurrence and attribution of operational expenditure (including those relating to wages, salaries and working conditions) represent good industry practice;
- An assessment of the extent to which SunWater's Opex projections are based on appropriate cost drivers, including water use;
- An assessment of the cost escalation methods and factors used by SunWater to project operating costs into the future are appropriate and consistent with industry benchmarks;
- An assessment of the bases for assigning Opex to schemes, scheme segments, and customers as appropriate; and

Completion of the above was undertaken with regard to:

- The conditions prevailing in relevant markets, historical trends in operating expenditure, the potential for efficiency gains or economies of scale, and relevant interstate and international benchmarks; and
- Required or agreed service standards and SunWater's compliance requirements.

3.2.2 Capital Expenditure (Capex) for Renewals and Rehabilitation

The Capex review comprised:

- An assessment of the renewals methodology and any associated variations;
- An assessment of the appropriateness of the renewals annuity balances through time;
- An assessment of whether SunWater's policies and procedures for the incurrence of renewals and rehabilitation (R&R) expenditure represent good industry practice;
- An assessment of whether R&R expenditure proposed by SunWater is prudent; that is, there is a demonstrated need for the expenditure;
- An assessment of whether the capital expenditure proposed by SunWater is cost-effective in its scope and standards; and

Completion of the above was undertaken with regard to:

- The classification of bulk and channel assets as approved by Treasury and provided by the Authority;
- The condition of both bulk and distribution assets;

[2] Queensland Competition Authority (2010), Terms of Reference: SunWater Water Supply Schemes 2011-2016 Price Paths: Review of SunWater's Network Service Plans (Capex & Opex), amended 9th November 2010.

3.3 Exclusions from the Scope

The assessment of the following items has been excluded from the scope of this review:

- SunWater's administration costs (i.e. indirect and overhead costs) or the appropriateness of their attribution;
- Return on capital;
- Cost of insurances;
- Discount rates used to calculate the renewals annuity; and
- Methodology used to allocate renewals expenditures to individual bulk water and distribution systems.

3.4 Methodology

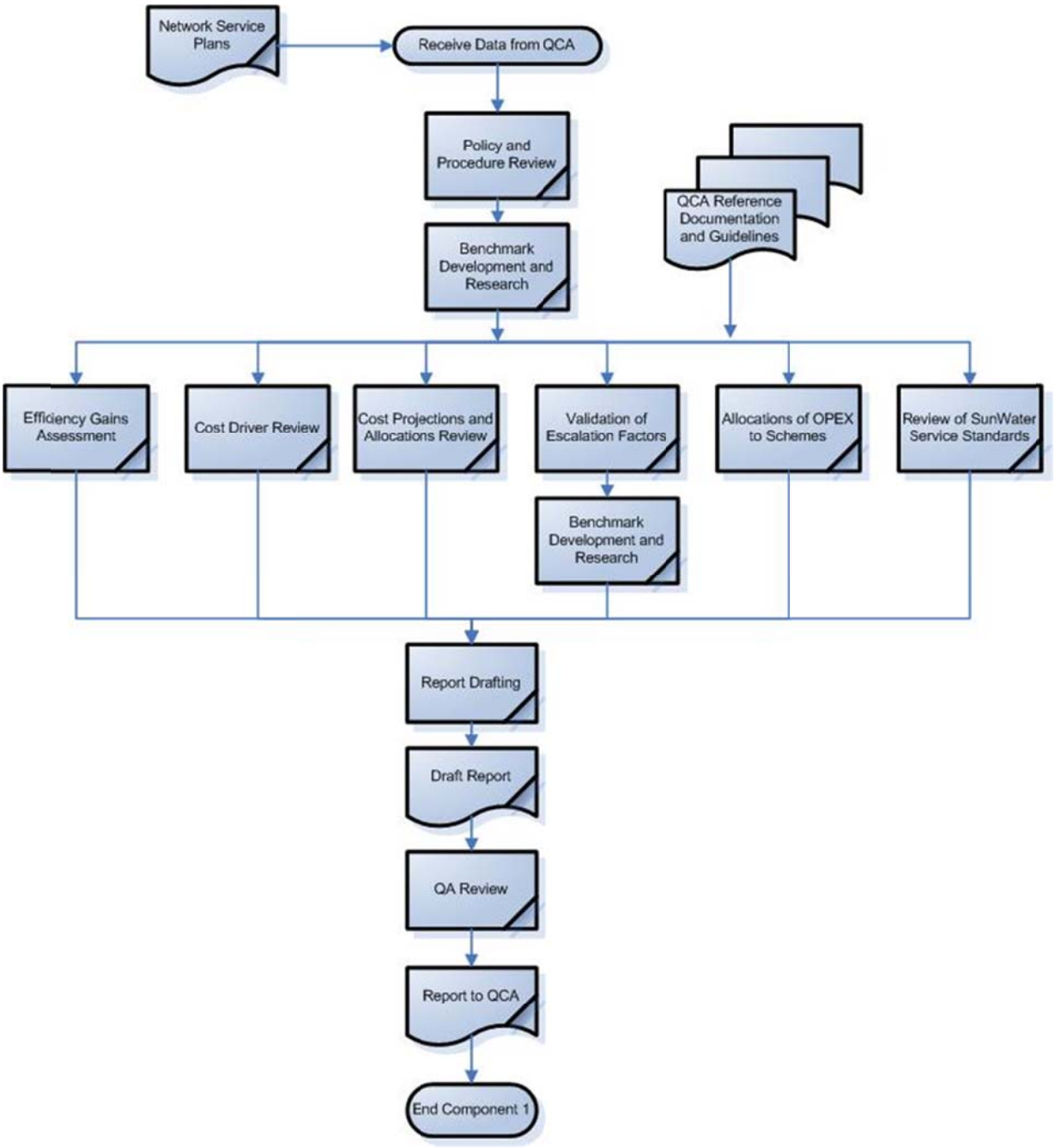
3.4.1 Operational Costs Review

Opex evaluation was limited to the review of the direct operational costs, excluding insurance costs attributed to each scheme, as instructed by the Authority.

The requirements of the Resource Operation Plan (ROP) and Resource Operating Licence (ROL) were evaluated as a means to justify the costs. Sampling was not achieved for operational expenditure due to the level of aggregation. Opex expenditure was requested from SunWater in a disaggregated form for further analysis and GHD was reliant on the Authority with its' powers to ensure the required data was delivered in a timely manner for this review.

However, the requested disaggregated data was not supplied in a timely manner or to GHD's requirements. So, Opex data for this review was gathered via direct interviews, information sessions and research and analysis of available information. Direct comparison against published benchmarks has been made, where possible.

GHD followed the approach outlined below to review the prudency and efficiency of direct operational costs as stated in SunWater's NSPs.



Policy and Procedure Review

GHD reviewed policy and procedural documents supplied by SunWater, and through interviews with management and on site operational staff to gain an understanding of how these policies and procedures have been adopted. The results of this review are included under Section 4.1.2 - Relevance and Adequacy of Supplied Information.

Benchmark Development and Research

Benchmarking development proved difficult in finding sufficient detailed comparative data in public documents published by other rural water supply providers. This difficulty lay in the complex nature of SunWater's business and differences in regulated water management regimes, climate, topography (pumping requirements) and regulatory reporting requirements.

Benchmarks were developed where possible, although overall, benchmarks were generally deemed not meaningful and were often not used.

Efficiency Gains Assessment

Due to the insufficient detail presented in the NSPs, efficiency gains assessment was conducted through interviews with and questions directed to SunWater management, site verification visits and examining regulatory requirements. The results of this assessment are outlined under the Potential Efficiency Gains section in the assessment for each scheme.

Cost Driver Review

A cost driver review was conducted while analysing the variance in expenditure for the previous price path with those projected for the upcoming price path. This review was conducted by posing direct questions to SunWater, with the knowledge gained through on-site inspection, and through conversations with the on site operators during the inspections.

A question log with responses from SunWater has been included in Appendix B.

Cost Projections and Allocations Review

A review of the cost projects was done in conjunction with the cost driver review. Cost projections were compared with the actual expenditure incurred during the previous price path. Peaks and troughs or inconsistent variances in the actual or forecast expenditure were questioned. Justification for these variances was sought by posing direct questions to SunWater, through conversation with on-site operation staff and through the visual inspection. Discussion of cost projections and an allocation review is included in Section 4.1.5, Subsection - Attribution and Allocation of Opex Costs to Customers or Tariff Groups.

A question log with responses from SunWater has been included in Appendix B.

Validation of Escalation Factors

GHD reviewed the escalation factors proposed by SunWater in their NSPs, and the justification for the escalation factors in SunWater's Background Paper – Cost Forecasting Assumptions. An analysis of escalation factors proposed and adopted by other regulated industries was undertaken. A comparison with other regulated industries was adopted, as a precedent has effectively been set during the review of these organisations. This analysis is included under Section 4.1.4 - Forecast Operational Expenditure.

Allocations of Opex to Schemes

Allocations of Opex between schemes have been excluded from the scope of this review, as this review was of direct operational expenditure only. This allocation review was intended for the review of indirect and overhead operational expenditure. At the time the methodology was proposed the instruction brief was understood that Indirect and Overhead Opex was to be part of this review. GHD was advised of the restriction of Direct Opex review only during the final engagement and negotiations process.

Review of SunWater Service Standards

The review of SunWater's Service Standards was conducted through consultation with stakeholders and during the site inspection. The consultation was used to verify the stakeholder's level of satisfaction that the standards were being met, and the site inspection was to visually assess the effort required to maintain service standards. Commentary on this element is provided in Section 4.3 - Stakeholder Comments from Consultation Sessions and in the Feedback from Field Visits section in the assessment for each scheme.

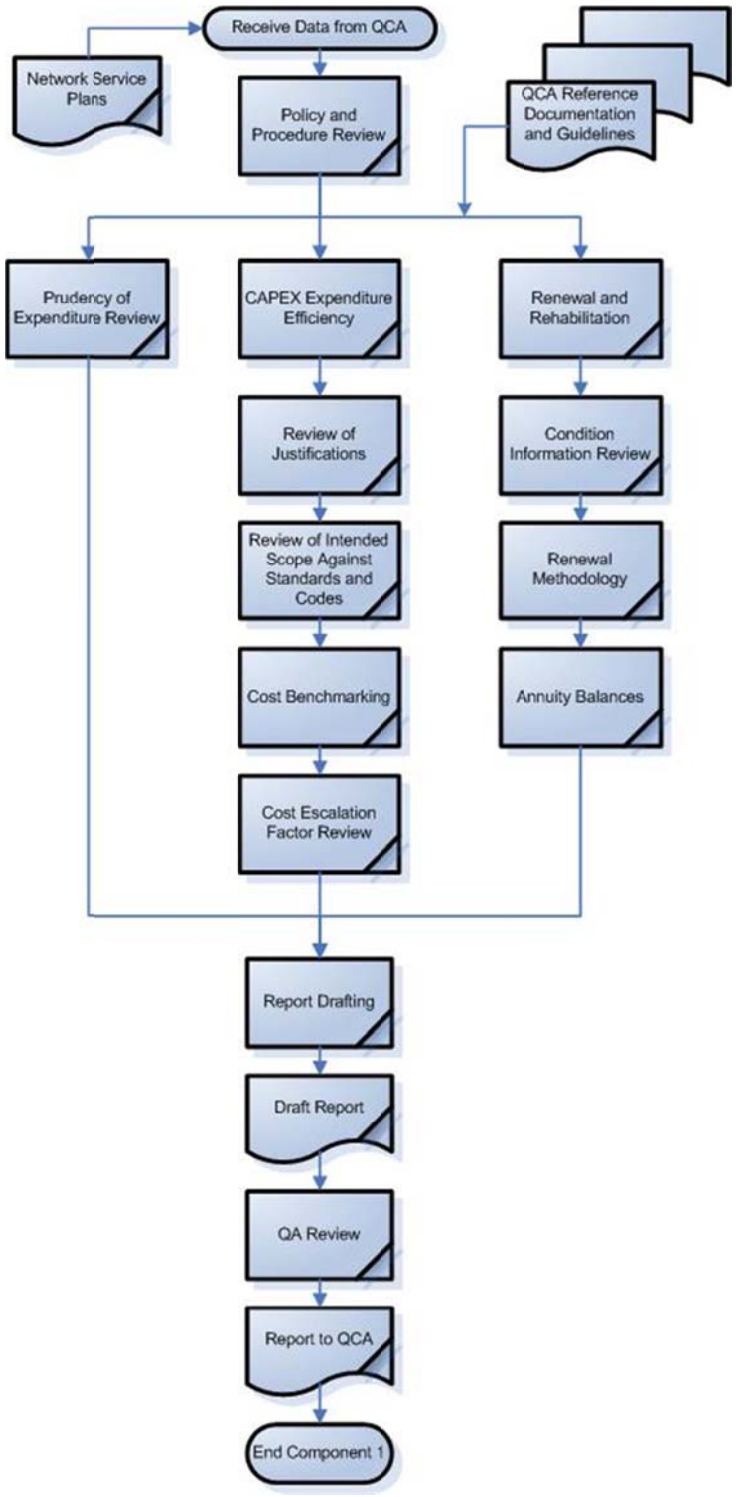
3.4.1 Capital Expenditure Review

The capital expenditure review evaluated the forward five year renewals program for the financial years ending 30 June, 2012 to 30 June, 2016 (referred to hereafter as the period 2012 to 2016) and a review of projects completed in the financial years ending 30 June, 2007 to 30 June 2011 (referred to hereafter as the period 2007 to 2011). SunWater includes refurbishment works and studies within the renewals program. While these types of projects could be classified as Opex expenditure under some business models, they are included within the annuity calculations and therefore treated as Capex under this review.

The review process examined each project in the period 2007 to 2011 (previous price path) and the 2012 to 2016 renewals program to assess whether the project was justified by the appropriate drivers, was within a reasonable cost range for the scope of works, and completed or programmed within an appropriate timeframe.

SunWater has adopted a 20 year rolling annuity approach to calculating annualised forecast expenditure for renewing and rehabilitating existing assets for each year in the next price path (2012 to 2016). Projects beyond the price path to the financial year ending 30 June 2036 (referred to hereafter as beyond 2016) were reviewed to assess the impact of forward project renewal and rehabilitation projects on the prudency of SunWater's calculated annuity for the price path 2012 to 2016.

GHD followed the approach as outlined below to review the prudency and efficiency of capital expenditure as stated in SunWater's NSPs.


Receive Data from QCA
Network Service Plans
Policy and Procedure Review
QCA Reference Documentation and Guidelines
Prudency of Expenditure Review
CAPEX Expenditure Efficiency
Renewal and Rehabilitation
Review of Justifications
Condition Information Review
Review of Intended Scope Against Standards and Codes
Renewal Methodology
Cost Benchmarking
Annuity Balances
Cost Escalation Factor Review
Report Drafting
Draft Report
QA Review
Report to QCA
End Component 1

3.4.2 The Approach

The approach to reviewing the NSPs involved a desktop review of information and data, meetings with the Authority, SunWater and selected Stakeholders, and verification of information in the NSPs by site inspection at selected Schemes (Macintyre Brook WSS, St George WSS, and St George Distribution System). The tasks and activities included:

- Reviewing the information provided by SunWater via the Authority;
- Meeting with SunWater on the Financial Model, SAP Project Management (Project Manager) Module and Work Management System (WMS);
- Requesting additional information from SunWater via the Authority;
- Reviewing the requirements of Resource Operation Plans and SunWater's Resource Operating Licences;
- Reviewing the policy, procedures and plans provided by SunWater in response to the information requests;
- Requiring the Authority to facilitate the delivery of additional information to address gaps in information;
- Reviewing the detail of selected projects in the forward Renewals Program in SAP PM and WMS with SunWater Asset Management staff;
- Site Inspections and Stakeholder engagement in Inglewood and St George;
- Reviewing additional information and data provided by SunWater; and
- Follow-up review of previous price path projects in SAP PM and WMS with SunWater Asset Management staff.

3.4.3 Desktop Review

The desktop review included examining the NSPs for each scheme, policy and procedures documents, stakeholder feedback, and Issues Papers from various consultants published on the Authorities' website. A request for information was prepared by the four Opex and Capex review consultants to SunWater on specific information required to complete the Terms of Reference (ToR). SunWater provided additional information at an initial meeting on 14th February 2011, and via a series of four Compact Disks and emails. Not all information requested at this meeting was provided, as discussed in Section 4.1.2 - Relevance and Adequacy of Supplied Information. The additional information was reviewed and used to assess the Opex and the Capex program in the NSPs.

3.4.4 Site Verification

Three schemes were selected for on-site inspection to review the operation and maintenance activities and projects listed in the NSPs. The aim of the site review was to validate the analysis and considerations made by GHD through the desktop review specifically focusing on the efficiency and prudency of the direct operational and capital expenditure.

GHD was escorted to each of the main assets within these schemes by SunWater's Area Operations Manager South (Peter Collett) and local operations staff. Peter Collett provided answers to clarification questions from the GHD team.

Operational Expenditure

The schemes selected for on-site inspection have the highest value of direct operational expenditure. Before the sites were inspected an analysis of the costs were considered and estimates of resource requirements considered. At the stakeholder meetings, specific questions of the resource numbers were addressed and discussed. Evaluation of the tasks completed by SunWater's regional teams were discussed and demonstrated by the SunWater's Area Operations Manager and his team.

Capital Expenditure

Three schemes were selected to review a sample of the projects nominated in the renewals program. Field visits were also required to check the condition appraisal and risk assessments in SunWater SAP PM software and to review a sample of the work completed in the last five years. For each of the selected projects the evaluation included the driver for the project, the estimated or actual cost, and timing within the program to assess whether the expenditure was efficient and prudent.

3.4.5 Interviews and Meetings

GHD met with SunWater on two occasions to understand the processes used in their Financial Model, the SAP PM asset management module and the WMS works management system. Two follow-up meetings were conducted with staff from SunWater's Asset Management Group to verify the asset management processes, condition appraisals, risk assessments, cost estimates breakdown (where available) and project drivers.

Stakeholders were also consulted from the Macintyre and St George schemes at meetings in Inglewood and St George on 1st and 2nd March 2011. The stakeholders were provided with an overview of the Consultants role in this review, general observations to date and the process leading to finalisation of the Opex and Capex Review Report. The stakeholders provided their opinions on a wide range of issues, but highlighted some specific examples where they thought SunWater had used inappropriate processes which had contributed to higher than expected costs over the past five years.

3.4.6 Evaluation

Operational Expenditure

This evaluation was limited to the review of the direct operational costs, excluding insurance costs, attributed to each scheme, as instructed by the Authority. The requirements of the Resource Operation Plan (ROP) and Resource Operating Licence (ROL) were evaluated as a means to justify the costs. Sampling was not possible for operational expenditure due to the level of aggregation in SunWater's SAP WMS. Information was requested to be supplied in a disaggregated form for further analysis; however this information has not been supplied in a usable form. Instead, information for the evaluation was gathered via direct interviews, information sessions and research and analysis of available information. Direct comparison against published benchmarks has been made, where possible.

Capital Expenditure

The final stage of the process was to evaluate the forward five year renewals program and the projects completed between 2007 and 2011. SunWater includes refurbishment works and studies within the renewals program. While these types of projects could be classified as Opex expenditure under some business models, they are included within the annuity calculations and therefore treated as Capex under this review.

The review process examined each project in the 2007 to 2011 (previous price path) and the 2012 to 2016 renewals program and assessed whether the project was justified by the appropriate drivers, was within a reasonable cost range for the scope of works, and completed or programmed within an appropriate timeframe. Projects beyond the price path (beyond 2016) to 2036 were reviewed to assess the impact of forward project renewal and rehabilitation projects on the prudency of SunWater's calculated annuity for the price path 2012 to 2016.

4. Assessment of Elements Common to Each Scheme

4.1 Operational Costs Review

4.1.1 Minsters' Referral Requirements

The Ministers' Referral is specific in the requirements of the Operational Costs Review. Point 1.19(a)(i) is reproduced here for clarity.

> *"1.1 For water supply schemes, or segments of schemes (except those listed in 1.2 below), bulk water supply and channel prices/tariff structures are to be set as follows:*
>
> *a) to provide a revenue stream that allows SunWater to recover:*
>
> *i) efficient operational, maintenance and administrative costs to ensure the continuing delivery of water services;*
>
> *For the removal of doubt, costs include, but are not limited to:*
>
> - *electricity costs;*
> - *recreation management costs;*
> - *compliance with workplace, health and safety; and*
> - *compliance with Australian and Queensland Government initiatives on water management, planning, trading, accounting, metering and measurement."*

The Authority required GHD to review the Direct Operational Expenditure with the exclusion of insurance costs for the SunWater Toowoomba Cluster.

4.1.2 Relevance and Adequacy of Supplied Information

The information in SunWater's Network Service Plans has been produced to suit a particular target audience (stated as the Authority). SunWater describes the NSPs' purpose as being an instrument to provide information to the direct customer. This is a relevant approach. However, the information in the NSPs is not sufficiently detailed for the analysis required in this review. The four consultants tasked by the Authority with the analysis of operational expenditure, made an initial direct request of SunWater to provide the required information with a specified materiality threshold to allow for a thorough examination. The information provided by SunWater was not in sufficient detail for GHD's analysis.

To address this deficiency, GHD posed direct questions, conducted interviews and attended information sessions with SunWater. The information provided by SunWater was then made available to all of the consultants conducting similar reviews for their information. All consultant teams have made consolidated requests on a number of occasions through the Authority to SunWater for disaggregated cost data. This disaggregated cost data would afford the ability to review and "drill down" into the summary costs that are provided in the Network Service Plan. To date, this data has not been supplied to GHD in sufficient detail for analysis.

SunWater has supplied the financial model used to develop the Network Service Plans. However, this information was also in summary form and does not afford the ability to "drill down" into the cost to adequately review the base line data. The cost information supplied has not been considered adequate for this review.

After submission of GHD's Draft Review Report to the Authority by the required deadline, SunWater (through the Authority) provided a data set of disaggregated information to GHD. GHD reviewed this information but concluded it was information generated from existing summary data to fit the data request and not a summation of detailed recorded expenditure. SunWater's provision of the allocation model for calculation of the data set would not have been acceptable either. It was not, in GHD's opinion, information that would have supported the development of the forecasts and, as such, has not been considered further.

SunWater has produced significant volumes of submissions, papers and other consultant reports on various aspects of the price setting process. GHD have reviewed these submissions and other submissions from stakeholders in the evaluation.

4.1.3 Policies and Procedures

SunWater provided Asset Management Policies, Procurement Policies, Energy Efficiency Opportunity Guidelines, Scheme Operating Manual Samples and other relevant procedural documents for this review. Broadly, the policy and procedural documents are consistent with industry practice. SunWater have also demonstrated the adoption and integration of these into their management systems.

Field investigations and discussions, along with third party reports provided by SunWater, show that field personnel are adopting the systems and practice specified in the policy and procedures. Investigations by a third party consultant and detailed in a report provided by SunWater describes the Work Instruction documents as being 'not available' for a majority of tasks, or deficient. The report does acknowledge that SunWater is taking steps to address the deficiency.

The policies, procedures, guidelines, manuals provided have been assessed and demonstrate a consistency with other like organisations the GHD team have encountered. It was apparent that the level of instructiveness of the documents is sufficient. The documents have a robust level of assumption that the personnel carrying out the instructions are competent. As such, the cost to maintain and manage these documents from the direct Opex perspective was considered efficient.

4.1.4 Forecast Operational Expenditure

Operational Expenditure

Operational expenditure forecasts have been assessed using the previous price path forecast, the actual reported expenditure for the previous price path period and the proposed forecast for the next price path period. Peaks and troughs in expenditure have been analysed and SunWater asked to qualify these variations.

The operational expenditure has been split in to cost categories (defined as activities by SunWater). These cost categories are:

- Operations
- Electricity
- Preventative maintenance
- Corrective maintenance
- Revenue offsets.

The cost categories are populated by the accounting methods of SunWater. Costs are assigned to an activity through the charging of time, materials and contractor expenses against these cost categories. The information provided by SunWater did not allow GHD the ability to assess the allocation to these cost categories to any depth. GHD has made comment as to the distribution of Preventative and Corrective Maintenance in addressing each scheme.

To add clarity at the summary level these cost categories are further defined into expenditure types as follows:

- Labour
- Electricity
- Materials
- Contractors
- Other
- Indirects and Overheads
- Revenue Offsets.

As previously discussed, the analysis of how the budget forecasts have been attributed to each of these categories and types was not able to be achieved, as GHD was not provided the required information in a timely manner and the data detail that was provided was insufficient for the requirements of this review. To mitigate this issue, GHD has relied on its extensive knowledge and experiences recorded in propriety GHD systems and from consultant partners.

A discussion of the allocation of operational expenditure by type is included for each scheme.

Escalation Factors

SunWater have escalated cost for labour at 4% in line with an Enterprise Bargaining Agreement until June 2012. Subsequent to this period labour cost are escalated at CPI. Electricity is escalated at CPI. Contractors and materials have been escalated at 4%. These escalation factors proposed by SunWater can be compared to the factors adopted by other regulated industries or bodies. This comparison has been chosen due to other industries and bodies having already been reviewed, which effectively sets a precedent for this review.

The Queensland Competition Authority has ruled in previous price setting reviews that escalations are to be set at CPI. Specific ruling and supporting evidence for this is listed below.

QR Network

> *"The Authority requires that QR Network apply the MCI [Maintenance Cost Index] in arrears, as an adjustment to forecast maintenance costs that have been escalated by forecast CPI…the tariff and revenues in the 2009 DAU should be developed on the basis of the best available forecast of the CPI, which is more readily available than is a forecast of the MCI. Regulated tariffs and revenues could then be adjusted by the difference between the estimated CPI and the actual MCI as part of the revenue cap review process which occurs in September of each year, when the actual MCI for the previous year is known."*[3]

[3] Queensland Competition Authority (2010). Draft Decision: QR Network 2009 Draft Access Undertaking, Section 6.15, Decision 6.20

Gladstone Area Water Board

"In particular, GAWB [Gladstone Area Water Board] argued that:

a) either the Construction Index of 6.3% or the Professional Services Engineers Index of 4.63% should be adopted as the escalation factor for maintenance expenditure; and

b) increases in its major chemical expenditure items have been greater than CPI and therefore should be escalated using GAWB's proposed factor of 4.84%, which was based on the Manufacturing Industries Chemical Index.

The Authority therefore proposes that CPI should be applied over the 2010-15 and 2015-30 periods for operations, maintenance and chemicals costs."[4]

"The Authority recommends that operations, maintenance and chemicals costs should be escalated at CPI for the 2010-15 period. All operating costs be escalated using CPI during the period 2015-2030."[5]

"The Authority proposes that chemicals costs be escalated at CPI rather than the specific index, as it is considered that the index as averaged by GAWB is not representative of a forward-looking estimate."[6]

SunWater's Cost Escalation Factors

GHD considered that the precedence for escalation has been set, as the Authority has not accepted that escalations for individual costs are valid in any past consideration. GHD also considered SunWater's arguments for a different approach as follows.

SunWater provided a Background Paper to the Authority titled "Cost Forecast Assumptions" which provides some discussion around escalation factors. Labour has been escalated at their Enterprise Bargain Agreement until 2012 and then reverts to inflation. GHD recommends that this is a reasonable approach.

Contractors and Materials are escalated at 4%, which SunWater argues is a conservative escalation. GHD is unable to see the rationale for the development of the 4% escalation and is therefore not able to validate why this is a conservative escalation.

SunWater has escalated Electricity at CPI, and have acknowledged the Benchmark Retail Cost Index (BRCI). However, SunWater contends that the BRCI is not stable or consistent enough to use as an escalator and that, adjustments would be made annually or at the next price-setting period. This argument could be applied to any number of indices utilised by SunWater or any other regulated body in a price setting process. SunWater's argument does not provide sufficient justifiable reason for GHD to accept this approach.

[4] Queensland Competition Authority (2010). Final Report: Gladstone Area Water Board – Investigation of Pricing Practices. Section 8.3 Escalation of Operating Costs

[5] Queensland Competition Authority (2010). Final Report: Gladstone Area Water Board – Investigation of Pricing Practices. Section Recommendation 41

[6] Queensland Competition Authority (2010). Final Report: Gladstone Area Water Board – Investigation of Pricing Practices. Section 8.4 Efficient Operating Costs

GHD concluded that the above information provided by SunWater as the basis for the cost escalations for Direct Opex is not sufficient, as it does not provide the rationale for the development of the escalators. A number of indices are provided as evidence for the selection of the cost drivers, however the arguments for the application of these drivers are not well defined. On the basis of previous rulings, GHD would recommend escalations for all operational expenditure (except electricity) proposed by SunWater be set to CPI and escalations for electricity be set to the BRCI.

4.1.5 Attribution and Allocation of Opex Costs to Customers or Tariff Groups

Water Supply Schemes

SunWater is proposing new factors to attribute and allocate operational costs partially due to a request from the Tier 1 working group in the previous price path. The Tier 1 Report recommended:

> *"Tier 1 has accepted the methodology used in the current price review to allocate scheme lower bound costs to water allocations of different priority based on estimated water entitlement conversion factors. However, Tier 1 recommends that this approach be reviewed for the next price path."* [7]

SunWater is now proposing to allocate operating costs per unit of nominal Water Access Entitlement (WAE). They have argued that this is because operating costs are fixed, and that every WAE has the same impact on operating costs, regardless of it being high or medium priority. SunWater also argues that, in terms of operations, there is no service quality differential between high and medium priority WAE. SunWater outlines this in their paper "Supplementary submission – Bulk water price differentiation, February 2011".

This approach follows the Authority's recommendation to Gladstone Area Water Board:

> *"The Authority recommends that, as a general principle, prices should reflect service quality to the extent this involves cost differentials."*[8]

Alternatively, the Authority concluded in 2000, that operating costs would differ between medium and high priority WAE:

> *"… fixed and operating costs will vary between customer groups where the water product, specifically the reliability of supply, differs. The allocation of costs between customer groups for pricing purposes will need to be on the basis of equivalent product, such as standard reliability, based on available hydrological information."*[9]

SunWater acknowledges that some operating costs are not fixed, to the extent that water is supplied via pumping, which is the case for Upper Condamine WSS. SunWater proposes to account for these variable costs as part of a consumption charge. In this case, variable and fixed operating costs will need to be identified. So far, this has not been done in the NSPs. SunWater states its stance on this tariff structure as follows:

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[7] SunWater (April 2006), Statewide Irrigation Pricing Working Group, Tier 1 Report, P76

[8] Queensland Competition Authority (June 2010), Final Report, Gladstone Area Water Board: Investigation of Pricing Practices, Recommendation 11

9 Queensland Competition Authority (December 2000), Statement of Regulatory Pricing Principles for the Water Sector, p78

"…while on average more water will be available under a high priority WAE, the incremental cost of releasing water from storages is negligible (or in most cases nil). Except to the extent that water is supplied via pumping, such as in the Upper Condamine (North Branch) and Barker-Barambah (Redgate Relift) in which case SunWater's proposed tariff regime will capture these costs and recover in the consumption charge."[10]

A consistent approach is supported by Independent Pricing and Regulatory Tribunal (IPART), the New South Wales regulatory authority. They support the application of a high security premium, as evidenced below:

"Our decision is to incorporate a high security premium within the calculation of the high security *entitlement charge. The introduction of a high security premium to the calculation of entitlement charges will increase the value of the high security entitlement charge and lower the value of the general security entitlement charge. This means that the charges will better reflect the values of each type of entitlement."*[11]

"This is particularly evident in light of the substantial value of high security water on the spot market in times of low water availability, and from the strong demand from general security licence holders to convert to a high security entitlement. The effective per ML price paid by general security customers, based on the water allocation that they receive, in comparison to the equivalent amount paid by high security customers is another indicator."[12]

Each of these options for allocating operational costs has no technical implications for the operation of each scheme. This is appropriate, provided all costs are allocated or accounted for, as there is incentive to operate the schemes prudently and efficiently. Given that the only implication on the allocation of costs is of an economic nature, it is referred to the Authority to decide how these costs should be attributed.

Distribution Systems

While the above debate applies to distribution systems, SunWater has not proposed any allocation method for operating costs incurred by distribution systems. As such, GHD cannot provide any technical comment as SunWater is awaiting guidance from the Authority.

4.2 Capital Costs Review

4.2.1 Relevance and Adequacy of Supplied Information

The information provided by SunWater for this element of the review was in four parts:

- Network Service Plans;
- Policy and Procedure documents;
- Project budget and expenditures for 2007 to 2011;
- A program of projects for 2012 to 2016 in excel files; and
- Annuity calculation graphs for all schemes from 2012 to 2035 in an excel file.

10 SunWater (February 2011), Supplementary Submission – Bulk water price differentiation, Section 4.2

11 Independent Pricing and Regulatory Tribunal (June 2010), Review of bulk water charges for State Water Corporation from July 2010 to June 2014 Water- Final Report, Section 10.4.4

12 Independent Pricing and Regulatory Tribunal (June 2010), July 2010 to June 2014. Water- Final Report, Section 10.4

Network Service Plans

The Network Service Plans include summary information under the renewals section (NSP section 4.3) which provides:

- a summary of the costs over the five year pricing period (NSP table 4.5) with a description of the more significant projects;
- expenditure profiles over the 25 year annuity period (NSP figure 4.1)
- the renewals annuity over the five year price path (NSP table 4.6);
- an annuity balance for each scheme (for financial year 2012); and
- a summary of the Optimised Replacement Costs (NSP table 4.7) repeated in Appendix A (NSP Table A.1).

The NSPs contain summary information only and assessment of the whether the costs are prudent or efficient was not been able to be determined with this information.

Policy and Procedures

The policy and procedures documents provided a very good level of understanding on how SunWater used an asset management approach to predicting asset renewals, refurbishment works, condition appraisal processes, and risk assessment in a whole of life approach to manage the infrastructure and headworks. The documentation adequately provided SunWater staff with information on how the system was to be used and was well understood and practiced by the SunWater staff who were interviewed in the course of this review.

The 2007 to 2011 Projects

SunWater provided two excel files in the 17 Feb 2011 Compact Disk which provided data on the 2007 to 2011 projects (2007-2011 PROJECTS.xls) and a summary file of the annuity costs and graphs for 2012 to 2036 (Annuity Charts – V610 03.xls). The 2007 to 2011 projects file included a listing of projects above $10,000 up to 15 February 2011.

The information was used to verify projects expenditures over the past four years, but did not correlate with the renewals expenditures detailed in Table 8 of SunWater's "Renewals Annuity Calculation, Internal Working Paper, January 2011". The file was intended to allow the consultant teams to reconcile the ARR balances over the previous price path and to verify and explain the opening ARR balances for the current price path. Unfortunately, this was not possible with the information provided.

The program of projects submitted in February 2011 by SunWater for the period 2007 to 2011 did not include any projects for 2006 and truncated current project expenditures for 2011. The file included all projects above $10,000 value (at the consultant's request to exclude minor projects) and all classifications of expenditure (i.e. renewals annuity, once off projects, federal funded, customer funded, and routine project).

Comparison between the actual expenditures with the planned expenditures over the 2006 to 2011 period was attempted to review the annuity balance. However, SunWater advised on 10 March 2011 that:

"Unfortunately the data that you have requested regarding the 2006-11 renewals projects is not available. SunWater's asset refurbishment program operates from a live database, and the data set you have requested is not stored in the system."[13]

Attempts to source the planned expenditure information from Indec Consulting and GHD's reports during 2004 and 2005 were unsuccessful.

The 2012 to 2016 Works Program

The data included in the 2012 to 2016 program of works spreadsheets (NSP Projects South V4.xls), had been extracted from SunWater's Financial Model and could be sorted by scheme using imbedded macros and pivot tables. The file was used to verify the summary information in Table 4.6 of the NSPs. This data was also used to verify SunWater's asset management methodologies within the SAP PM and WMS systems for each scheme.

The 2012 to 2016 program of projects file included all projects that had been classified as annuity expenditure. The file also included a breakdown of each project by labour, contract, material and plant. However no information was provided on the rates and quantities used to determine the expenditure breakdown.

In this instance, the file had limited use. The information in the file contained project titles, which in many cases did not provide enough information to determine what work was proposed, why the work was required or whether the project costs were reliable and the project timing prudent.

The cost data included an annual escalation allowance of CPI (2.5% per annum) and therefore did not match the cost estimated in SAP PM, which were current values for all years.

All projects above $50,000 and a selection of other projects were reviewed in SAP PM and could be used to reconcile the financial and asset management cost estimates. In many cases, similar projects in the same financial year had been aggregated in the Financial Model. Although, verifying these project costs was problematic and relied on the skill of the SunWater asset management staff to identify which SAP PM projects were aggregated into the financial model projects.

Annuity Charts

The Annuity Charts file was used in the Scheme Summaries contained in the latter sections of this document. The data in this file was annual summaries of rolling annuity, opening and closing balances and customer funded spends over the 25 year annuity period. The file was used to verify the annuity calculation methodology, however did not contain any detailed cost information and could not be used to verify either the prudency or efficiency of the future Capital Cost expenditures.

4.2.2 Renewals Planning

SunWater's renewal planning is based on replacing assets at the end of their useful life. This generated by the SAP PM system, from the asset attribute details in the asset registers, based on asset age, standard useful life and risk assessment. The procedures are documented in SunWater's "Asset Management Planning, Methodology Paper, which includes classifying assets into "asset types", completing a risk assessment of each asset and setting the "start" date for the asset's age. Condition Appraisal is also part of the renewals planning process and is used to determine whether projects proceed or can be delayed.

[13] Email from Peter McGahan on 10 Mar 2011

Condition Appraisal

SunWater uses Condition Appraisal to the review remaining asset lives, and to identify future refurbishment and restoration works. The Condition Assessment procedures include very detailed instructions on how to appraise the various types of assets in the inventory and how to record the details of the appraisal in SAP PM. The assessor identifies what work is needed to restore or preserve the asset, when the work should be done, and an estimate of the cost. Assessments on simple assets are completed by regional operations staff.

More complex assets, such as dam gates, may be assessed by Brisbane based engineering staff and specialist equipment such as cableways and large electrical motors will be assisted by a sub-contractor consultant.

Useful Life

SunWater has categorised all assets which share similar functionality into common asset types. Each asset type is assigned a useful life based on the normal distribution of replacement profiles. The useful life is then adjusted for risk exposure as described below.

Risk Assessment

SunWater has adopted a risk assessment process to distribute asset failures around an asset type's standard useful life. Assets which have a higher failure risk profile are programmed to be replaced at an earlier date than lower risk assets by adjusting the useful life of the asset. The process recognises the impact of each asset on SunWater's business continuity capability and related asset reliability to the target levels of services. Using risk to make decisions about when to replace assets is a practical way of ensuring that early failures on high risk assets do not impact on the capacity of the organisation to meet its levels of service obligations.

It could be argued that replacing high risk assets early in the failure profiles would lead to many assets being replaced before they are due, leading to an increase in the annual annuity expenditure beyond an optimum replacement cycle. The process could produce a higher annuity cost, but this is likely to be balanced by early failure of lower risk assets and a deferral of the better performing high risk assets. However, to counter this potential, SunWater's process uses Condition Appraisal to review and adjust the remaining life of the asset. Provided there is a review and adjustment mechanism within the Capital Replacement model, the annuity values should represent the average annual expenditure over the annuity period, and mimic the actual requirements.

Project Management

All projects are reviewed by SunWater's Infrastructure Management Group with assistance as needed by the Engineering staff within Infrastructure Development. Projects proceed through an approval and planning process, which includes approval to proceed, procurement, construction, completion and project close out. The project closure activities include amending the SAP PM records to remove old assets, include new assets, and reset the planned maintenance tasks and activities.

4.2.3 Water Use and Renewals and Refurbishment Requirements

The Authority requested advice on whether there was a relationship between water consumption and Renewals and Refurbishment expenditures and forecasts.

For the majority of the schemes and assets in the Toowoomba Cluster schemes, the assets are static and deteriorate naturally regardless of whether water is used by irrigators or not. The same volume of water will flow down a channel of stream, regardless of whether irrigators extract water or not. The materials and product that make up the assets deteriorate based sun radiation, water erosion, biological attack and other age related decay agents. These assets need to be refurbished when the protective coatings have failed or be renewed at the end of their effective lives.

The exception is rotating and mechanical machinery, which wear every time they are operated. In the Toowoomba Cluster schemes, the only movable or rotating items are water pumps, channel gates and valves. Each piece of equipment is designed to operate in a prescribed manner or at a specified rate of effort by the supplier or manufacturer. As long as the equipment is operated within its serviceability and design parameters, the items should last to the end of its design life (effective useful life).

However the rate of deterioration will increase significantly if the equipment used beyond its design parameters. In most cases, under-using equipment will also reduce the effective useful life of the items. For example, failing to exercise valves can lead to early failure through seizing of the valve stem and gearbox. Over exercising a valve can lead to excessive wear in the valve stem and gear box, and early failure of the stem and seat seals. These types of assets also fail through the natural deterioration of materials within the equipment and usage not the only factor impacting when the assets need to be refurbished or renewed.

In the Toowoomba Cluster schemes, GHD observed that the water pumps, channel gates and valves appeared to be operated within their design capacities. Therefore, GHD considers the volume of water use was unlikely to impact on when assets needed to be refurbished or renewed, or the extent of work needed to preserve the assets or to restore assets' functionality.

4.2.4 Benchmarking

Benchmarking of capital expenditure can be achieved if the comparison is between schemes with similar governance regimes, service level requirements, asset types and water yields. When reviewing the various irrigation water schemes across Australia with the level of information available for SunWater, GHD could not determine a meaningful benchmark that could be applied to capital expenditures. In many cases, existing benchmarks were actually measuring the account systems and processes rather than the performance of irrigation.

Some options that QCA may consider include:

- Cost of water delivered to a customer over the replacement value of the assets;
- Cost of water delivered to a customer over the annuity cost of capital renewals; and
- Annuity renewals expenditure over replacement asset values.

One option considered by the GHD team was to measure the annuity expenditure as a percentage of capital replacement value (Optimised Replacement Cost - ORC). The following is an example of the application of this approach.

SunWater's assets have useful lives ranging from 30 years to 200 years with an average of about 80 years based on those assets GHD reviewed as part of the sampling process. If the useful life of the assets is assumed to be 80 years, then the renewals rate should be 1/80 = 1.25%, which is within most water industry rates of 0.8% to 2.5%.

If this approach was applied to the Upper Condamine weirs and structures, which have an ORC of $164.9 million and an upper useful life of 200 years, the renewals rate should be 1/200 = 0.5%. The average annuity over the next five years is $0.718m, which equates to 0.42% of ORC. In this case, the benchmark (0.5%) would indicate that the age profile is greater than 200 years (unlikely) or that SunWater is not spending enough on the annuity provision (more likely).

Unfortunately, this approach could not be applied, because the ages and values of the assets were not available. The GHD team concluded that there was insufficient information and data from SunWater or other comparable bulk rural water supply schemes to conduct a meaningful benchmarking exercise.

4.3 Stakeholder Comments from Consultation Sessions

4.3.1 Macintyre Brook Water Supply Scheme

Stakeholders for the Macintyre Brook Water Supply Scheme were consulted on 1st March 2011 at Inglewood. Attendees were: Anthony Doljanin, Rick McDougal, and Peter Collett (SunWater).

Stakeholders raised a number of concerns that were discussed during the consultation session. These concerns are as follows:

- Whetstone Weir - The irrigators had lost confidence in SunWater over the Whetstone Weir project. The initial cost of the project was advised at $780k, but then revised to $2.2m and again to over $3m. The irrigators had asked for information on the costs of the project, but did not receive a response. Anthony Doljanin and Rick McDougal thought that if the irrigators had known the cost would be so high, they would not have supported the project. Peter Collett advised that the original cost was the replacement value of the timber weir and not reflective of the cost of replacing the weir in modern equivalent terms. He agreed that SunWater had not consulted fully with the irrigators on this project.
- Capacity Sharing - The irrigators were concerned about the cost of managing the capacity sharing scheme, but acknowledged that SunWater and the Irrigators had worked well together on the scheme. Under the scheme, the irrigators were responsible for monthly meter readings and SunWater the quarterly readings. SunWater continued to read the metres monthly, which may be wasting labour costs. The current system of faxing in forms was not efficient and the irrigators would prefer an online system. The cost of upgrading the SWIMMS water allocation software was questioned.
- The Irrigators noted that the Dam Safety Upgrades of over $5m was included in the NSP for Dam Safety Upgrades for Coolmunda Dam. Peter Collett advised that the costs had not been included in the annuity, but needed to be clarification by Government.
- Why irrigators had to pay for recreation facilities, which benefit the community, not just the irrigators was questioned.
- It was questioned whether SunWater pay council rates as detailed in the NSPs.
- The issue of HUFF, renewals annuity costs and carryover of water entitlements was raised.
- The irrigators questioned the assumptions used on the hydraulic performance of the channel.
- The issue of meter replacements was raised. SunWater advised that the meter replacements was not in the current costs and was subject to clarification by Government.

- The irrigators suggested that SunWater could be better at selling their product, particularly in carry-over of entitlements, downstream trading and temporary trading outside the scheme.
- After the meeting, Anthony Doljanin questioned whether the irrigators should pay for improvement or refurbishment works related to flood mitigation functions. SunWater advised that the assets were not designed for flood mitigation and there were no works planned to introduce flood mitigation functionality to any of the scheme assets.
- The question was raised concerning the gauge at the end of the system as to who owns it – SunWater or DERM.

4.3.2 St George Water Supply Scheme and Distribution System

Stakeholders for the St George Water Supply Scheme and St George Distribution System were consulted on 2nd March 2011 at Inglewood. The attendees were: Scott Armstrong, Ian Brimblecombe, John Knights, Hamish McIntyre, Rob Jakins, Bill Knights, David Moon, Cleave Rogan, Glenn Rogan, Peter Collette (SunWater), and Peter Waters (SunWater).

Stakeholders raised a number of concerns that were discussed during the consultation session. These concerns are as follows:

- Cost of installing fencing around the main channel and the need for fencing was extensively discussed. SunWater advised that where fencing was required was subject to risk analysis and driven by Occupational Health and Safety legislative requirements. Only those areas at risk had been fenced, notably where houses were in close proximity to open channels.
- The refurbishment and renewals works in the current price path was agreed through the Customer Services Council.
- The irrigators were disappointed that the detail of the proposed renewals program was not published as had been done for the previous price path
- Why an outlet pipe was needed on the Jack Taylor Weir was questioned. The weir had been constructed with an outlet pipe, which had been sealed up.
- The cost of manning the dams and weirs during the floods was questioned. SunWater advised that manning the structures needed to be done during flood events to protect the structures. The cost in 2010 floods had resulted in significant variations in the Operations costs.
- The cost of regulation was discussed at length. Why the irrigators should cover these costs was questioned.
- The cost of implementing capacity sharing appeared to be too high.
- SunWater's responsiveness to water sharing during holiday periods, when the irrigators where very active was criticised.
- The condition of the drainage infrastructure was poor and did not reflect the expectations of the irrigators. The irrigators thought SunWater did not have enough equipment and resources to effectively maintain the drains. SunWater acknowledged that the past performance was below an acceptable standard, but outlined the improvements implemented this year and proposed for the following years.

- The irrigators thought that the upgrade of the St George Pump Station had been previously studied and did not understand why another study was needed. The cost of the studies at $100k was considered to be high as was the cost for the upgrade works at $3M. It was pointed out that the design fees generally equate to 3% to 5% of the capital works costs, and the Pump Station design costs are within this range.
- Benchmarking against privately owned schemes (Pioneer Water Board McKay) and government schemes should be carried out to evaluate the SunWater costs.

5. Assessment of Chinchilla Weir Water Supply Scheme

5.1 Network Service Plan Overview

The Chinchilla Weir Water Supply Scheme has a total of 31 bulk customers with a yearly Total Allowable Water Use (WAE) of 4,049 ML. This allowance comprises 2,884 ML of medium priority WAE and 1,165 ML of high priority WAE. SunWater proposes to allocate 71% of operating costs and 12% of the renewals annuity to medium priority WAE holders. Costs classified as Indirect or Overhead operating costs are excluded from the scope of this review.

The Condamine Balonne Resource Operations Plan specifies the operation and management requirements for this scheme. A senior operator is located at the Pittsworth depot and is responsible for the day to day water supply management and delivery of the programmed works. This scheme consists of only one major bulk asset, the Chinchilla Weir.

See Appendix A for a map of the scheme.

5.2 Operational Costs Review

SunWater distributes Operational Costs into two broad categories being Direct Costs, and Indirect and Overhead Costs. This review is limited to the Direct Operational Expenditure (Opex), while excluding insurance costs. Direct Opex costs are the costs described in Tables 4.2 and 4.3 of SunWater's Chinchilla Weir WSS (Water Supply Scheme) Network Service Plan. The ratio of Direct Opex to Indirect and Overhead Opex is shown below.

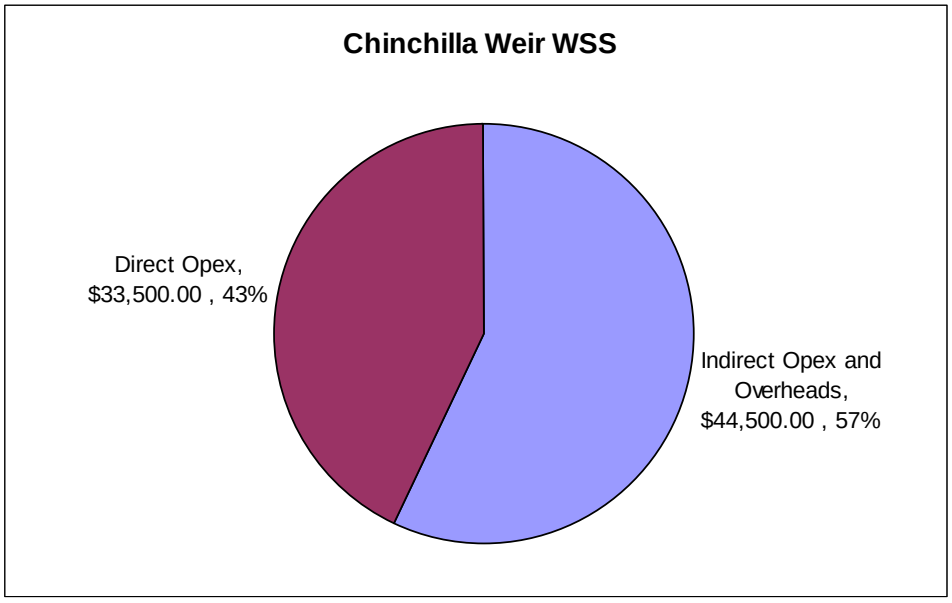

Figure 5.1 Chinchilla Weir WSS Breakdown of Opex

5.2.1 Forecast Operational Expenditure

When comparing the average Opex for the previous and current price path, a reduction in Opex has been realised. When questioned on this, SunWater advised that the higher expenditure in the 2007 period has caused an artificial increase in the 5 year average. SunWater implemented a new Business Operating Model after the 2007 period achieving savings that have had a net reduction in expenditure.

When comparing averages for the two price path periods considered for this review, a saving of 8.3% in Direct Opex has been forecast by SunWater.

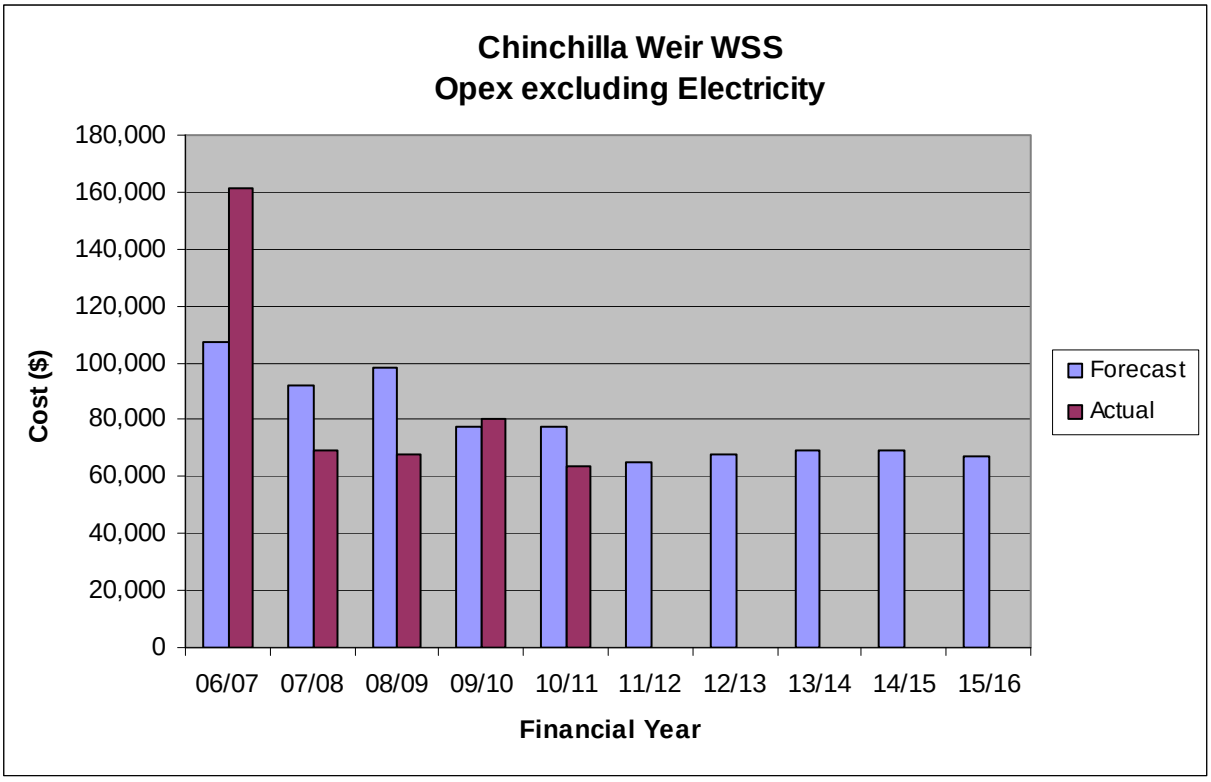

Figure 5.2 Chinchilla Weir WSS Forecast and Actual Opex excluding Electricity

Analysis of Direct Opex by type is consistent with other scheme allocation ratios and consistent with the level of maintenance that is required for these asset types. Water releases are achieved by contract labour (Western Downs Regional Council) on behalf of SunWater, constituting approximately half of the forecast contractor expenditure.

Considering the allocations of Direct Opex, the 2007 period is excluded on the basis that SunWater acknowledge that substantial cost reductions have been achieved through the changes to the business operating model. Also, it should be noted the majority of the “Other” expenditure type is predominately insurance costs and excluded from this review as instructed by the Authority. Therefore, using the remaining 2008, 2009 and 2010 periods the average expenditure for these periods has been used as the forecast ongoing.

Table 3 Chinchilla Weir WSS - Operational Expenditure Type – Actuals and Averages

Category	Actual Expenditure			Average 2008-2010
	2008	2009	2010	
Labour	15,000	16,000	21,000	20,000
Electricity	0	0	0	0
Materials	3,000	2,000	1,000	1,750
Contractors	2,000	5,000	9,000	4,750
Other	11,000	13,000	13,000	12,750

These averages align to the forecast budgets as shown below.

Table 4 Chinchilla Weir WSS - Operational Expenditure Type Averages Vs. Forecast

Category	Average 2008-2011	Forecast					
		2011	2012	2031	2014	2015	2016
Labour	20,000	17,000	18,000	18,000	18,000	18,000	18,000
Electricity	0	0	0	0	0	0	0
Materials	1,750	2,000	2,000	2,000	2,000	2,000	2,000
Contractors	4,750	5,000	5,000	5,000	5,000	5,000	5,000
Other	12,750	11,000	11,000	11,000	11,000	11,000	11,000

Direct Opex is reduced with the resultant net decrease of $3,250 per year, which equates to a -8% decrease and is considered reasonable.

Analysis of the Direct Opex by expenditure type is shown below.

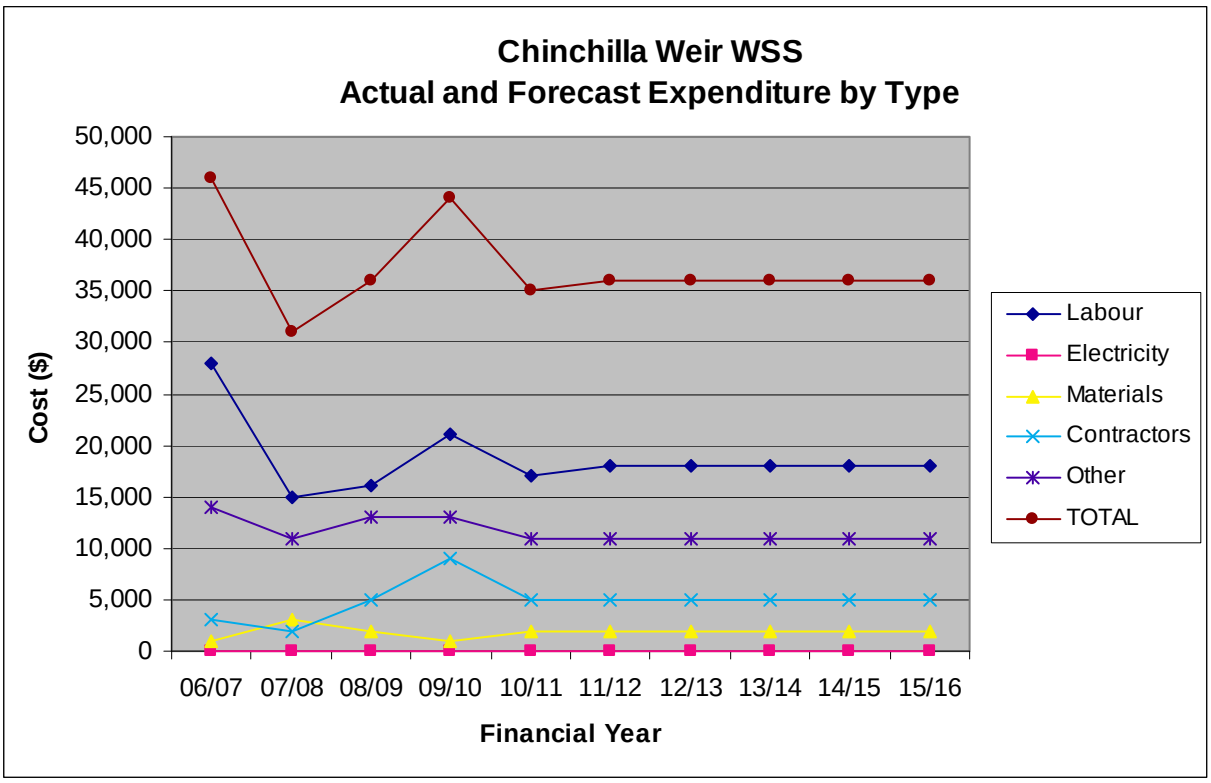

Figure 5.3 Chinchilla Weir WSS Actual and Forecast Expenditure by Type

Regulatory Compliance

The required compliance activity for a weir asset accounts for the majority of the cost of this scheme. The business risk assigned to the scheme by SunWater and the compliance requirements will require a frequent inspection and maintenance regime.

The expectations for compliance with Australian and Queensland Government regulation and initiatives, the management water allocations, corrective and preventative maintenance, these costs are considered efficient. SunWater have forecast the required expenditure using the current cost requirements as the basis. Considering the regulatory requirements are unlikely to change, the management and administration costs of this scheme would be consistent with the actual expenditure incurred in the current price period. Allowing for anomalies such as floods, the method for calculating the forecast using actual historical cost is considered robust.

Preventative and Corrective Maintenance

Preventative and Corrective Maintenance is forecast as a 60/40 precent ratio. This is considered consistent with the requirements for weed management, compliance inspections and reactive responses as required. Assessment the distribution of preventative to corrective maintenance is problematic and would usually be conducted against system losses, unaccounted for water and non-revenue water evaluating reductions in these loses against the maintenance expenditure. In this case the complication of natural watercourses used as the transport mechanism, actions by other irrigators, and so on, makes it extremely difficult to make this assessment. Applying engineering and operational management judgement, this ratio is determined as reasonable.

Dams and Weirs are generally long-lived assets that combined with appropriate periodic maintenance programs can be retained in service indefinitely. The maintenance and inspection program is relatively static from year to year. The forecast provided by SunWater reflects a static program of work to maintain the assets in this scheme.

Contactors and Materials

Contactor and Materials costs are considered appropriate. This consideration is made understanding that SunWater no longer maintain machinery such as backhoes in the region and rely on contractors. This decision was made on the basis that the utilisation of the equipment did not justify the retention of the equipment. Materials are also considered appropriate. SunWater have advised the main expense in this cost line is for poisons for weed management.

Stakeholder interview notes from the Queensland Competition Authority - First Round Consultation session questions the use of Western Downs Regional Council to conduct maintenance, specifically on the recreational area. SunWater currently engage Western Downs Regional Council to open the valve on the weir, as the round trip for a SunWater team member would be 5 hours. So on this basis, it is assumed that utilising contract labour (Western Downs Regional Council in this case) is the most efficient means of managing the asset. This accounts in the main for the contractor cost element in the forecast.

Water Demand

Consumption is not considered a driver for Direct Opex. The expenditure on Direct Opex is required to maintain the service through management of the assets, compliance with regulation and the provision of water to customers. All of these costs are incurred irrespective of the volume of water sold to customers, released to maintain environmental flows or lost through natural causes. Those that gain the most benefit from the scheme must carry an allocation of these costs. On this basis, the allocation of cost is considered appropriate.

5.2.2 Feedback from Field Visits

This scheme was not visited during the review. However, the Stakeholder comments detailed in the Macintyre Brook and St George Scheme Reviews would likely be consistent with the views of the Chinchilla Weir WSS Stakeholders.

5.2.3 Potential Efficiency Gains

Efficiency gains for this scheme could be achieved with the implementation of electronic water ordering through Integrated Voice Recognition (IVR) or the SunWater Online solution. SunWater have indicated, when questioned, that customers in this scheme are not willing to pay for these services. Considering the low volumes allocated to this scheme this is considered reasonable. No other Direct Opex efficiency gains are recommended for this scheme.

5.2.4 Recommendations

No recommendations for adjustment to Direct Opex are made for this scheme.

5.3 Capital Costs Review

5.3.1 Overview

The major asset in the Chinchilla Weir WSS is the Chinchilla Weir which has an Optimised Replacement Cost of $16,182,488 as at 1st July 2011.[14]

The list of all projects planned for between 2012 and 2016 is included in Table 5 below. The majority of the expenditure is forecast for replacement of the gate valve No 3 ($123,895) and decommissioning of valve No 2 ($41,486) at the Chinchilla Weir in year 2016. Both projects were reviewed in SAP PM. The need and timing of the works was supported by condition appraisals and risk assessments.

Table 5 Chinchilla Weir WSS - Renewals and Refurbishment Projects 2012 to 2016

Facility	Description	Driver	2012 ($000)	2015 ($000)	2016 ($000)
Chinchilla Weir	09CHW01-REPLACE: HW Gauge w/ Level Sensor	Age		27.96	
	14CHWXX DECOMMISSION RH CONDUIT & VALVES	Condition			41.49
	Replace 300 Gate Valve D/S	Condition	17.58		
	REPLACE: Purchase Butterfly Valve (Replaces existing Gate Valve)	Condition			122.89
Grand Total			**17.58**	**37.86**	**164.38**

The cost breakdown for the replacement of the Gate Valve was reviewed and appeared to be reasonable estimate of the probable cost based on typical engineering cost estimates for this size valve, although the labour (48%) and contractor (20%) costs appear to be high in relation to materials (20%) and plant (12%). Without a detailed scope of works, bill of materials and quantities and details of the unit rates used to calculate the estimates, the costs could not be fully reviewed.

5.3.2 Forecast Renewals Expenditure

Figure 5.4 shows the forecast renewals expenditure over the 25 year annuity forecast. The major expenditure will occur within the first five years with the replacement of one gate valve in 2016. The majority of the expenditures over the remaining 20 years are 5 yearly dam inspections, replacement of smaller valves based on remaining useful life and refurbishments/repainting of the conduit ($19,000 in 2028). The forecast renewals expenditure was assessed as efficient and prudent based on the predicted useful life of the assets.

[14] Annexure A.2 Table A-1 Network Service Plan

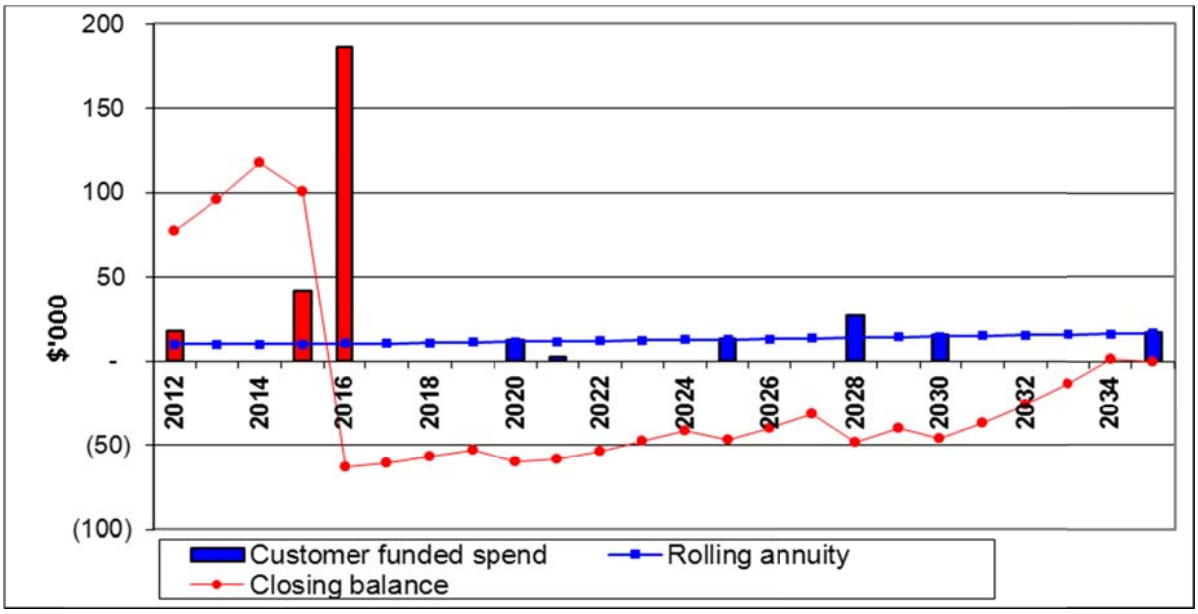

Figure 5.4 Annuity Graph – Chinchilla Weir

5.3.3 Renewals Annuity

The Chinchilla Weir Water Scheme commences the new price path with a positive balance of $74,000 in 2012. The balance will become negative with the decommissioning of valve No 2 and replacement of Valve 3 at the Chinchilla Weir. As discussed below, this project may be able to be delayed, but the risk of deferral is that the valve may fail and SunWater will lose the capacity to control flows from the weir.

The renewals annuity is to increase significantly over the next 5 years from between $3,000 to $4,000 in the previous price path to $9,000 to $10,000 in the next price path as a direct result of the valve replacement project. The cause of the increase is directly related to the replacement of the right hand gate valve with a butterfly valve in 2016. The driver for the project is the condition and age of the existing valve. The valve is required to regulate flows through the weir and the system could not be controlled if the valve seized or failed during operations. The replacement may be able to be deferred if the condition proved to better than expected, or if the deterioration proved to be slower than expected. However it is prudent to predict the replacement based on the current condition appraisal information and age of the current gate valve.

Past Renewals Expenditures

Over the past five years, SunWater has completed two projects to purchase a data-logger and install a buoy line for the Chinchilla Weir. The annuity revenues, expenditures and balances over the 2006 to 2011 period are provided below and in Figure 5.5.

- Opening Balance -$51,000
- Revenue $18,000
- Expenditure $53,000
- Closing Balance -$74,000

While the expenditure exceeds the direct revenue for the period by $35,000, the annuity balance has increased through interest on the positive balance.

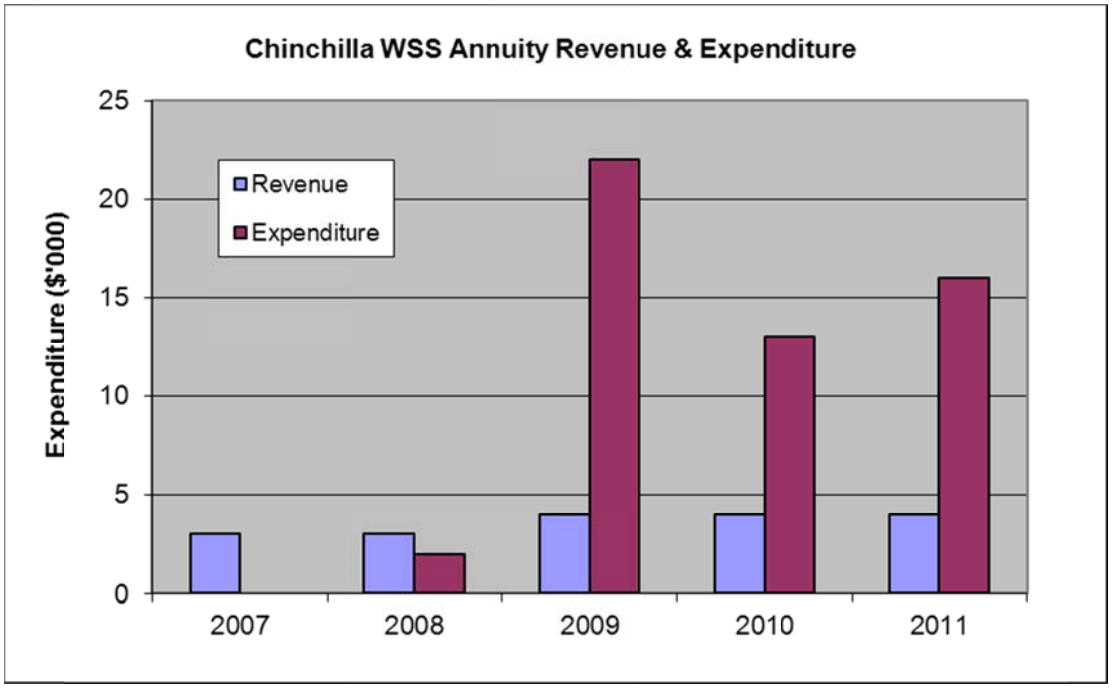

Figure 5.5 Revenue and Expenditure Annuity 2007 to 2011

Renewals Annuity Balance

As SunWater were unable to provide detail on what projects were planned during the 2006 to 2011 price path or the forecast annuity balance at the end of 2011, a comparison between what was planned and what occurred during the past five years was not possible. The methodology used to determine the opening and closing annuity balances and annuity calculations were checked and found to be correct.

As shown in Figure 5.4, the scheme's initial positive balance of $74,000 will be eroded by the projects forecast for 2016 and then gradually returned to a zero balance across the remaining 20 years.

5.3.4 Renewals and Water Consumption

The Chinchilla Weir Water system is mainly composed of static assets, which deteriorate naturally through aging. The movable assets appear to be operated well within their design parameters and replacement based on useful life predictions is appropriate. The rate of asset deterioration is not affected by water use and therefore not an impact on the renewals forecasts.

5.3.5 Feedback from Field Visits

The Chinchilla Weir Water System was not reviewed onsite during the field visits.

5.3.6 Potential Efficiency Gains

There were no suggested efficiency gains for the Capex forecast expenditures.

5.3.7 Recommendations

There were no recommendations for adjustment of the Chinchilla Weir Capex expenditure.

6. Assessment of Cunnamulla Water Supply Scheme

6.1 Network Service Plan Overview

The Cunnamulla Water Supply Scheme has a total of 26 bulk customers with a yearly Total Allowable Water Use (WAE) of 2,612 ML. As all WAEs are medium priority SunWater proposes to allocate all operating costs and the renewals annuity to medium priority WAE. Costs classified as Indirect or Overhead operating costs are excluded from the scope of this review.

The Warrego, Paroo, Bulloo and Nebine Resource Operations Plan specifies the operation and management requirements for this scheme. A Service Manager is located at the St George depot and is responsible for the day-to-day water supply management and delivery of the programmed works. The Allan Tannock Weir is the scheme's only major bulk water asset. All customers draw water from the river system. The weir is located near the town of Cunnamulla and is on the Warrego River.

See Appendix A for a map of the scheme.

6.2 Operational Costs Review

SunWater distribute Operational Costs into two broad categories being, Direct Costs, and Indirect and Overhead Costs. This review is limited to the Direct Operational Expenditure (Opex), while excluding insurance costs. Direct Opex costs are the costs described in Tables 4.3 and 4.4 of SunWater's Cunnamulla Water Supply Scheme (WSS) Network Service Plan. The ratio of Direct Opex to Indirect and Overhead Opex is shown below.

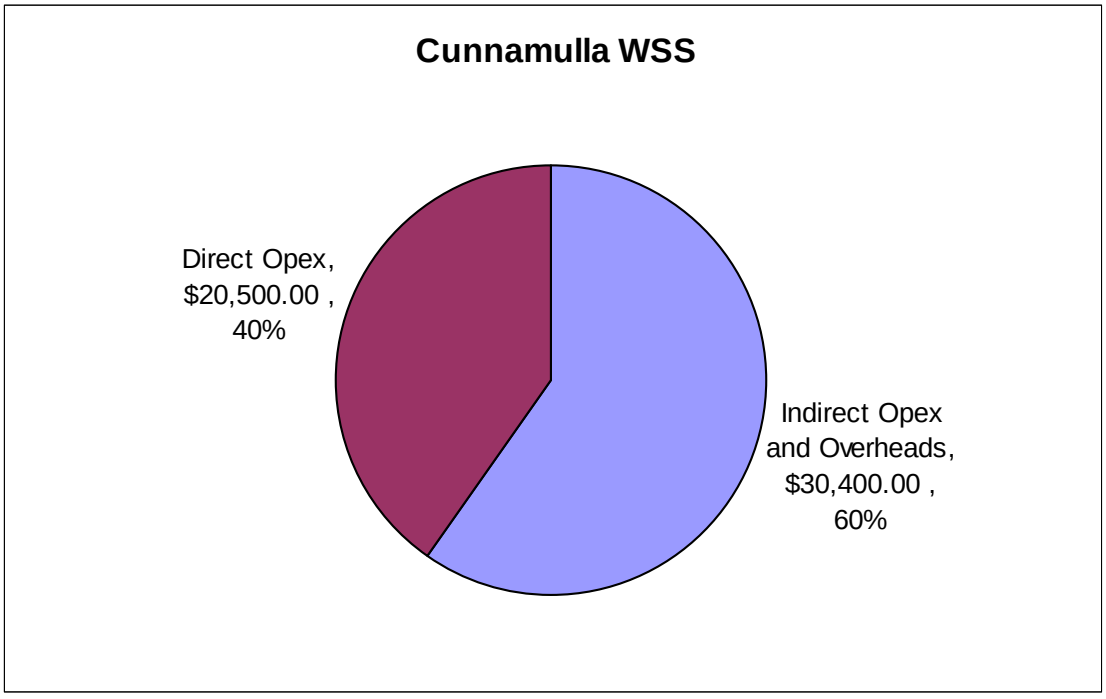

Figure 6.1 Cunnamulla WSS Breakdown of Opex

6.2.1 Forecast Operational Expenditure

When comparing the average Opex for the previous and current price path, a reduction in Opex has been realised. When questioned, SunWater has advised that the higher expenditure in the 2007 period has caused an artificial increase in the 5 year average. SunWater implemented a new Business Operating Model after the 2007 period achieving savings that have had a net effect on expenditure.

When comparing averages for the two price path periods considered for this review, an increase of 21% in Direct Opex has been forecast by SunWater. While 21% seems high, in reality, it is an increase of only $4,500. This amount would be easily accounted for by the increased Resource Operating Plan requirements and the additional weed management requirements to manage the Water Lettuce infestations as noted in the Network Service Plan.

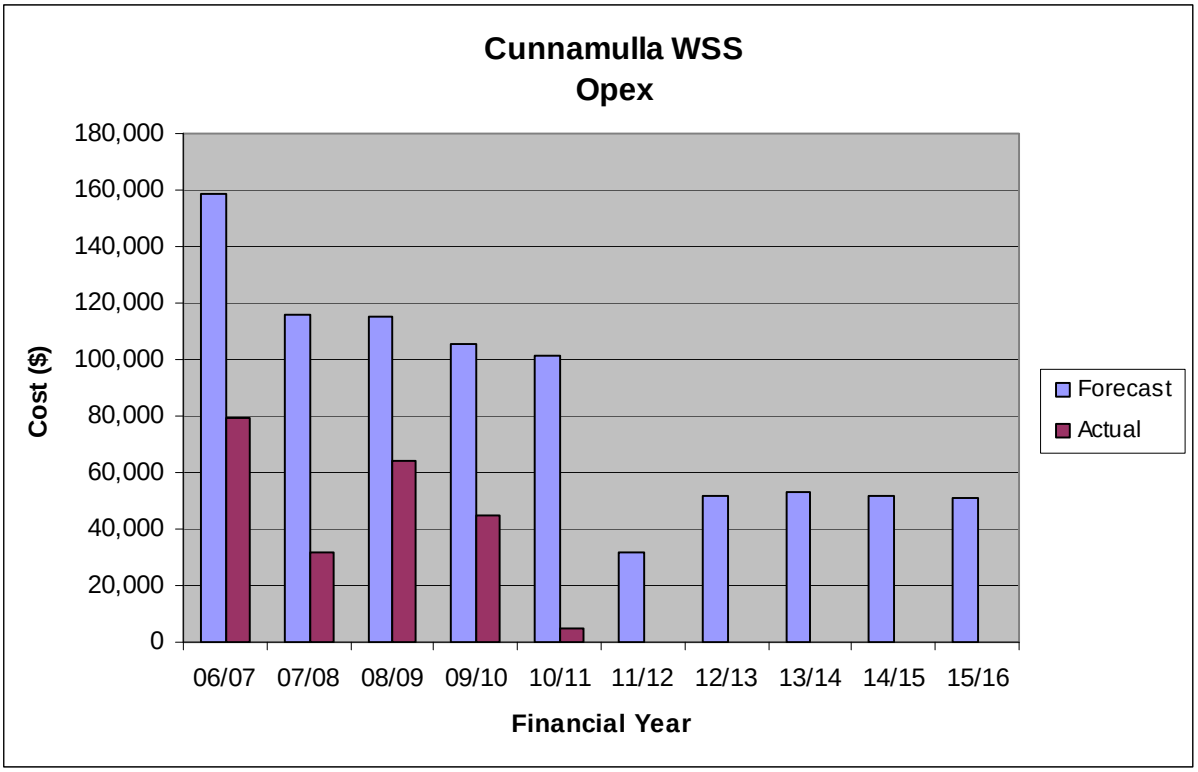

Figure 6.2 Cunnamulla WSS Forecast and Actual Opex excluding Electricity

Analysis of Direct Opex by type is consistent with other scheme allocation ratios and consistent with the level of maintenance that is required for these asset types.

Considering the allocations of Direct Opex, the 2007 period is excluded on the basis that SunWater acknowledge that substantial cost reductions have been achieved through the changes to the business operating model. Also, it should be noted the majority of the “Other” expenditure type is predominately insurance costs and excluded from this review as instructed by the Authority. Therefore, using the remaining 2008, 2009 and 2010 periods the average expenditure for these periods has been used as the forecast ongoing.

Table 6 Cunnamulla WSS - Operational Expenditure Type – Actuals and Averages

Category	Actual Expenditure			Average 2008-2010
	2008	2009	2010	
Labour	$6,000	$15,000	$11,000	$10,667
Materials	$2,000	$2,000	$2,000	$2,000
Contractors	$5,000	$8,000	$8,000	$7,000
Other	$4,000	$5,000	$4,000	$4,333

These averages do not align to the forecast budgets as shown below.

Table 7 Cunnamulla WSS - Operational Expenditure Type Averages Vs. Forecast

Category	Average 2008-2011	Forecast					
		2011	2012	2031	2014	2015	2016
Labour	$10,667	$14,000	$14,000	$14,000	$14,000	$14,000	$14,000
Electricity	0	0	0	0	0	0	0
Materials	$2,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000
Contractors	$7,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
Other	$4,333	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000

The increases in labour cost has been qualified and justified by SunWater as being required to meet additional compliance cost imposed under the Commonwealth Water Act. These additional compliance costs are imposed on schemes that form part of the Murray Darling Basin.

Excluding Labour, the remaining Direct Opex Types are reduced with the resultant net decrease of $1333 per year. Overall there is a net increase of $4000 per year, which equates to a 4% increase. Considering the increased compliance requirement this increase is considered reasonable.

Analysis of the Direct Opex by expenditure type is shown below.

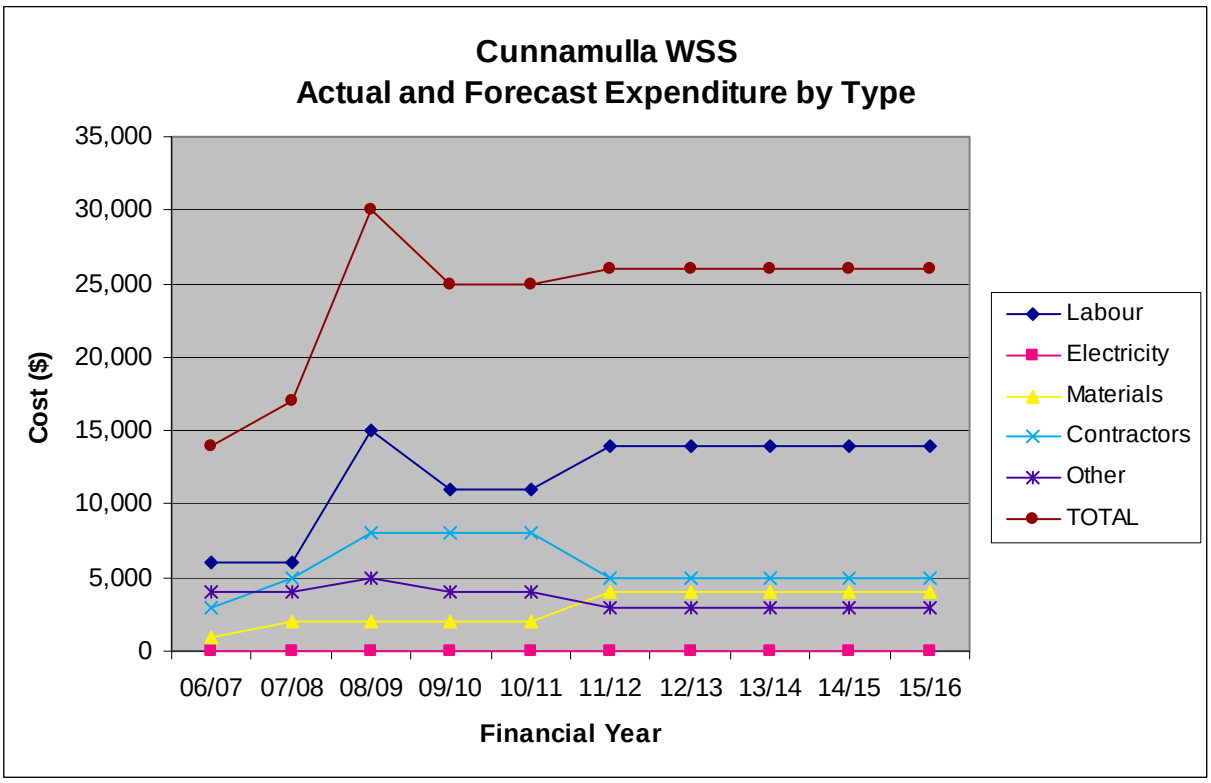

Figure 6.3 Cunnamulla WSS Actual and Forecast Opex by Type

Regulatory Compliance

Given the expectations for compliance with Australian and Queensland Government regulation and initiatives, the management water allocations, corrective and preventative maintenance, these costs are considered efficient. SunWater have forecast the required expenditure using the current cost requirements as the basis. Considering the regulatory requirements are unlikely to change, the management and administration costs of this scheme would be consistent with the actual expenditure incurred in the current price period. Allowing for anomalies such as floods, the method for calculating the forecast using actual historical cost is considered robust.

Preventative and Corrective Maintenance

Preventative and Corrective Maintenance is forecast as a 40/60 precent ratio. In normal circumstances this would be considered a poor ratio with Preventative Maintenance being insufficient. However, in this case as it is a 5-hour round trip for SunWater personnel to travel to the scheme the ratio is considered appropriate. This is considered consistent with the requirements for weed management, compliance inspections and reactive responses as required. In discussions with SunWater Regional Management during the site inspections, SunWater confirmed that consolidation of activity is achieved where possible for the non-staffed schemes. Preventative Maintenance and inspections are programmed to coincide with the meter reading processes.

Assessment the distribution of preventative to corrective maintenance is problematic and would usually be conducted against system losses, unaccounted for water and non-revenue water evaluating reductions in these loses against the maintenance expenditure. In this case the complication of natural watercourses used as the transport mechanism, actions by other irrigators and so on make it extremely difficult to make this assessment.

Contractor costs are also reflective of a higher Corrective Maintenance regime. In applying engineering and operational management judgement, this ratio is determined as reasonable.

Dams and Weirs are generally long-lived assets that combined with appropriate periodic maintenance programs can be retained in service indefinitely. The maintenance and inspection program is relatively static from year to year. The forecast provided by SunWater reflects a static program of work to maintain the assets in this scheme.

Contactors and Materials

Contactor and Materials costs are considered appropriate. This consideration is made understanding that SunWater no longer maintain machinery such as backhoes in the region and rely on contractors. This decision was made on the basis that the utilisation of the equipment did not justify the retention of the equipment. Materials are also considered appropriate. SunWater have advised the main expense in this cost line is for poisons for weed management.

Water Demand

Consumption is not considered a driver for Direct Opex. The expenditure on Direct Opex is required to maintain the service through management of the assets, compliance with regulation and the provision of water to customers. All of these costs are incurred irrespective of the volume of water sold to customers, released to maintain environmental flows or lost through natural causes. Those that gain the most benefit from the scheme must carry an allocation of these costs. On this basis, the allocation of cost is considered appropriate.

6.2.2 Feedback from Field Visits

This scheme was not visited during the review. However, the Stakeholder comments detailed in the Macintyre Brook and St George Scheme Reviews would likely be consistent with the views of the Cunnamulla WSS Stakeholders.

6.2.3 Potential Efficiency Gains

Efficiency gains for this scheme could be the implementation of electronic water ordering through Integrated Voice Recognition (IVR) or the SunWater Online solution. SunWater have indicated, when questioned, that customers in this scheme are not willing to pay for these services. Considering the low volumes allocated to this scheme this is considered reasonable. No other efficiency gains are recommended for this scheme.

6.2.4 Recommendations

No recommendations for adjustment to Direct Opex are made for this scheme.

6.3 Capital Costs Review

6.3.1 Overview

The major asset in the Cunnamulla WSS is the Allan Tannock Weir which has an Optimised Replacement Cost (ORC) of $7,227,211 as at 1st July 2011.[15]

Over the next five years, three minor projects are planned with a total expenditure of $19,000 in 2014 on repairs to erosion on the Allan Tannock Weir, and $25,000 in 2016 on refurbishment or replacing the sluice gate and aluminium rack. These projects have been supported with condition appraisals that conclude that the works are required to preserve the assets. The timing of the works appears to be prudent. One of the 2016 projects was deferred from 2004 after a review of the condition and reassessment of priorities. This indicated that SunWater is following the guidelines in the Asset Management documents.

Table 8 Cunnamulla WSS - Renewals and Refurbishment Projects 2012 to 2016

Facility	Description	Driver	2014 ($000)	2016 ($000)
Allan Tannock Weir	10CUWXX REPAIR EROSION AT WALL	Condition	18.65	
	Refurbish: Repair or Replace Aluminium Rack	Condition		12.29
	Refurbish: Sluice Gate Moved out from 04 by Raj Nov 03-	Condition		12.29
Grand Total			**18.65**	**24.58**

6.3.2 Forecast Renewals Expenditure

Figure 6.4 shows the forecast renewals expenditure over the 25 year annuity forecast. There is minimal expenditure up until 2016. The only significant expenditure is works for further refurbishment of the sluice gate and racks in 2026 ($17,000), 2028 ($18,000) and 2032 ($21,000) and further restoration of the weir in 2033 ($63,000). The forecast renewals expenditure was assessed as efficient and prudent.

[15] Annexure A.2 Table A-1 Network Service Plan

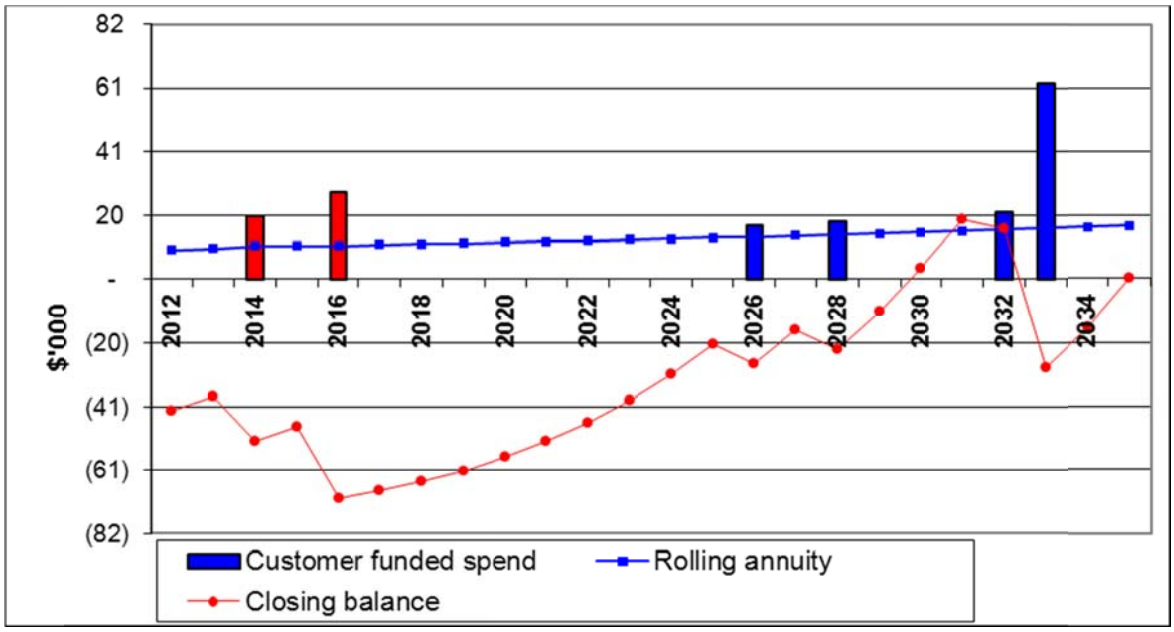

Figure 6.4 Renewals Annuity Graph 2012 to 2036

The refurbishment of the weir in 2033 was investigated in SAP PM. The driver was the useful life of the asset, which predicts when the weir will need to be refurbished and the expenditure has been based on an order of cost estimate. Minimal details were available on the method of estimating the refurbishment cost and an assessment of the efficiency was not possible without a quantified scope of works or bill of materials.

6.3.3 Renewals Annuity

The Cunnamulla Scheme commenced the new price path with a negative balance of $46,000 in 2012. The balance remains a negative balance until 2030, primarily as an impact of the interest charges. While the scheme achieves a positive balance in 2030 to 2032, the weir refurbishment works will return the scheme to a negative balance for the remainder of the 25 year forecast. The interest charges have a significant impact on the annuity balances for this scheme.

Past Renewals Expenditures

Over the past five years SunWater has completed two projects, to refurbish the rock protection and install a buoy line on the Allan Tannock Weir. The annuity revenues, expenditures and balances over the 2006 to 2011 period are below and in Figure 6.5.

- Opening Balance -$45,000
- Revenue $68,000
- Expenditure $53,000
- Closing Balance -$46,000

While the revenue will exceed expenditure by $15,000 over the period, the negative annuity balance has increased through interest costs on the negative balance.

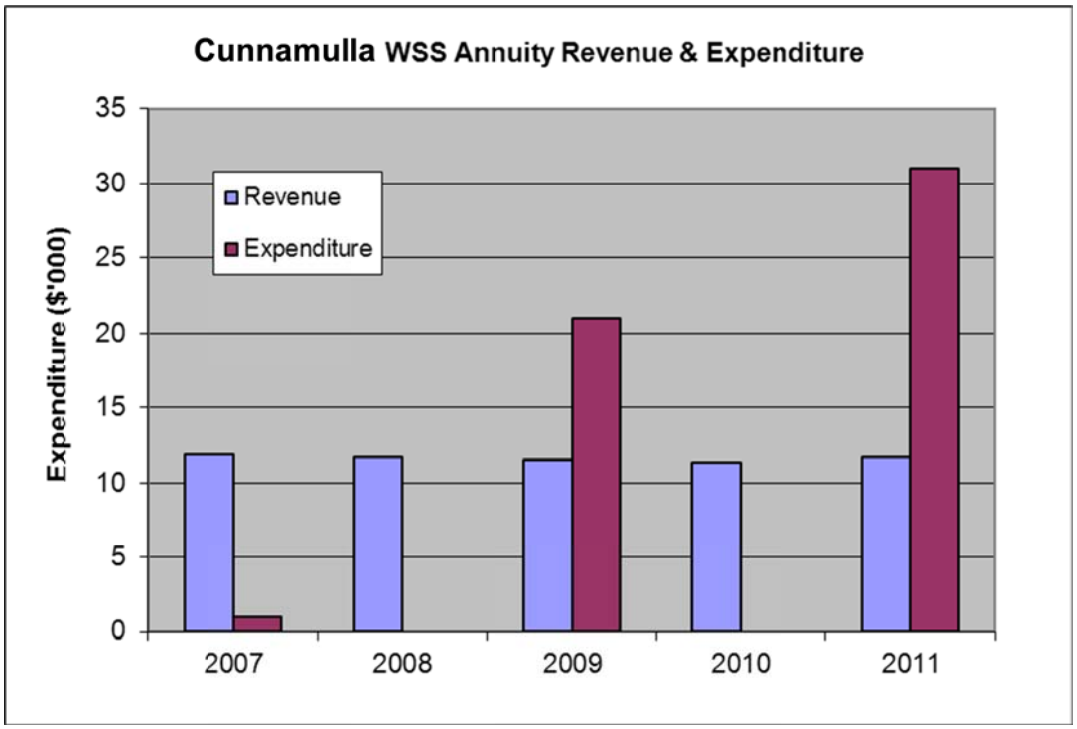

Figure 6.5 Revenue and Expenditure Annuity 2007 to 2011

The average annuity revenue over the next five years of $10,000 to $11,000 per annum is a reduction from that collected in the previous price path of $13,000 to $14,000 per annum.

Renewals Annuity Balance

As SunWater were unable to provide detail on what projects were planned during the 2006 to 2011 price path or the forecast annuity balance at the end of 2011, a comparison between what was planned and what occurred during the past five years was not possible. The methodology used to determine the opening and closing annuity balances and annuity calculations were checked and found to be correct.

As shown in Figure 6.4, the scheme's opening negative balance will be slowly reduced by the annuity contributions and then eroded by the projects forecast for 2016 the balance will gradually be returned to zero across the remaining 20 years.

6.3.4 Renewals and Water Consumption

The Cunnamulla system is mainly composed of static assets, which deteriorate naturally through aging. The movable assets appear to be operated well within their design parameters and replacement based on useful life predictions is appropriate. The rate of asset deterioration is not affected by water use and therefore not an impact on the renewals forecasts.

6.3.5 Feedback from Field Visits

The Cunnamulla System was not reviewed onsite during the field visits.

6.3.6 Potential Efficiency Gains

There were no suggested efficiency gains for the Capex forecast expenditures.

6.3.7 Recommendations

There were no recommendations for adjustment of the Cunnamulla Capex expenditure.

7. Assessment of Macintyre Brook Water Supply Scheme

7.1 Network Service Plan Overview

The Macintyre Brook Supply Scheme has a total of 90 bulk customers with a yearly Total Allowable Water Use (WAE) of 24,997 ML. This allowance comprises 24,509 ML of medium priority WAE and 488 ML of high priority WAE. SunWater proposes to allocate 98% of operating costs and 87% of the renewals annuity to medium priority WAE holders. Costs classified as Indirect or Overhead operating costs are excluded from the scope of this review.

The Border Rivers Basin Resource Operations Plan specifies the operation and management requirements for this scheme. A Service Manager is located at the Toowoomba depot and is responsible for the day-to-day water supply management and delivery of the programmed works. This scheme consists of four major bulk water assets:

- Coolmunda Dam;
- Greenup Weir;
- Ben Dor Weir; and
- Whetstone Weir.

SunWater's customers are located on the regulated section of the Macintyre Brook from the upstream ponded area of Lake Coolmunda to the junction with the Dumaresq River on the Queensland Border.

See Appendix A for a map of the scheme.

7.2 Operational Costs Review

SunWater distribute Operational Costs into two broad categories being - Direct Costs, and Indirect and Overhead Costs. This review is limited to the Direct Operational Expenditure (Opex), while excluding insurance costs. Direct Opex costs are those described in Tables 4.3 and 4.4 of SunWater's Macintyre Brook WSS (Water Supply Scheme) Network Service Plan. The ratio of Direct Opex to Indirect and Overhead Opex is shown below.

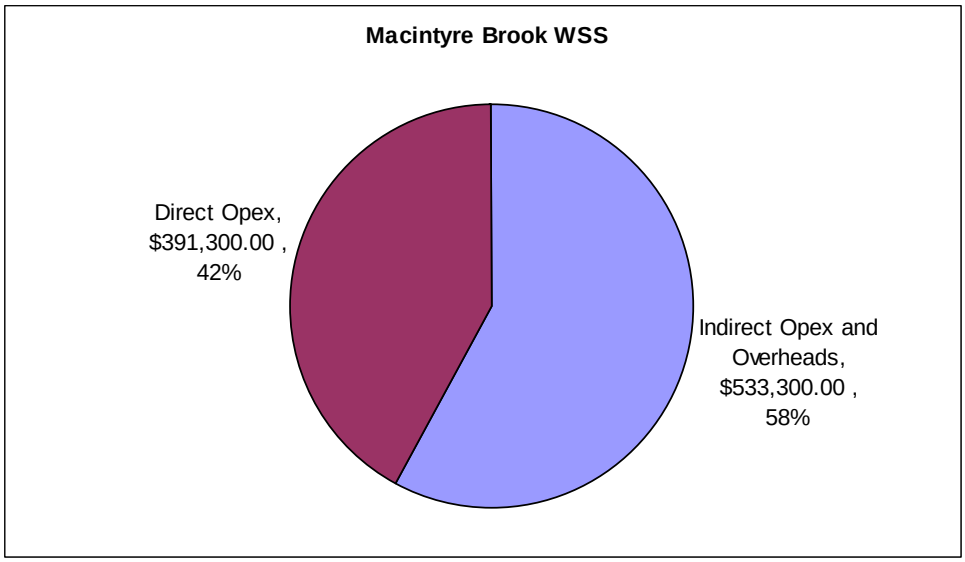

Figure 7.1 Macintyre Brook WSS Breakdown of Opex

7.2.1 Forecast Operational Expenditure

For Macintyre Brook, an overall decrease in average expenditure is seen when Actual Opex is compared to the Forecast Opex. Labour has increased marginally, with significant reductions in Contract and Material costs. The contractor costs in 2007 are acknowledged by SunWater as being in error. When the correct costs are applied, the forecast expenditure is more consistent with the actual expenditure as the follow graphs demonstrate.

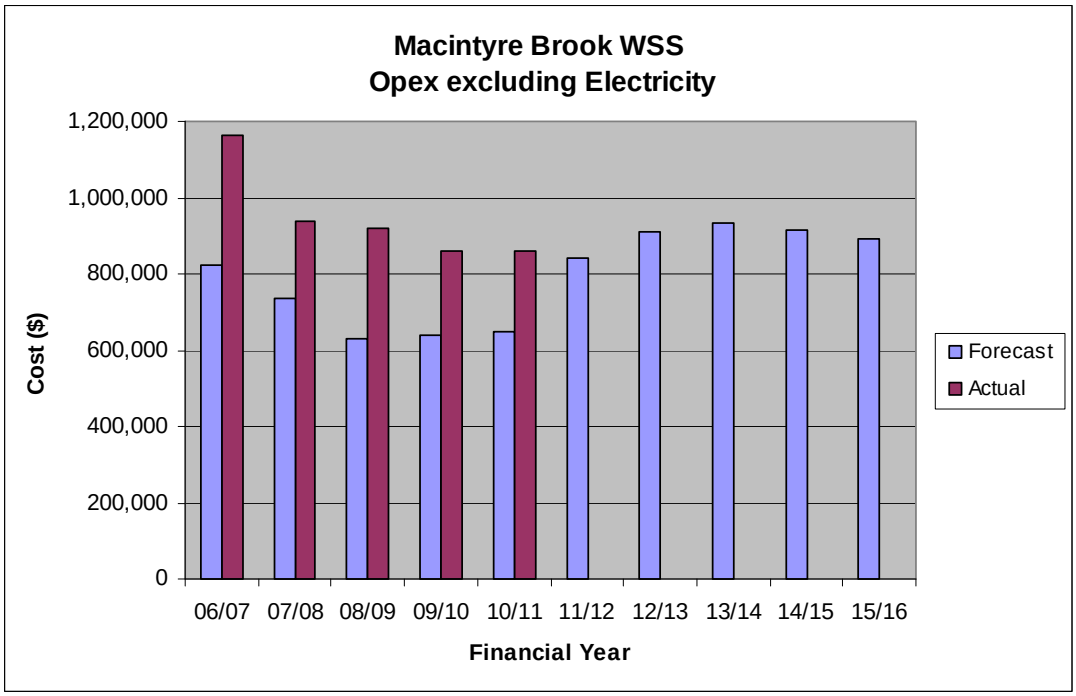

Figure 7.2 Macintyre Brook WSS Forecast and Actual Opex excluding Electricity

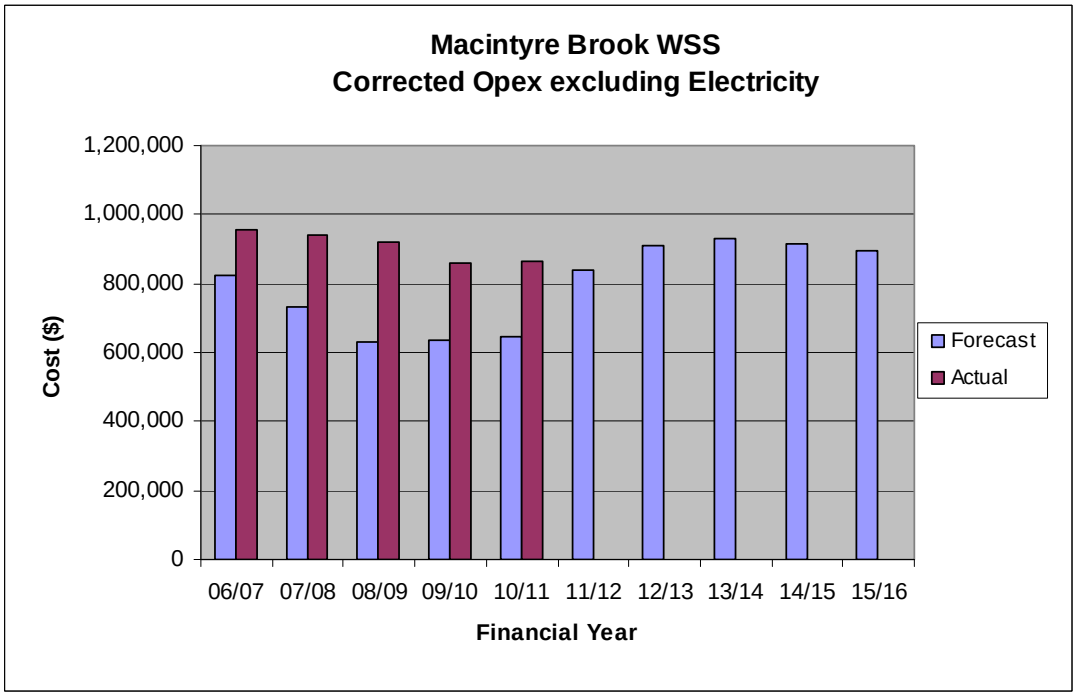

Figure 7.3 Macintyre Brook WSS Corrected Forecast and Actual Opex excluding Electricity

When costs are analysed by type, this error correction becomes more apparent.

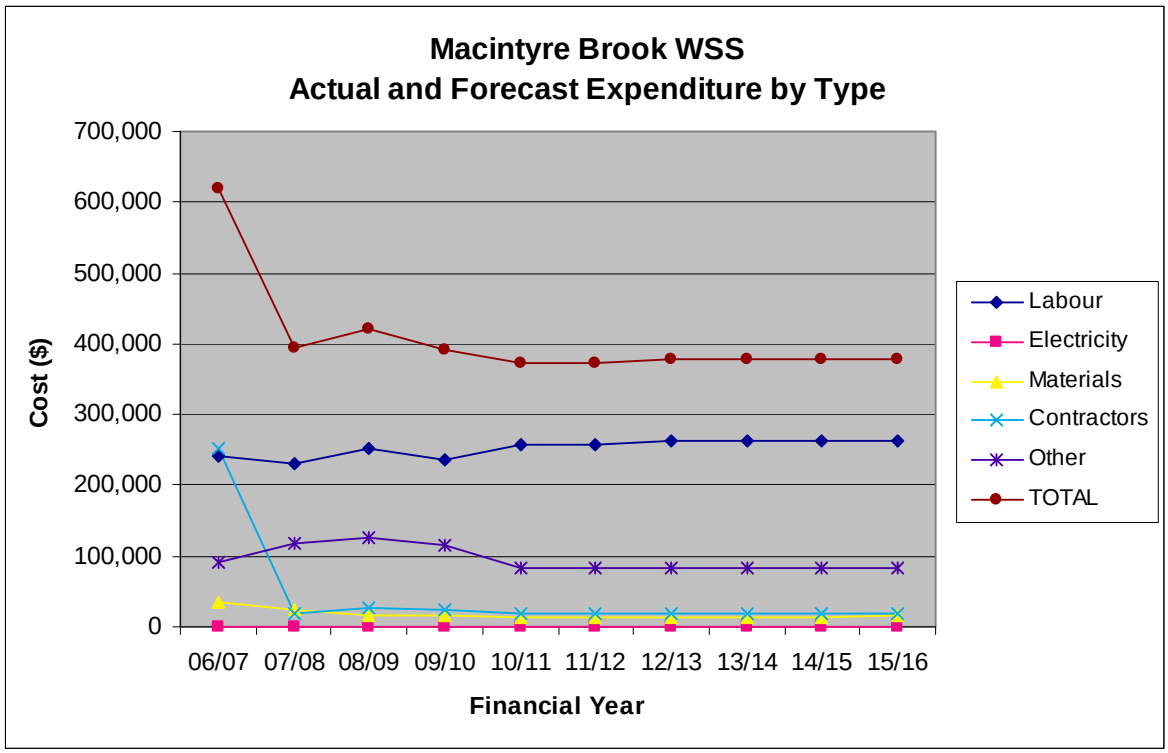

Figure 7.4 Macintyre Brook WSS Actual and Forecast Opex by Type

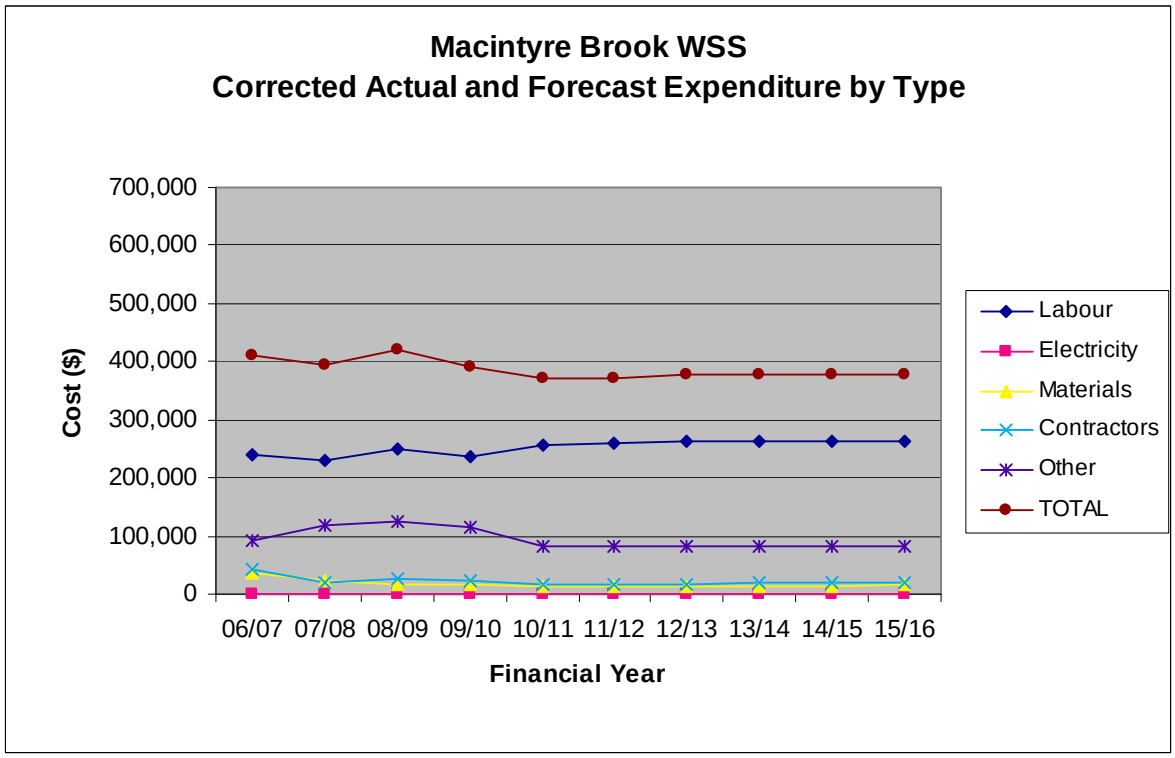

Figure 7.5 Macintyre Brook WSS Corrected Actual and Forecast Opex by Type

These graphs demonstrate that forecast expenditure is in line with the actual expenditure when corrected. In consultation with stakeholder representatives, the Opex was discussed at length and agreed that the forecast was appropriate.

Considering the allocations of Direct Opex, the 2007 period is excluded on the basis that SunWater acknowledge that substantial cost reductions have been achieved through the changes to the business operating model. Also, it should be noted the majority of the "Other" expenditure type is predominately insurance costs and excluded from this review as instructed by the Authority. Therefore, using the remaining 2008, 2009 and 2010 periods the average expenditure for these periods has been used as the forecast ongoing.

Table 9 Macintyre Brook WSS Operational Expenditure Type – Actuals and Averages

Category	Actual Expenditure			Average 2008-2010
	2008	2009	2010	
Labour	$230,000	$251,000	$237,000	$239,333
Electricity	$1,000	$1,000	$1,000	$1,000
Materials	$24,000	$15,000	$15,000	$18,000
Contractors	$20,000	$27,000	$23,000	$23,333
Other	$118,000	$126,000	$116,000	$120,000

These averages align to the forecast budgets as shown below.

Table 10 Macintyre Brook WSS Operational Expenditure Type - Averages vs. Forecast

Category	Average 2008-2010	Forecast					
		2011	2012	2013	2014	2015	2016
Labour	$239,333	$257,000	$258,000	$262,000	$262,000	$262,000	$262,000
Electricity	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Materials	$18,000	$14,000	$14,000	$14,000	$14,000	$14,000	$15,000
Contractors	$23,333	$18,000	$18,000	$18,000	$19,000	$19,000	$19,000
Other	$120,000	$82,000	$82,000	$82,000	$82,000	$82,000	$82,000

Labour

Labour increases are consistent with the SunWater Enterprise Bargain Agreement. The escalation is apparent in this scheme as the labour budget is of a higher value and therefore the increases are not lost in the rounding effects.

Regulatory Compliance

The expectations for compliance with Australian and Queensland Government regulation and initiatives, the management water allocations, corrective and preventative maintenance, these costs are considered efficient. SunWater have forecast the required expenditure using the current cost requirements as the basis. Considering the regulatory requirements are unlikely to change, the management and administration costs of this scheme would be consistent with the actual expenditure incurred in the current price period. Allowing for anomalies such as floods, the method for calculating the forecast using actual historical cost is considered robust.

Preventative and Corrective Maintenance

Preventative and Corrective Maintenance is forecast as an 83/17 precent ratio. This is considered consistent with the requirements for weed management, compliance inspections and reactive responses as required. While the Preventative Maintenance appears disproportionally high, SunWater have programmed preventative maintenance for the timed to coincide with the Capex for the gates on the Coolmunda Dam over the price setting period. This program of work is significant but is an infrequent requirement that is coincidental to this price setting period.

Assessment of the distribution of preventative to corrective maintenance is problematic and would usually be conducted against system losses, unaccounted for water and non-revenue water evaluating reductions in these loses against the maintenance expenditure. In this case the complication of natural watercourses used as the transport mechanism, a dam with a high ratio of surface area to depth, actions by other irrigators and so on make it extremely difficult to make this assessment. In applying engineering and operational management judgement, this ratio is determined as reasonable.

Dams and Weirs are generally long-lived assets that combined with appropriate periodic maintenance programs can be retained in service indefinitely. The maintenance and inspection program is relatively static from year to year. The forecast provided by SunWater reflects a static program of work to maintain the assets in this scheme.

Contactors and Materials

Contactor and Materials costs are considered appropriate. This consideration is made understanding that SunWater no longer maintain machinery such as backhoes in the region and rely on contractors. This decision was made on the basis that the utilisation of the equipment did not justify the retention of the equipment. Materials are also considered appropriate. SunWater have advised the main expense in this cost line is for poisons for weed management.

Water Demand

Consumption is not considered a driver for Direct Opex. The expenditure on Direct Opex is required to maintain the service through management of the assets, compliance with regulation and the provision of water to customers. All of these costs are incurred irrespective of the volume of water sold to customers, released to maintain environmental flows or lost through natural causes. Those that gain the most benefit from the scheme must carry an allocation of these costs. On this basis, the allocation of cost is considered appropriate.

7.2.2 Feedback from Field Visits

GHD was able to undertake site inspections of the assets for this scheme and engaged with representatives from the stakeholder groups. Preventative Maintenance and Corrective Maintenance activity was evidenced and discussed at both asset site inspections. The assets inspected were in good condition and appeared to be well maintained. Stakeholders questioned the plans to automate the water releases at the Whetstone Weir and suggested that it would be inefficient. The cost of supplying electricity to the weir would not be justifiable. The control valve installed at the weir is capable of remote operation, but has not been connected to an electrical supply.

Whilst Stakeholders were agreeable to the Direct Opex costs, they expressed broad concerns about the Indirect and Overhead Opex. They also did not agree with the proposed risk sharing arrangements.

Stakeholders raised the concerns that the communications, escalations and dispute resolution processes in SunWater are not clear and are an impediment to operational efficiency. They also indicated that the decline in the collaboration between SunWater and its customers was having negative operational impacts. Stakeholders identified relationship management as a key area for improvement between SunWater Management and customers as an area of efficiency gain.

Stakeholders initiated the capacity share (now called Continuous Share under the Resource Operating Plan) with one of the aspects being customers would read the meter monthly and SunWater only reading the meters quarterly. Stakeholders see this as an efficiency gain. They also commented that the Continuous Share arrangement would gain greater efficiency if a carryover cap were implemented as originally proposed.

Stakeholders also suggested that an end of scheme gauging monitor should be installed to monitor outflows from the scheme. Such a device would have limited Opex impact.

Stakeholders were advised that these issues, other than the Direct Opex, were outside of this review, but that the issues raised would be documented.

7.2.3 Potential Efficiency Gains

Meter reading is conducted on a monthly basis and argued by SunWater that this is a requirement to comply with the Resource Operating Plan. As with the other Continuous Share schemes, GHD suggests that having the customer read the meter and enter the reading via the SunWater Online system would provide a substantial efficiency gain.

The SunWater argument that the customer may not enter the correct reading is not valid on the basis that the customer requires an accurate reading to manage their allocation. It is in customers' best interest to have the most accurate meter reading to allow them to plan their consumption and potential for water trading.

SunWater would still be required to conduct the quarterly meter read for the purposes of billing and to assess the condition of the meter and its' ancillary devices (solar panel, etc.). The quarterly read would also serve to validate the monthly readings entered by the customer. It could be argued that the customer would gain a benefit from entering the meter reading on a daily basis during periods of peak consumption. The time gained from not having to conduct monthly meter readings could be utilised to complete preventative maintenance activity.

Recreation areas attached to the Coolmunda Dam have been closed off and are not being maintained to a level expected to allow public use. This is evidence of an efficiency gain achieved by SunWater. SunWater indicated that the Local Government in the area had been approached to take over the Recreational area but that they had declined.

7.2.4 Recommendations

GHD would recommend that the process issues identified by Stakeholders should be addressed by SunWater with regards to the Indirect and Overhead costs.

GHD would recommend that SunWater negotiate with the customers to have monthly meter reading entered via the SunWater Online Customer account and reduce their own meter reading routine to quarterly.

7.3 Capital Costs Review

7.3.1 Overview

The main assets in the Macintyre Brook WSS are the Coolmunda Dam, Greenup, Whetstone and Ben Dor Weirs. The storages have an optimised replacement cost (ORC) of $207,664,812 as at 1st July 2011.

Over the next five years, the major projects include refurbishment of the gates, floats and bulkheads at Coolmunda Dam and installation of three gauging stations within the scheme. The refurbishment work on Coolmunda Dam is programmed between 2012 and 2014 at a total cost of $442,000. The refurbishment work is required to maintain the functionality of the Dam's gate systems and is based on condition appraisals. The installation of gauging stations is driven by operational requirements and is estimated at $109,000.

7.3.2 Forecast Renewals Expenditure

Figure 7.6 below shows the forecast renewals expenditure over the 25 year annuity. The renewals projects include refurbishments to protect the assets, recurrent expenditures on Dam Inspections, and refurbishment and repainting of the Coolmunda Dam Gates. Replacement of the outlet pipework ($235,000) is included in year 2035. This project contributes to the peak in the final year of the 25 year renewals annuity. The forecast renewals expenditure was assessed as efficient and prudent.

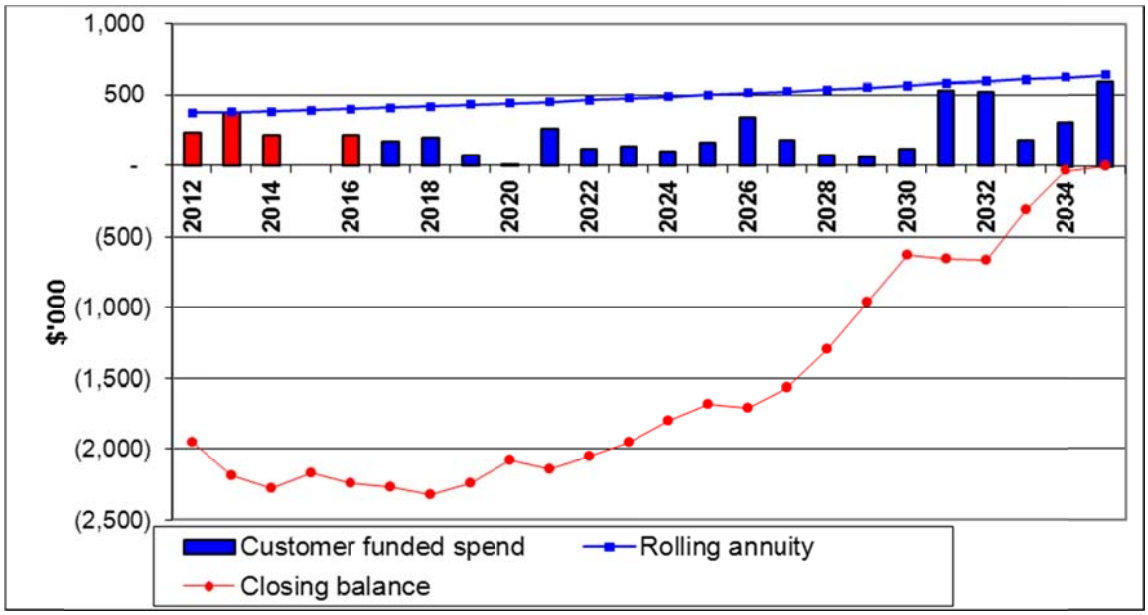

Figure 7.6 Renewals Annuity Graph 2012 to 2036

The following projects were reviewed in SunWater's SAP PM and WMS:

Table 11 Macintyre Brook WSS - Renewals and Refurbishment Projects 2012 to 2016

Facility	Description	Driver	Cost Estimate ($'000)				
			2012	2013	2014	2015	2016
Coolmunda Dam	12MABXX Refurbish Downstream Face	Age	54				
	13MABXX Paint Bulkheads/ Replace Seals	Condition		83			
	13MABXX Paint D/S Of Gate Structure	Condition	54				
	13MABXX Reseal /Insp / Repair /Repaint	Condition		23			
	14MABXX Paint Ext Surface,Ca Int/ Cctv,	Condition			49		
	14MABXX Refurbish Top Trash Rack - Job C	Condition				22	
	14MABXX Refurbish: Repaint All D/S Face	Condition				49	
	14MABXX Repaint All U/Sand D/S Faces	Condition			69		
	14MABXX Study:Refurb All Cables & Cblwys	Condition				28	
	Regrade and clear toe drain downstream face of embankment	Condition			80		
	Study: 5yr Dam Comprehensive Inspection (5yr Review of EAP, O&M and SOPs)	Compliance		24			
	11MAB06 5 Yr Dam Safety Inspection	Compliance					52
Whetstone Weir	09MAB08 Install Whetstone Head Water Gauge	Operational		48			
Macintyre Brook	09MAB-Install Tail Water Gauge at Coolm	Compliance			27		
	Replace 416404C Bracker Ck Terraine	Condition					36
	Replace 416409A Coolmunda Dam Hw	Condition					36
	Replace 416410A Macintyre Brook Barongarook	Condition					36

The drivers for each project were sound, and the timing and cost of the works appears to be prudent. The need to complete the programmed refurbishment of the Coolmunda Dam between 2012 and 2014 should be review with a view to deferring the projects by two years. The impact will be a reduction in the closing balances for these years and a reduction in the interest charges. As the interest charges are a significant cost contributors when schemed have negative closing balances, deferring these projects would reduce the closing balance and reduce the renewal annuity by approximately 2.5%.

Whetstone Weir Project

A far greater impact would be achieved if the cost over-run of the Whetstone Weir Project was removed from the opening balance. The renewals annuity could be reduced by 21% if the cost estimate ($1.229 million) was agree as a fair value of the project and by 36% if the original estimate ($0.744 million) was deemed to be a fair contribution from the irrigators.

7.3.3 Renewals Annuity

The Macintyre Brook WSS commences the new price path with a significant negative renewals balance of $1,868,000 in 2012. The balance remains negative for the whole of the 25 year annuity period as shown in Figure 7.6.

As can be seen by Figure 7.6, the negative balance will remain until the end of the 25 year annuity period and the rolling annuity has to remain above any planned customer funded expenditure to return the scheme to a zero balance by 2036. Interest on the negative annuity balance is a significant cost over the next 25 years, rising from $226,000 in 2012 to $281,000 in 2019.

The following renewals projects beyond 2016 in Table 12 were reviewed to determine whether the expenditures were required and whether the timing was appropriate. All of the projects were schedule based on the planned maintenance frequency or useful life of the asset. While the project's forecast cost are within an acceptable order of magnitude based on engineering judgement, the detailed information on each project was not available to complete a detailed analysis of the cost estimates.

Table 12 Macintyre Brook WSS - Renewals and Refurbishment Projects Beyond 2016

Facility	Description	Driver	Value ($'000)	Year
Coolmunda Dam	11MAB01 REFUBISH D/S GATE FACE	Age	158	2031
	13MABXX PAINT BULKHEADS/ REPLACE SEALS	Age	130	2031
	12MABXX INSTALL BUOY LINE	Age	152	2032
	14MABXX REPAINT ALL U/SAND D/S FACES	Age	104	
	Replace Pipework	Age	378	2035

Past Renewals Expenditures

Over the past five years, SunWater has completed a range of minor projects on the scheme. The significant project over this period was the replacement of the Whetstone Weir which cost SunWater $1,926,557 between 2007 and 2010. The annuity revenues, expenditures and balances over the 2006 to 2011 period are detailed below and in Figure 7.7.

- Opening Balance $336,000
- Revenue $667,000
- Expenditure $2,600,000
- Closing Balance -$1,868,000

The expenditure has exceeded revenue by $933,000 over the period, transferring the renewal balance from positive in 2006 to a large negative annuity balance by 2011. As can be seen in the Figure 7.7, expenditure, largely from the Whetstone Weir project, has exceeded revenues in each year of the previous five year period.

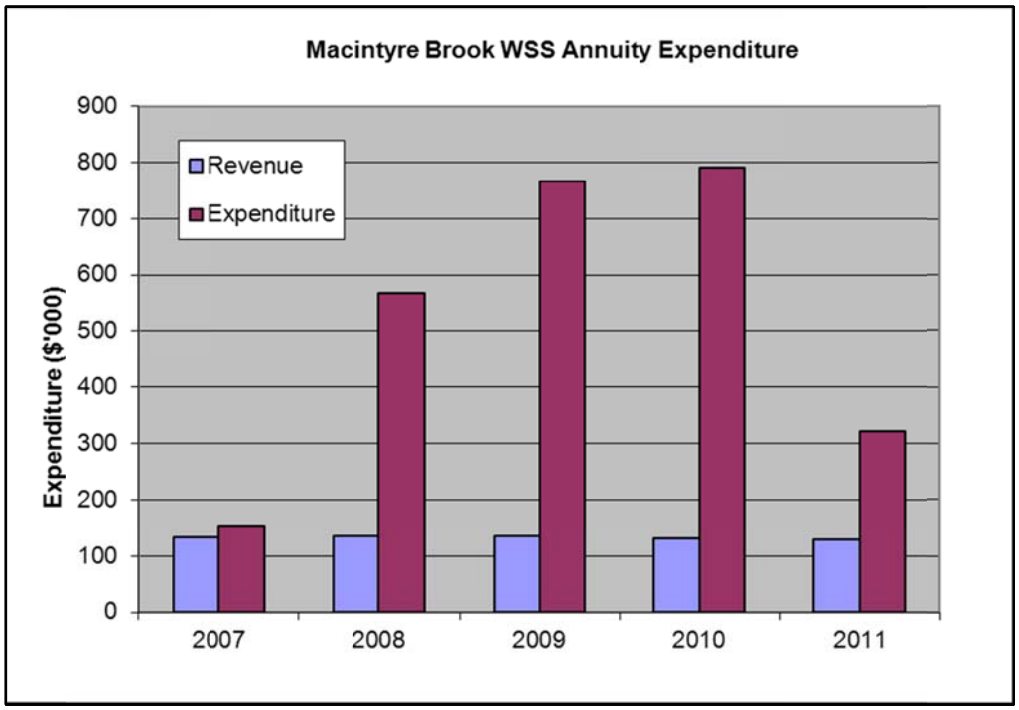

Figure 7.7 Revenue and Expenditure Annuity 2007 to 2011

The following projects completed between 2006 and 2011 were reviewed in SAP PM and WMS and assessed as prudent and efficient based on the information provided by SunWater's staff and GHD's analysis using engineering experience and judgement.

Table 13 Macintyre Brook WSS - Renewals and Refurbishment Projects 2006 to 2011

Project	Year	Cost ($)	Driver
Coolmunda Dam: Relocate power supply to dam	2007	40,809	Safety
Study - Overall Risk Assessment - Coolmunda Dam	2008	64,144	Compliance
Refurbish Spillway Regulating Gate 1 D/S Face (Paint) - Coolmunda Dam	2009	76,721	Condition
Study - Overall Risk Assessment - Coolmunda Dam	2009	57,109	Compliance
11MAB07-RE-ESTABLISH TOE DRN ON D/S EMB	2011	40,265	Condition
Refurbish D/S Face - Spillway Gate 2 - Coolmunda Dam	2011	56,085	Condition
Refurbish D/S Face - Spillway Gate 7- Coolmunda Dam	2011	56,085	Condition
11MABXX 5 YR Dam Safety Inspection	2011	78,064	Compliance

As discussed in Section 7.3.2, the expenditure on the Whetstone Weir, while required because of the poor condition of the weir and the irrigator's requirements for the asset, far exceeded the initial and revised cost estimates. A detailed cost analysis was not possible without additional information from SunWater, which is subject to consideration by the Authority.

Renewals Annuity Balance

As SunWater were unable to provide detail on what projects were planned during the 2006 to 2011 price path or the forecast annuity balance at the end of 2011, a comparison between what was planned and what occurred during the past five years was not possible. The methodology used to determine the opening and closing annuity balances and annuity calculations were checked and found to be correct.

As shown in Figure 7.7, the scheme's opening negative balance will be slowly reduced by the annuity contributions over the next 25 years. During the next 5 years, the rolling annuity will rise from $371,000 in 2012 to $399,000 in 2016. This is a significant increase from the previous price path of $130,000 to $134,000.

7.3.4 Renewals and Water Consumption

The Macintyre Brook system is mainly composed of static assets, which deteriorate naturally through aging. The movable assets appear to be operated well within their design parameters and replacement based on useful life predictions is appropriate. The rate of asset deterioration is not affected by water use and therefore not an impact on the renewals forecasts.

7.3.5 Feedback from Field Visits

The GHD team inspected Coolmunda Dam and Whetstone Weir on 1st March 2011 accompanied by SunWater's Operations Manager South. The following observations were recorded during the visit.

Coolmunda Dam

The Dam was generally in good condition; however, detailed inspection of the spillway gates was not carried out. The Dam operator was taken ill and access was not available to all parts of the Dam. Three of the gates have been refurbished and the dam has generally been well maintained. Removal of vegetation on the embankment slopes is required to facilitate inspection of the slopes. The embankment upstream slope is lacking larger sized rip rap in the upper section and the requirement for larger sized rip rap at, or near, the dam crest should be reviewed.

The site inspection team verified that the following works were required and agreed with the timing of the projects in the five year forecast:

- Refurbishment of the embankment downstream face;
- Paint bulkheads and replace seals;
- Paint D/S of gate structure;
- Refurbish trash racks. This appeared to have been completed as a new trashrack was in place for the gate intake water;
- Regrade and clear toe drain; and
- Dam safety inspections.

Whetstone Weir

The weir has recently been upgraded and is a substantial concrete structure, which appears to be somewhat over-designed for its function. Details of the construction were not available to confirm this and discussions with SunWater indicated that the weir comprises a timber pile structure with concrete overlay. The weir and bypass pipework were nearly new and in excellent condition. Silt deposition at the pipe flow mechanism was occurring and will require cleaning out. Similarly, the intake structure trashrack is working well but was partly blocked by debris. Minor erosion of the bank protection rip rap has occurred on both abutments and will require preventive maintenance.

The operation of the weir requires opening and closing of the butterfly valve on the left bank river release pipeline. This valve is fitted with a Rotork actuator, but is operated manually as the site does not have an electrical power. The need for automation of this valve is questionable given the low frequency of flow adjustments required to maintain the environmental flow releases.

The adjoining landowner had been using the upstream apron of the weir as an access road to their farm since the downstream crossing had been washed away in the recent floods. Whether the apron had been designed to accommodate vehicle loads was questioned and the safety of using the apron without edge markers does not appear to have been considered. The capacity of the apron should be checked and edge markers installed before agreeing to this arrangement. SunWater advised that this practice was not permitted and took immediate steps to close access to the apron.

7.3.6 Potential Efficiency Gains

While there were no Capex efficiency gains evident in the forward works program, the cost of the Whetstone Weir replacement project indicated that the options analysis process was not followed. Information provided by SunWater did not include any options analysis and the cost estimate proved to be significantly undervalued. The irrigators agreed to the project on the basis of a forecast capital expenditure of $744,000. SunWater advised that this estimate appears to be the replacement value of the original timber weir. A Structural Stability Analysis and Inspection in May 2005 concluded that the Weir was in poor condition and should be encased in concrete.

Sometime between July and September 2009, SunWater provided a presentation to the irrigators and advised that the cost had increased to $2.2 million and that $995,295 had been spent to the end of June 2009.

A preliminary cost estimate was prepared by SunWater (dated June 2009) for a total project cost of $1,228,980 with an accuracy of ±25%. The estimate did not include Geotechnical Investigation or design costs. The project was originally approved by SunWater to proceed to $1,611,119, but later the budget was revised again and approved to $2,229,632. The final approved budget in 2010 was recorded at $1,924,359.

The possible problems identified with this project include:

- Lack of or no options analysis or cost benefit analysis;
- Lack of understanding of the cost of works in the preliminary cost estimate;
- Lack of cost control mechanisms or procedures; and
- Lack of communication with irrigators as they were not informed as the project progressed.

During the meeting with the irrigators, the project was raised as an example of SunWater failing to consult with and ignoring the needs of the irrigators.

7.3.7 Recommendations

The recommendations for the Macintyre Brook Water Supply Scheme Capex expenditure review is that SunWater should be more open with the irrigators on their expenditure plans and the project delivery procedures for larger projects, based on the Whetstone Weir experience. The need to consider project options and cost benefits before commencing projects that require significant capital expenditure may need to be reviewed in SunWater's project procurement procedures.

Whether the cost over-runs on the Whetstone Weir should be included in the opening renewals balance is a matter for consideration by the Authority.

8. Assessment of Maranoa River Water Supply Scheme

8.1 Network Service Plan Overview

The Maranoa River Water Supply Scheme has a total of 4 customers with a yearly Total Allowable Water Use (WAE) of 805 ML. All of this WAE is medium priority. SunWater proposes to allocate 100% of operating costs and the renewals annuity to medium priority WAE holders. Costs classified as Indirect or Overhead operating costs are excluded from the scope of this review.

The Condamine and Balonne Resource Operations Plan specifies the operation and management requirements for this scheme. A Service Manager is located at the St George depot and is responsible for the day to day water supply management and delivery of the programmed works. This scheme consists of one major bulk water asset, the Neil Turner Weir, this weir supplements surface water along the Maranoa River over a combined 9.7 km stretch to the end of its ponded area. Customers pump directly from the weir pond.

See Appendix A for a map of the scheme.

8.2 Operational Costs Review

SunWater distribute Operational Costs into two broad categories being, Direct Costs, and Indirect and Overhead Costs. This review is limited to the Direct Operational Expenditure (Opex), while excluding insurance costs. Direct Opex costs are the costs described in Tables 4.3 and 4.4 of SunWater's Maranoa River WSS (Water Supply Scheme) Network Service Plan. The ratio of Direct Opex to Indirect and Overhead Opex is shown below.

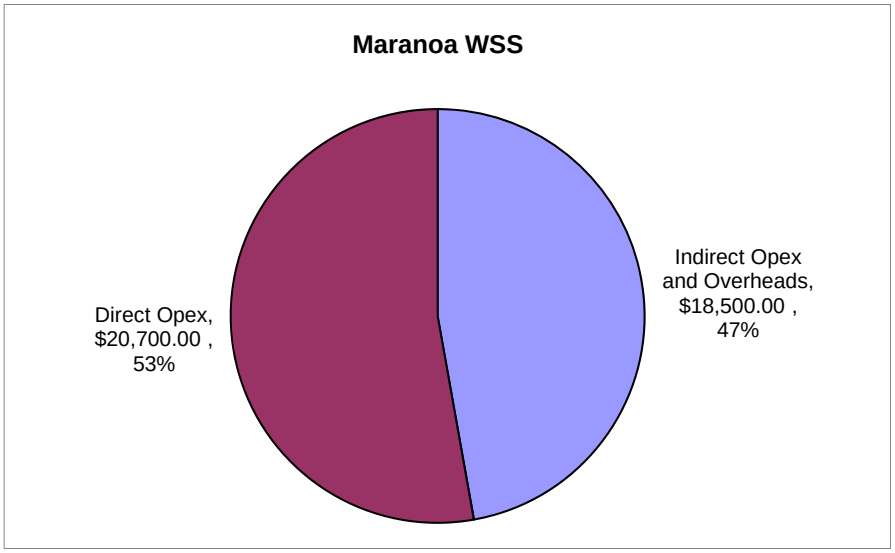

Figure 8.1 Maranoa River WSS Breakdown of Opex

While it is outside of the scope of this review, the distribution of Indirect Opex and Overheads to this scheme raises questions. This distribution is not consistent with the distribution in all other schemes in this cluster.

8.2.1 Forecast Operational Expenditure

Overall, there has been a decrease in the five year average expenditure when comparing Actual Opex to Forecast Opex over the previous price path 2007-2010 (refer Figure 8.2). There is a relatively large increase of labour cost in this scheme with a larger decrease in contractor costs. SunWater have explained that the variations are a change in management method of the scheme with SunWater labour taking over the work previously conducted by contractors.

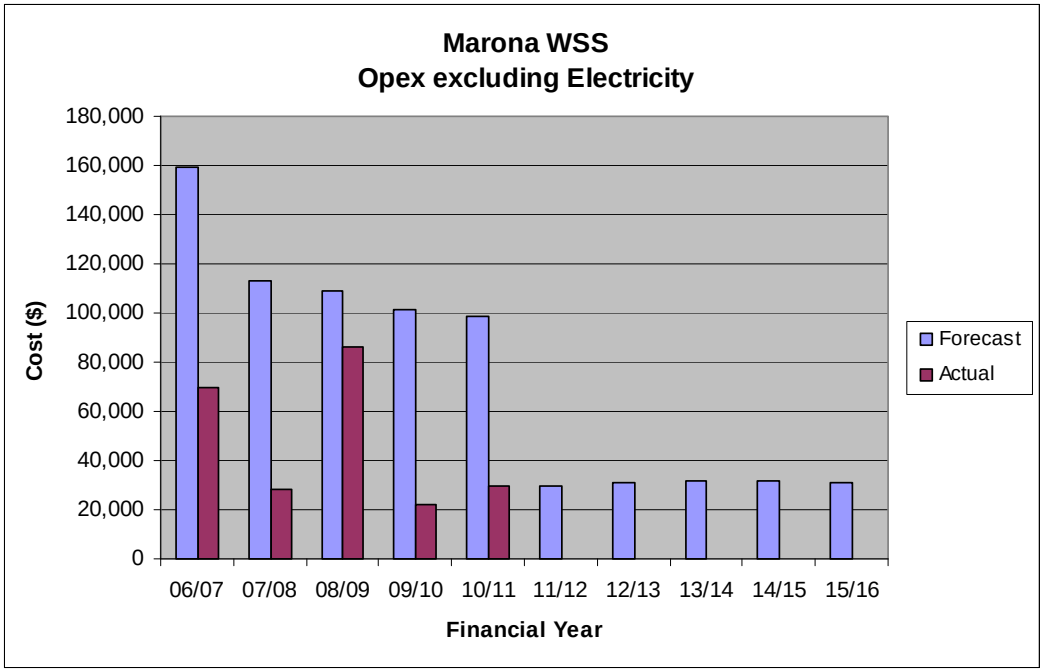

Figure 8.2 Maranoa River WSS Forecast and Actual Opex excluding Electricity

The above analysis shows a large differential in the forecast Opex and Actual Opex for the previous price path. Over the five year period, $277k of forecast Opex was not expended. SunWater have further explained this variation as an outcome of major business structure and process reform reducing the levels of indirect and overhead Opex. GHD has not been able to confirm this statement as the requested information operational expenditure information has not been provided. Further analysis was conducted and findings detailed below.

Considering the allocations of Direct Opex, the 2007 period is excluded on the basis that SunWater acknowledge that substantial cost reductions have been achieved through the changes to the business operating model. Also, it should be noted the majority of the “Other” expenditure type is predominately insurance costs and excluded from this review as instructed by the Authority. Therefore, using the remaining 2008, 2009 and 2010 periods, the average expenditure for these periods has been used as the forecast ongoing.

Table 14 Maranoa River WSS Operational Expenditure Type – Actuals and Averages

Category	Actual Expenditure			Average 2008-2010
	2008	2009	2010	
Labour	$5,000	$6,000	$3,000	$4,667
Electricity	0	0	0	0
Materials	0	0	0	0
Contractors	0	$51,000	$3,000	$18,000
Other	0	$8,000	$9,000	$10,000

These averages do not align to the forecast budgets as shown below.

Table 15 Maranoa River WSS Operational Expenditure Type Averages Vs. Forecast

Category	Average 2008-2010	Forecast					
		2011	2012	2031	2014	2015	2016
Labour	$4,667	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Electricity	0	0	0	0	0	0	0
Materials	0	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Contractors	$18,000	0	0	0	0	0	0
Other	$10,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000

SunWater have explained the changes in the budgets as a change in operational philosophy. Contractors have previously been used to complete the maintenance tasks for the Maranoa River scheme. SunWater have concluded that it would be more cost efficient to utilise SunWater Personnel for the management of this scheme.

Using the calculated averages, total Direct Opex for 2008-2010 would be $32,667 annually. Utilising the SunWater personnel to maintain the scheme average the forecast total for Direct Opex is $16 000 annually. While acknowledging that the average Contractor cost for 2008-2010 is inflated due to the one off maintenance cost in 2009, the forecast average annual Direct Opex for 2011-2010 of $14,667 does not equate to an adjusted average annual total Direct Opex for 2008-2010 of $16 000.

Analysis of the Direct Opex by expenditure type is shown in Figure 8.3.

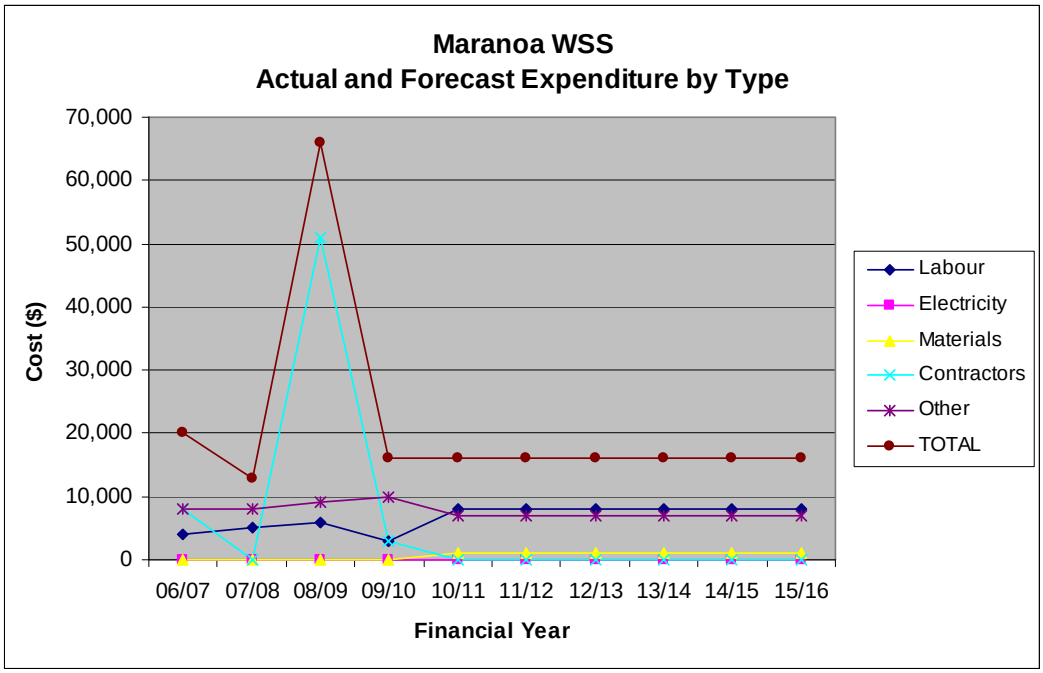

Figure 8.3 Maranoa River WSS Actual and Forecast Opex by Type

SunWater have qualified the Contractor Expenditure Peak ($51k) in the 2009 period as scheduled weir corrective maintenance. As the Actual expenditure over the current place path was less than the forecast expenditure it is considered reasonable as a planned maintenance activity. When this expenditure peak is excluded from the analysis, there is a 0% increase in the five year average comparisons in the forecast Opex for the 2010-2016 Price Path.

Preventative and Corrective Maintenance

Considering the expectations for compliance with Australian and Queensland Government regulation and initiatives, the management water allocations, corrective and preventative maintenance, these costs are considered efficient. SunWater have forecast the required expenditure using the current cost requirements as the basis. Considering the regulatory requirements are unlikely to change, the management and administration costs of this scheme would be consistent with the actual expenditure incurred in the current price period. Allowing for anomalies such as floods, the method for calculating the forecast using actual historical cost is considered robust.

Preventative and Corrective Maintenance is forecast as 87/13 precent ratio for a total budget of $8 000 annually. For such a small budget the expectation would be that preventative maintenance would be heavily weighted to reduce the potential for corrective maintenance activity. This is considered consistent with the requirements for weed management, compliance inspections and reactive responses as required.

Assessment the distribution of preventative to corrective maintenance is problematic and would usually be conducted against system losses, unaccounted for water and non-revenue water evaluating reductions in these loses against the maintenance expenditure. In this case, the complication of natural watercourses being used as the transport mechanism, actions by other irrigators and so on make it extremely difficult to make this assessment. In the Maranoa River WSS case, the irrigators all take water directly from the weir pond adding another element of complexity to this assessment. In applying engineering and operational management judgement, this ratio is determined as reasonable.

Dams and Weirs are generally long-lived assets that combined with appropriate periodic maintenance programs can be retained in service indefinitely. The maintenance and inspection program is relatively static from year to year. The forecast provided by SunWater reflects a static program of work to maintain the assets in this scheme.

Contractor and Materials

Contactor and Materials costs are considered appropriate. In the Maranoa River case, the Contract Cost line has been forecast as $0. From this it is concluded that SunWater do forecast the need for any maintenance outside of the capability of their own personnel. Materials are also considered appropriate. SunWater have advised the main expense in this cost line is for poisons for weed management.

Water Demand

Consumption is not considered a driver for Direct Opex. The expenditure on Direct Opex is required to maintain the service through management of the assets, compliance with regulation and the provision of water to customers. All of these costs are incurred irrespective of the volume of water sold to customers, released to maintain environmental flows or lost through natural causes. Those that gain the most benefit from the scheme must carry an allocation of these costs. On this basis, the allocation of cost is considered appropriate.

8.2.2 Feedback from Field Visits

This scheme was not visited during the review. However, the Stakeholder comments detailed in the Macintyre Brook and St George Scheme Reviews would likely be consistent with the views of the Maranoa River WSS Stakeholders.

8.2.3 Potential Efficiency Gains

Water Allocations in the Maranoa River WSS are managed on a yearly basis. Customer orders are not automated and it is unlikely that this will be changed in the foreseeable future. The number of customers in the scheme does not justify the expense of online or IVR services for this scheme. Customers draw their water directly from the weir pond. As such, there are no water release requirements to fulfil customer orders. The only water releases will be to maintain environmental flows and will be set and checked during routine inspections.

The direct costs associated with this scheme are small and are considered appropriate to meet the requirements of the Condamine and Balonne Resource Operations Plan management requirements for this scheme. No efficiency gains have been identified.

8.2.4 Recommendations

No recommendations are made with respect to direct Operational Expenditure.

8.3 Capital Costs Review

8.3.1 Overview

The major asset in the Maranoa River WSS is the Neil Turner Weir which has an Optimised Replacement Cost of $17,454,229 as at 1st July 2011.[16] Anecdotal advice that the weir is silted up and is of minimal use to irrigators has not been confirmed.

Over the next five years, two minor projects are planned with an expenditure of $10,000 in 2015 for a Comprehensive Dam Inspection and $15,000 in 2016 on inspection and repairs to the Neil Turner Weir. The Dam Inspection is a recurrent study and the Weir refurbishment is based on a planned maintenance cycle. The timing and cost of the works appears to be prudent.

8.3.2 Forecast Renewals Expenditure

The graph below (Figure 8.4) shows the forecast renewals expenditure over the 25 year annuity forecast. These are mostly recurrent expenditures on Dam Inspections and Erosion Inspection and Repairs from 2016 to 2034. Several minor projects are also included in this period to replace safety signs at the end of their life. The larger expenditure in 2035 is a combination of replacement of the trash racks, safety and warning signs, and spillway refurbishment. The forecast renewals expenditure was assessed as efficient and prudent.

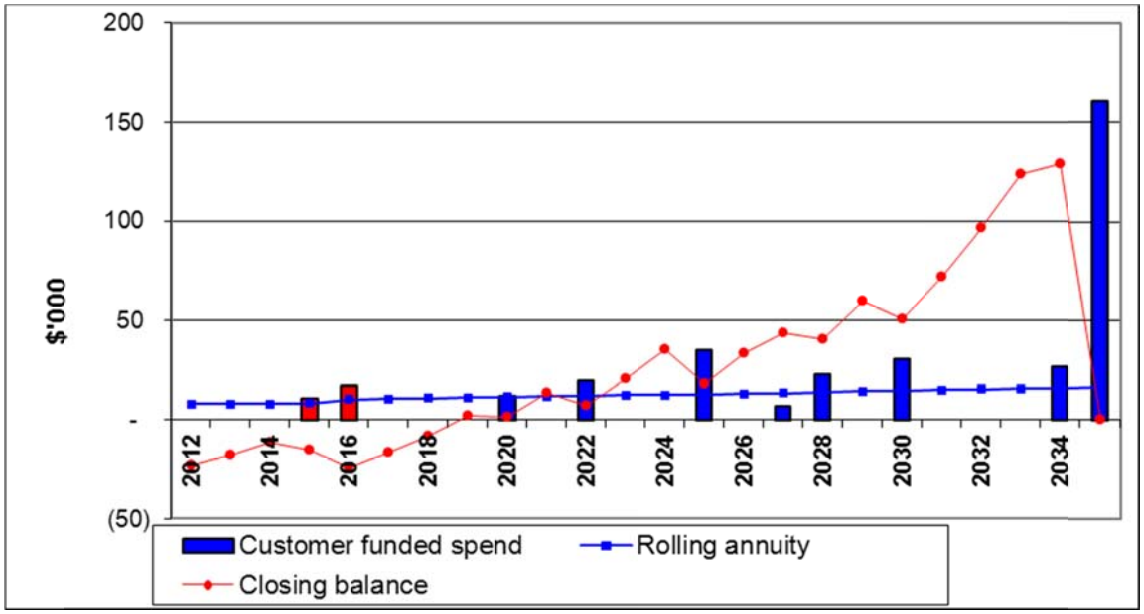

Figure 8.4 Renewals Annuity Graph 2012 to 2036

The following projects were reviewed in SunWater's SAP PM and WMS systems:

[16] Annexure A.2 Table A-1 Network Service Plan

Table 16 Maranoa WSS - Renewals and Refurbishment Projects 2012 to 2016

Facility	Description	Driver	Cost Estimate ($'000)	
			2015	2016
Neil Turner Weir	Refurbish: Inspect and repair for damage and corrosion	Condition		15.4
	Study: 5yr Dam Comprehensive Inspection	Compliance	9.9	

The refurbishment of Neil Turner Weir is a planned maintenance inspection to review the condition of the weir and is prudent based on preservation of the assets. Whether this work could be done at the same time as the 5 yearly dam inspections should be investigated to determine whether cost savings may be possible by combining the tasks.

8.3.3 Renewals Annuity

The Maranoa River Scheme commences the new price path with a negative balance of $27,000 in 2012. The balance remains negative until 2020, primarily as an impact of the interest charges. While the scheme achieves a positive balance for the remainder of the 25 year forecast, the renewals expenditure in 2035 returns the balance to zero. The interest charges have a significant positive impact on the annuity balances beyond 2020.

The average annuity revenue over the next five years of $7,000 to $9,000 per annum is a slight reduction from that collected in the previous price path of $9,000 to $10,000 per annum.

The following renewals projects beyond 2016 in Table 12 were reviewed to determine whether the expenditures were required and whether the timing was appropriate. All of the projects were schedule based on the planned maintenance frequency or useful life of the asset. While the project's forecast cost are within an acceptable order of magnitude based on engineering judgement, the detailed information on each project was not available to complete a detailed analysis of the cost estimates.

Table 17 Maranoa River WSS - Renewals and Refurbishment Projects Beyond 2016

Facility	Description	Driver	Value ($'000)	Year
Neil Turner Weir	Refurbish: Inspect and repair for damage and corrosion	Condition	20	2022
	Enhance: Spillway Safety Rails & Sign Boards	Safety	44	2035

The inspection of Neil Turner Weir is driven by the planned maintenance condition inspection cycle and required to confirm the preservation of the asset. The spillway safety rails and signs are a safety requirement and must be completed under SunWater's statutory compliance obligations.

Past Renewals Expenditures

Over the past five years, SunWater has completed two projects to refurbish the rock protection on the downstream section and install a buoy line on the Neil Turner Weir. The annuity revenues, expenditures and balances over the 2006 to 2011 period are shown below and in Figure 8.5.

- Opening Balance -$38,000

- Revenue $49,000
- Expenditure $24,000
- Closing Balance -$28,000

While the revenue has exceeded expenditure by $25,000 over the period, the interest charges on the negative annuity balance extend the time required to return the scheme to a positive balance.

There were no renewals projects above $10,000 completed for the Maranoa River scheme over the past five years. Therefore, an analysis of past projects was not completed for this scheme as only expenditures above $10,000 were included in the information provided by SunWater.

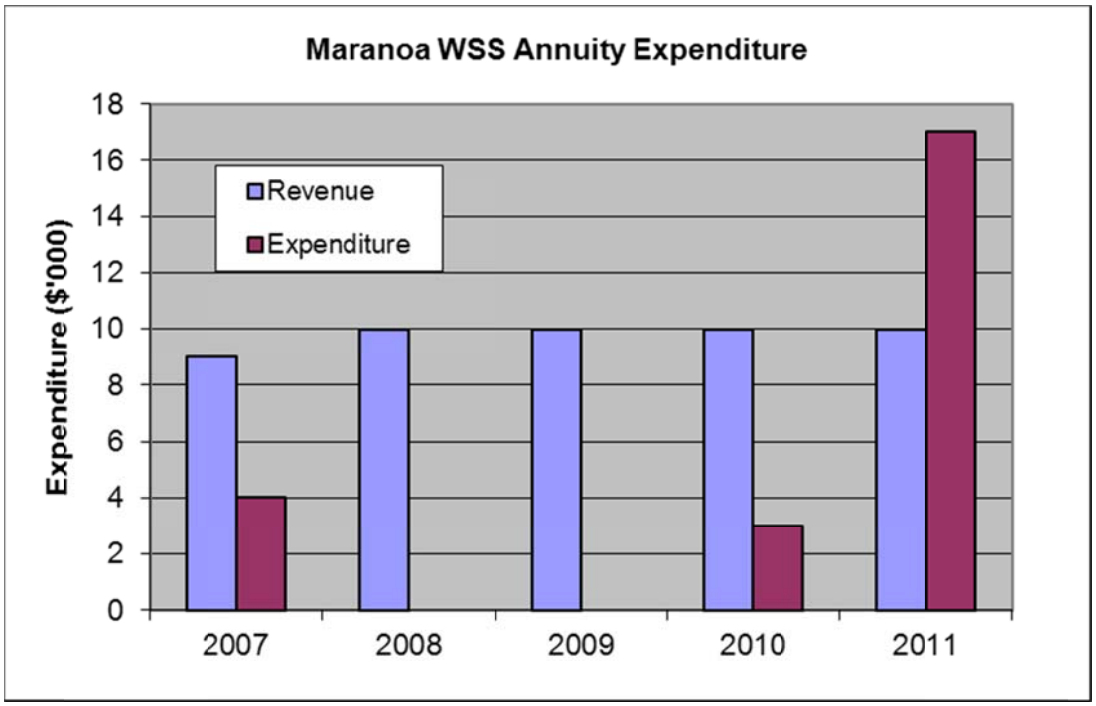

Figure 8.5 Revenue and Expenditure Annuity 2007 to 2011

Renewals Annuity Balance

As SunWater were unable to provide detail on what projects were planned during the 2006 to 2011 price path or the forecast annuity balance at the end of 2011, a comparison between what was planned and what occurred during the past five years was not possible. The methodology used to determine the opening and closing annuity balances and annuity calculations were checked and found to be correct.

As shown in Figure 8.4, the scheme's opening negative balance will be slowly reduced by the annuity contributions until 2020 and then remain in positive balance until 2035.

8.3.1 Renewals and Water Consumption

The Maranoa River system is entirely of static assets, which deteriorate naturally through aging. The rate of asset deterioration is not affected by water use and therefore does not an impact on the renewals forecasts.

8.3.2 Feedback from Field Visits

The Maranoa River System was not visited during the field visits.

8.3.3 Potential Efficiency Gains

There were no suggested efficiency gains for the Capex forecast expenditures review.

8.3.4 Recommendations

There were no recommendations for adjustment of the Maranoa River Capex expenditure.

9. Assessment of St George Water Supply Scheme

9.1 Network Service Plan Overview

The St George Water Supply Scheme has a total of 153 bulk customers with a yearly Total Allowable Water Use (WAE) of 84,575 ML. This allowance comprises 81,575 ML of medium priority WAE and 3,000 ML of high priority WAE. SunWater proposes to allocate 96% of operating costs and 94% of the renewals annuity to medium priority WAE holders. Costs classified as Indirect or Overhead operating costs are excluded from the scope of this review.

The Condamine and Balonne Resource Operations Plan specifies the operation and management requirements for this scheme. A Service Manager is located at the St George depot and is responsible for the day-to-day water supply management and delivery of the programmed works. This scheme consists of four major bulk water assets:

- E.J. Beardmore Dam;
- Jack Taylor Weir;
- Moolabah Weir; and
- Buckinbah Weir.

SunWater's customers are located on the regulated section of the Balonne River from the upper reaches of Lake Karajabie to the bifurcation of the Culgoa River and the Balonne Minor River and the regulated section along the Thuraggi watercourse.

See Appendix A for a map of the scheme.

9.2 Operational Costs Review

SunWater distribute Operational Costs into two broad categories being, Direct Costs, and Indirect and Overhead Costs. This review is limited to the Direct Operational Expenditure (Opex), while excluding insurance costs. Direct Opex costs are the costs described in Tables 4.3 and 4.4 of SunWater's St George WSS (Water Supply Scheme) Network Service Plan. The ratio of Direct Opex to Indirect and Overhead Opex is shown below.

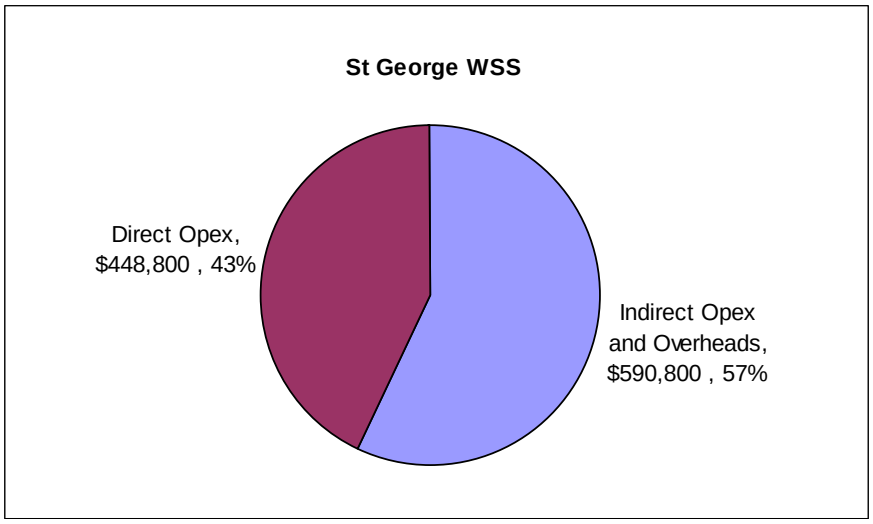

Figure 9.1 St George WSS Breakdown of Opex

9.2.1 Forecast Operational Expenditure

When comparing the average Opex for the previous and current price path, a reduction in Direct Operational Expenditure (Direct Opex). Material costs showed a peak in the 2007-2010 period due to one off costs due to fuel oil requirements to run the pumps at the low level pump station. The major assets in this scheme are considered high business risk by SunWater. Under the risk management policy of SunWater, this requires monthly condition inspections and risk mitigations are in place for each asset. As a consequence the direct Opex is proportionally higher to manage this higher risk.

Additionally, as the scheme is a continuous share scheme, daily variation of flows and releases are required to fulfil customer orders. The SunWater staff also carry out daily maintenance activity at each site (such as clearing trash screens) to make best use of the time taken to travel to each site. These activities are also aimed at mitigating the risks that sufficient water is not released to meet the customer order.

Release Valve Operation

The release of water is a labour intensive activity as was demonstrated to GHD during the site investigations. Most water release sites are remote and have no access to electricity. The water release structures are substantial and require a powered mechanical means to open valves. At one site inspection, a hydraulic system is used to actuate the valves. The process of connection of the hydraulics, changing the value position and disconnecting the system again is labour intensive. At other sites the valves are adjusted manually (that is, unpowered) with some sites having powered actuators. Powered or unpowered, the valve positioning process is manual requiring the operator to count the number of turns or measure the time a valve is driven to its required position.

Historical Expenditure

In considering the allocations of Direct Opex, the 2007 period is excluded on the basis that SunWater acknowledge that substantial cost reductions have been achieved through the changes to the business operating model. Also, it should be noted the majority of the "Other" expenditure type is predominately insurance costs and excluded from this review as instructed by the Authority. Therefore, using the remaining 2008, 2009 and 2010 periods the average expenditure for these periods has been used as the forecast ongoing.

Table 18 St George WSS Operational Expenditure Type – Actuals and Averages

Category	Actual Expenditure			Average 2008-2010
	2008	2009	2010	
Labour	$288,000	$1,177,000	$430,000	$278,333
Electricity	$4,000	$4,000	$6,000	$4,667
Materials	$33,000	$12,000	$35,000	$26,667
Contractors	$11,000	$9,000	$89,000	$36,333
Other	$53,000	$67,000	$83,000	$67,667

These averages do not align to the forecast budgets as shown below.

Table 19 St George WSS Operational Expenditure Type - Averages Vs. Forecast

Category	Average 2008-2010	Forecast					
		2011	2012	2013	2014	2015	2016
Labour	$278,333	$243,000	$262,000	$266,000	$266,000	$266,000	$266,000
Electricity	$4,667	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Materials	$26,667	$82,000	$83,000	$85,000	$86,000	$87,000	$88,000
Contractors	$36,333	$21,000	$21,000	$22,000	$22,000	$22,000	$23,000
Other	$67,667	$62,000	$62,000	$62,000	$62,000	$62,000	$62,000

To understand the inconsistencies, GHD questioned SunWater regards the variations and expenditure peaks to understand the financial distributions. SunWater advised that significant errors were made in the attribution of costs to cost centres. GHD remodelled the corrected costs below.

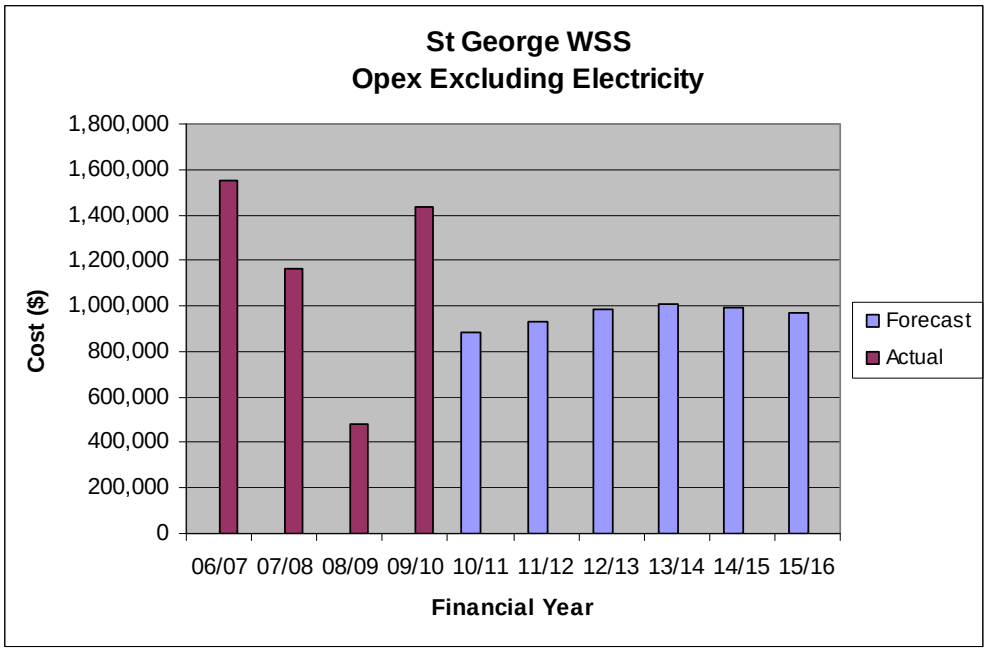

Figure 9.2 St George WSS Forecast and Actual Opex excluding Electricity

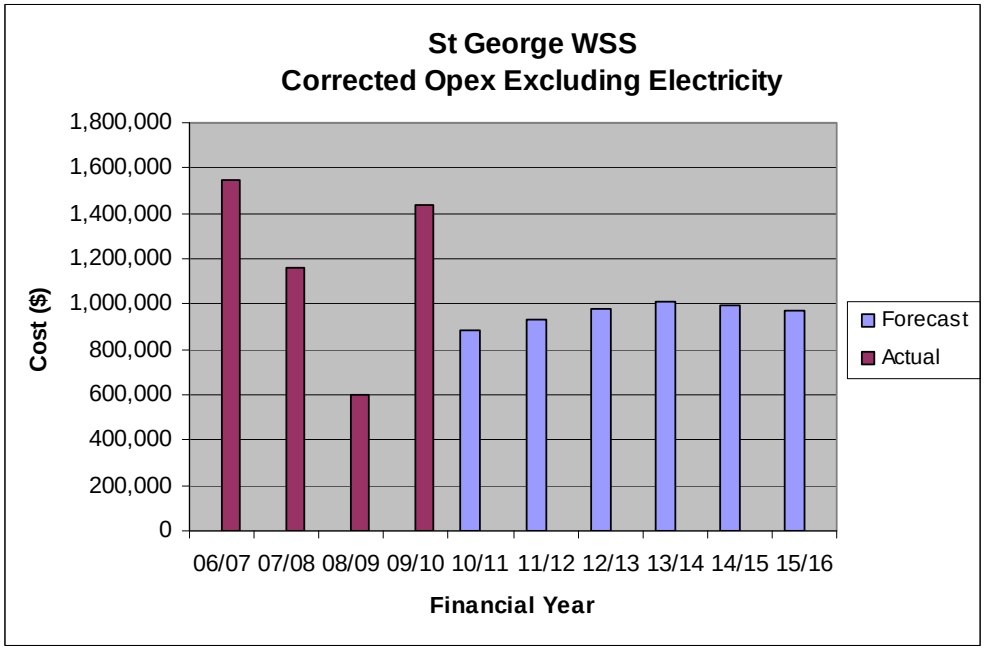

Figure 9.3 St George WSS Corrected Forecast and Actual Opex excluding Electricity

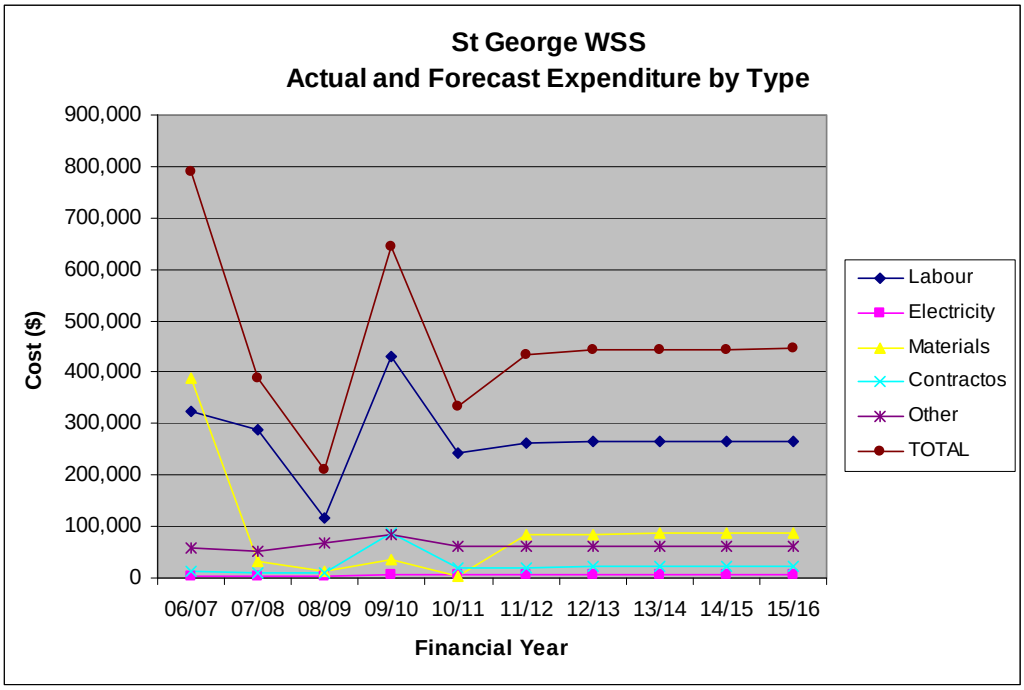

Figure 9.4 St George WSS Actual and Forecast Opex by Type

SunWater have acknowledged allocation errors for Opex costs as explanation of expenditure peaks. These errors have been addressed and allocated to the correct accounts. A corrected Expenditure by Type graph appears below.

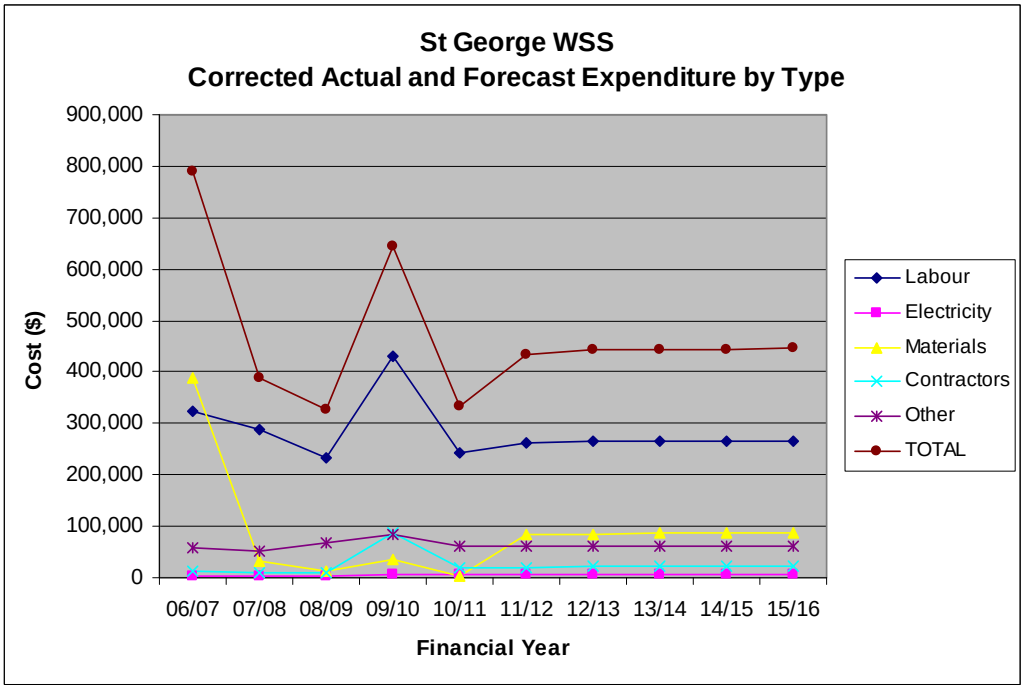

Figure 9.5 St George WSS Corrected Actual and Forecast Opex by Type

Flood Management

For this analysis, it is problematic to use the averages as an evaluation point due to the extenuating circumstances of recent flood events, extended drought period requiring additional pumping of water and other extraneous events both inside and outside of the control of SunWater. Engineering and operations management judgement was exercised to evaluate the cost allocations for this scheme.

E.J. Beardmore Dam is a referable dam and as a consequence has additional compliance requirements. SunWater is conducting preventative maintenance on the gates of the dam. Other preventative maintenance works are being programmed to be coincidental with the gate maintenance as the access to parts of the dam is enhanced while the gates are removed for maintenance.

Electricity

Electricity consumption is forecast to be higher during this period. It was considered that the amount of equipment utilised in the preventative maintenance programs would easily account for the additional consumption of electricity.

Additional costs have been incurred to maintain personnel levels at the dam during the recent flood events. The dam was staffed continuously during the floods to manage the situation and staff had to be located that the dam as the access from St George was cut off by floodwaters. These costs are reflected in the expenditure peaks. Post the floods, dam infrastructure required repair to reinstate the damaged equipment. Recreation facilities where damaged and also required rehabilitation. SunWater is considering the impacts of these floods and are investigating the relocation of some of the infrastructure to lessen the impacts and damages in future flood events.

Preventative and Corrective Maintenance

Preventative maintenance activity was demonstrated to GHD at the site visits and is clearly being carried out in an appropriate manner. One of the gates was removed from service for maintenance. A servicing area was created to complete the stripping and repainting of the gate. The area was established to minimise environmental harm with spray capture devices and bunded work areas in place.

Corrective Maintenance activity was also demonstrated to GHD while inspecting the assets. Explanation of the drivers for the maintenance was also discussed at length with SunWater. At the time of the asset inspections the prime driver was repairs post the significant flood event.

The Jack Taylor Weir is a substantial structure with mechanical gates and associated opening and closing mechanical and electrical infrastructure. The weir is also a main road access to St George with large heavy transport vehicles seen passing over the weir while GHD was inspecting the asset. The gate equipment and heavy traffic drive the requirement for SunWater to maintain and inspect this asset to a very high level. The asset was assessed as having a high operational requirement as a key aspect to the Water Supply Scheme and therefore the activity associated was considered well justified.

Preventative and Corrective Maintenance is forecast as a 62/38 per cent ratio. This is considered consistent with the requirements for weed management, compliance inspections and reactive responses as required. Considering the amount of mechanical and electrical equipment assets for this scheme this ratio is appropriate. Reviewing the ratios of the actual spend on Preventative and Corrective Maintenance, it is clear SunWater have found this to be the most appropriate balance for the assets in this scheme.

Assessment the distribution of preventative to corrective maintenance is problematic and would usually be conducted against system losses, unaccounted for water and non-revenue water evaluating reductions in these loses against the maintenance expenditure. In this case the complication of natural watercourses used as the transport mechanism, a dam with a high ratio of surface area to depth, actions by other irrigators and so on make it extremely difficult to make this assessment. In applying engineering and operational management judgement, this ratio is determined as reasonable.

Dams and Weirs are generally long-lived assets that combined with appropriate periodic maintenance programs can be retained in service indefinitely. The maintenance and inspection program is relatively static from year to year. The forecast provided by SunWater reflects a static program of work to maintain the assets in this scheme.

9.2.2 Feedback from Field Visits

GHD attended a stakeholder meeting where stakeholders raised their concerns and discussed their issues regards the management of the SunWater infrastructure in the St George WSS and Distribution Schemes. GHD inspected a selection of many of the asset in the scheme areas. The SunWater staff demonstrated the activities they are carrying out to GHD for the St George WSS. It is GHD's view that the assets are being maintained and managed efficiently. Preventative maintenance regimes are very obviously being carried out. Corrective maintenance was also evidenced by assets obviously taken out of service and sent for repairs.

Additionally, corrective maintenance to assets and systems damaged during recent flood events is clearly taking place. Issues that have become apparent post the flood events are also being addressed to reduce the potential damages in future flood events. A specific example of this is the planning to move the emergency generator required to operate the dam. In its' current location the generator would have been inundated by flood waters had the SunWater staff not removed it. SunWater is now looking to relocate the generator, or consider alternate emergency generator options.

From an operational perspective, it was clear that the management and maintenance of the scheme is very labour intensive. Daily interventions are required to release the required water volumes. The SunWater personnel also carry out required servicing at each site to maintain water flows every day. Stakeholders raised concern that SunWater was closed for the Christmas period, and as a consequence, they could not get the water they required. This was a good demonstration of the reliance of the customers on SunWater staff for daily water management.

Some may argue that the use of other means to achieve water releases should be considered. However, this would either prove to be cost prohibitive due to the considerable cost of capital that would be required to connect some of the release sites to electricity as an example. Even if the cost is discounted, automation of water releases could not guarantee effective and accurate releases occur due to the build-up of weed and other contaminates around the release mechanisms. These mechanisms require frequent cleaning to maintain efficient water flow.

In discussions during the stakeholder meeting around the weed management issues, stakeholders were of the opinion that they could manage the weeds more cost effectively. SunWater pointed out that their practice was not conducive to erosion management as SunWater is responsible for erosion management this was the reason for the weed management methods employed. This was also an example of the risk-managed approach taken by SunWater in the operational management of the scheme.

9.2.3 Potential Efficiency Gains

Meter reading is conducted on a monthly basis and is argued by SunWater to be a necessary requirement to comply with the Resource Operating Plan. As with the other Continuous Share schemes, GHD suggests that having the customer read the meter and enter the reading via the SunWater Online system would be a substantial efficiency gain.

SunWater's counter argument that the customer may not enter the correct reading is not valid on the basis that the customer requires an accurate reading to manage their allocation. It is in customers' best interest to have the most accurate meter reading to allow them to plan their consumption and potential for water trading.

It is required that SunWater would still be required to conduct the quarterly meter read for the purposes of billing and to assess the condition of the meter and its' ancillary devices (solar panel, etc.). The quarterly read would also serve to validate the monthly readings entered by the customer. It could be argued that the customer would gain a benefit from entering the meter reading on a daily basis during periods of peak consumption. The time gained from not having to conduct monthly meter readings could be utilised to complete preventative maintenance activity on either the Water Supply Scheme or Distribution Scheme.

9.2.4 Recommendations

GHD would recommend that SunWater negotiate with the customers to have monthly meter reading entered via the SunWater Online Customer account and reduce their own meter reading routine to quarterly.

9.3 Capital Costs Review

9.3.1 Overview

The major assets in the St George WSS are the E.J. Beardmore Dam, Jack Taylor Weir, Moolabah Weir and Buckinbah Weir. The storages have an optimised replacement cost (ORC) of $115,543,877 as at 1st July 2011.

Over the next five years, major projects include refurbishment of the gates and hoists on E.J. Beardmore Dam, installation of outlet works, refurbishment of gates and repair to eroded wing walls and apron slabs at Jack Taylor Weir and repairs to the Moolabah Weir slabs and gates. The NSP also includes four projects between 2012 and 2016 on the E.J. Beardmore Dam Water Treatment Plant. This system does not supply the town of St George as stated in the NSP, but services the recreation facilities, three houses for the dam operators, an office and depot complex and the camping grounds. The SunWater Operations Manager South advised that the need for the Treatment Plant had been reviewed and SunWater had decided to install rainwater tanks and decommission the treatment plant. The following projects were reviewed in SunWater's SAP PM and WMS:

Table 20 St George WSS - Renewals and Refurbishment Projects 2012 - 2016

Project/Location	Driver	2012 $'000	2013 $'000	2014 $'000	2015 $'000	2016 $'000
E.J. Beardmore Dam						
12SGAXX Major Service On Diesel Motor	Preservation	6				
12SGAXX Patch Paint U/S Face &CP Maint	Condition	8				
12SGAXX Replace Gate	Condition		217			
13SGAXX Study: 5yr Dam Safety Inspection	Compliance		88			
14SGAXX Maintain Road SW Houses/Office	Condition			7		
14SGAXX Study:Refurb All Cables & Cblwys	Condition			17		
Clean out foundation drains located in dam gallery	Condition				60	
Refurbish: Full paint upstream face and CP maintenance	Condition				50	
Refurbish: Repair scouring and undermining of dental concrete in spillway apron and dissipator area	Condition				63	
Refurbish: Upstream Face full paint and CP maintenance	Condition					150
Refurbish: Downstream face Full blast and paint	Condition				50	50
Refurbish: Regrade embankment to design profile	Condition	53				
Study: 5yr Dam Comprehensive Inspection (Review of EAPs, O&M, SOPs)	Compliance			25		
Upgrade Thuraggi metering				38		
Jack Taylor Weir						
12SGAXX - reinstatement of Outlet works	Condition	282				
12SGAXX Blst & Paint Gate Guides/Inst CP	Condition		114			
Carry out repairs as per design (2011) to wingwalls, retaining walls, apron slabs and rockpitching	Condition			272		
Refurb of hoist mechanisms on gates	Condition				113	131
Replace Control Equipment	Condition				91	
Moolabah Weir						
12SGAXX - Repairs to Crest and back face	Condition	250				

The drivers for each project were sound, and the timing and cost of the works appear to be prudent. The following is a summary of the investigation into each project:

E. J. Beardmore Dam

Servicing of Diesel Motor is a planned maintenance task specified by the supplier of the low water bypass pumps and required to preserve the asset and comply with the suppliers operations and maintenance requirements. Patch Painting of the dam gate upstream face and maintenance of the road to the office is needed to protect and preserve these assets. Replacement of the gate is needed to correct problems with the seals and travel alignment. The Dam Safety Inspections are a statutory compliance requirement and mandatory within the planned cycles over the five year price path. The study into refurbishment of the cables and cableways is a condition assessment requirement to determine what work is needed to preserve the assets and confirm their condition by non-destructive testing.

Most of the projects planned beyond 2014 were based on planned maintenance cycle based on the past experience with the life of the assets. For example, painted steel will need to be stripped and reapplied every seven years which is the life of the paint coatings.

Cleaning out the foundation drains is required to protect the structural integrity of the dam. The need for repairs to the dental concrete on the spillway apron and regrading of the embankment was evident during the site inspection and the timing was assessed as appropriate.

Jack Taylor Weir

The repairs on the Jack Taylor Weir wing walls, retaining walls, apron slabs, and rock pitching estimated to cost $272,000 in 2014 was assessed as under-estimated from the extent of the damage observed during the site inspection. The restoration work on the Weir is expected to be well above this estimate. How much additional damage occurred during the 2011 floods is not known, but may explain the difference between the current estimate and the site observations. The field visit also identified the need to repair the road deck balustrades, which did not appear to be included in the forward works program.

The reinstatement of the outlet works is required to ensure that controlled releases can be made rather than rely on opening the gates. The weir has an outlet pipe and valve in the centre of the weir floor, which was inaccessible for maintenance or operations. The valve and outlet pipe had been sealed several years ago to address safety issues with this design. The new outlet works has been designed to be installed within the left wall of the weir. The need for this project and indicative costs are supported on operational and engineering practice grounds. The timing could be deferred if needed.

The need to refurbish the outlet gate guides was reviewed on site and supported based on their design and condition. There is a risk that if the guides deteriorate further, the gates may seize and become inoperable. If the gates seize shut, the weir's structural integrity could be compromised and releases of water will not be possible.

The refurbishment of the hoist mechanisms on the gates and control equipment is planned to coincide with the end of their useful life. The planned works is supported based on the age and type of hoists and control equipment sighted during the site inspection.

Moolabah Weir

As discussed below, the Moolabah Weir was inspected by the GHD engineers during the site visit. The weir had suffered significant damage through the loss of material under the embankment concrete slabs. The damage needed to be repaired to protect the structure from further damage. While the cost of the repairs will be dependent on the selected repair method, the cost estimate appeared to be appropriate.

9.3.2 Forecast Renewals Expenditure

The graph below (Figure 9.6) shows the forecast renewals expenditure over the 25 year annuity forecast. The renewals projects include refurbishments to protect the assets, recurrent expenditures on Dam Inspections and refurbishment and repainting of the E.J. Beardmore Dam Gates. The peaks in expenditure in 2022, 2023, 2027, 2028, 2029 and 2030 result from the planned replacement of the gate winches at the end of their useful life and recurrent repainting programs on the gates and bulkheads. The forecast renewals expenditure was assessed as efficient and prudent.

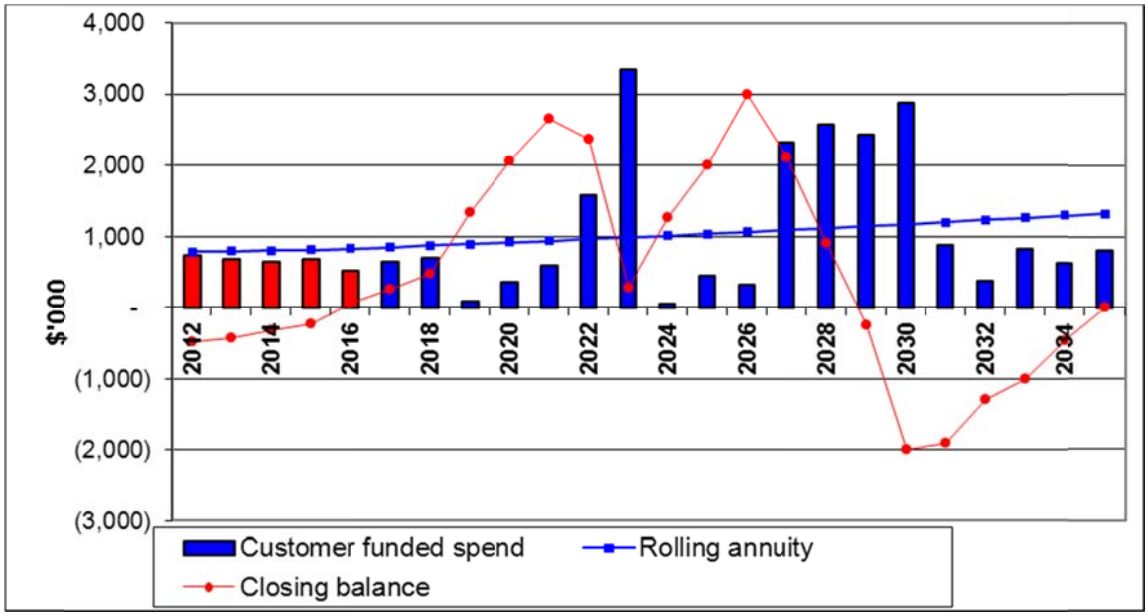

Figure 9.6 Renewals Annuity Graph 2012 to 2036

The following renewals projects beyond 2016 were reviewed to determine whether the expenditures were required and whether the timing was appropriate. All of the projects were schedule based on the planned maintenance frequency or useful life of the asset. While the project's forecast cost are within an acceptable order of magnitude based on engineering judgement, the detailed information on each project was not available to complete a detailed analysis of the cost estimates.

Table 21 St George WSS - Renewals and Refurbishment Projects Beyond 2016

Facility	Description	Driver	Value ($'000)	Year
E.J. Beardmore Dam	Refurbish: Part replacement of components due to obsolescence. 4 Small boards and one Main Board	Age	49	2022
	Refurbish Hoisting Mechanism - Beardmore Dam Gate 7, 8 9, 10, 11 & 12	Age	120	2022
	Refurbish: regrade embankment to design profile	Age	73	2022
	Replace Trash Screen	Age	98	2023
	Replace Winch, Perrin Eng	Age	2094	2027
	Replace Winch, Perrin Eng	Age	2146	2028
	Refurbish: Downstream face Full blast and paint	Age	75	2028
	Refurbish: Part replacement of components due to obselecence.4 Small boards and one Main Board	Age	58	2029
	Replace Winch, Perrin Eng	Age	2209	2029
	Replace Winch, Perrin Eng	Age	2247	2030
	Clean out foundation drains located in dam gallery	Age	94	2030
	14SGAXX REFURB:U/S FACE-CP MAINT & PAINT	Age	90	2030
Jack Taylor Weir	Replace Winches	Age	1241	2022
	Replace Winches	Age	2828	2023
	12SGAXX BLST & PAINT GATE GUIDES/INST CP	Age	172	2028
	Replace Gate Valve	Age	74	2029
	Replace Starter, 0-30Kw Auto (3 Off)	Age	126	2030
	Replace Control Equipment	Age	203	2030

As shown in the "drivers" column of the renewals projects beyond 2016 (

Table 21) all of the projects reviewed in SAP PM were forecast on either the planned maintenance frequency of the activities (refurbishment and repairs) or the useful life of the assets. The schedule dates were checked against the past maintenance or replacement dates and the standard frequencies for assets and activities. The estimates costs were stored in SAP PM and were based on replacement valves or estimate costs. A detailed cost estimate or options analysis had not been completed on any of these projects. GHD's audit team members verified the cost estimates by engineering judgement based on very limited cost estimating information. While GHD have not been able to verify the costs by detailed analysis, the order of magnitude estimate are within SunWater's forecast values.

9.3.3 Renewals Annuity

The St George WSS commences the new price path with a negative renewals balance of $468,000 in 2012. The balance remains negative until 2016, then becomes positive between 2017 and 2029. The winch replacement program at B J Beardmore Dame between 2027 and 2030 causes the balance to become negative from 2029 before returning to a zero balance in 2035.

As shown in Figure 9.6 above, the planned renewals expenditures up to 2018 are relatively stable. The rolling annuity for the five years of the price path is valid. However, the number and value of the projects predicted in 2022 and 2023, and between 2027 and 2030 is significantly higher than the adjoining years, resulting in a spikey closing balance line. While GHD recognise that the data is unedited from SAP PM, SunWater should consider deferring some of the projects in the high spend years to offset the impact of interest charges, particularly on the negative balances. The result of deferring some of these projects will be a reduction in the rolling annuity.

Past Renewals Expenditures

Over the past five years, the Renewals reporting for the St George WSS and St George Distribution systems were combined. The scheme specific projects were segregated by asset descriptions where possible. SunWater has completed a range of minor projects on the scheme assets, the majority of which were completed between 2007 and 2011.

The annuity revenues, expenditures and balances over the 2006 to 2011 period are below and in Figure 9.7.

- Opening Balance $837,000
- Revenue $884,000
- Expenditure $2,352,000
- Closing Balance -$480,000

The expenditure has exceeded revenue by $1,468,000 over the period, transferring the renewal balance from a positive balance in 2006 to negative annuity balance by 2011. As can be seen in Figure 9.6, the expenditures on refurbishments, repairs and new requirements have exceeded revenues in all but one of the previous five year period.

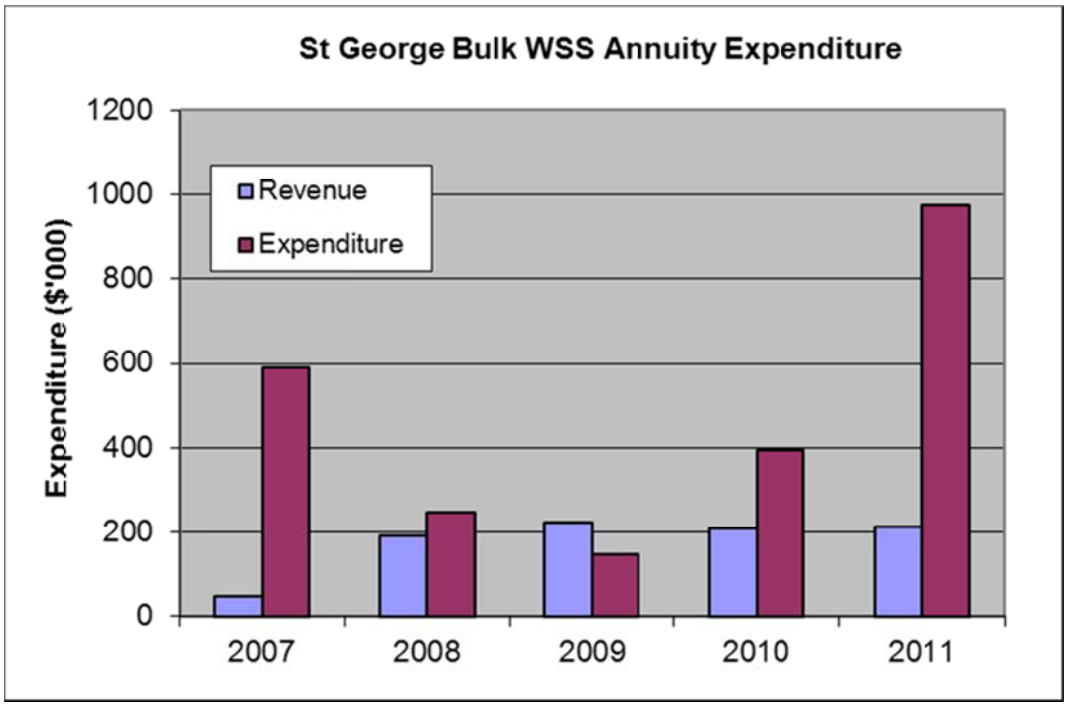

Figure 9.7 Revenue and Expenditure Annuity 2007 to 2011

Five projects were selected for investigation to determine the drivers for the projects, the rationale for scheduling and verification of the expenditure values. These projects were:

- Refurbishment of Gate 12 at E.J. Beardmore Dam at a cost of $58,645 in 2007 was needed to restore the paint coating and undertake planned maintenance on the gate axles;
- Modifications to the Thuraggi Outlet at a cost of $58,645 in 2007 was required to restore aging assets and improve the operational efficiency of the outlet;
- Refurbish the E.J. Beardmore Dam gates No 8, 9 and 10 at a cost of $88,498 in 2010 was based on the need to restore paint coatings on the gates on a planned restoration frequency of seven years;
- Installation of Buoy-lines for both Jack Taylor Weir and E.J. Beardmore Dam at a cost of $139,528 in 2010 was required for compliance to occupational health and safety obligations and SunWater's duty of care to the public; and
- Removal of contaminated material from the Jack Taylor Weir sandblasting compound at a cost of $51,577 in 2010 was required to correct past poor environmental practice by removing hazardous materials in the gate refurbishment area.

The expenditures on each project were within an acceptable range of the likely cost estimates determined by engineering judgement. The quantities and unit rates for each project were not available and therefore a more detailed analysis was not possible. The timing of each project was within the defined frequency for planned maintenance tasks and supported by condition and risk assessments recorded in the SAP PM system. The engineering assessments were supported site inspection of each asset refurbished in the above list.

Renewals Annuity Balance

As SunWater were unable to provide detail on what projects were planned during the 2006 to 2011 price path or the forecast annuity balance at the end of 2011, a comparison between what was planned and what occurred during the past five years was not possible. The methodology used to determine the opening and closing annuity balances and annuity calculations were checked and found to be correct.

As shown in Figure 9.6, the scheme's opening negative balance will be reduced by the annuity contributions over the next 25 years. During the next five years, the rolling annuity will rise from $779,000 in 2012 to $828,000 in 2016. This is a significant increase from the previous price path of $47,000 (2006) to $222,000 (2009).

9.3.4 Renewals and Water Consumption

The St George Bulk system is mainly composed of static assets, which deteriorate naturally through aging. The movable assets (manual and actuated valves and dam gates) appear to be operated well within their design parameters and replacement based on useful life predictions is appropriate. The rate of asset deterioration is unlikely to be affected by water use and therefore will not an impact on the renewals forecasts.

9.3.5 Feedback from Field Visits

The St George WSS and St George Distribution System were visited and reviewed on 2nd March 2011. The GHD team was accompanied by the SunWater's Manager Operations South and operations staff for the St George Depot. The inspections included the Jack Taylor Weir, E.J. Beardmore Dam and Moolabah Weir.

Jack Taylor Weir

The Jack Taylor weir is located at the eastern edge of the St George township, across the Balonne River.

The downstream erosion protection has been damaged by recent floods and the rock facing has been undermined in a number of areas. The wing walls on the downstream embankment have settled and cracked. The balustrades on both sides of the road deck have been damaged through vehicle collision and more significantly, a number of the concrete posts have been damaged by flood debris (logs) impacting the posts and will require repair. This vehicle damage has been occurring over many years.

The right abutment asphalt road surface was lifted off the embankment in areas during the recent floods and has been repaired. Similarly, erosion damage on the left abutment upstream area has been repaired. The left abutment road surface is suffering from structural failure of the sub-grade leading to "pumping" of fines from the embankment through the cracked road surface. The security fencing on the left bank has been damaged by the recent floods and some material eroded from the bank has been deposited against the fencing, which will require repair.

The spillway gates were successfully operated during the recent floods, which indicate that the operation and maintenance of the gates is generally acceptable and the operators are aware of the operating procedure.

The Weir has an outlet pipe with a gate valve at the base of the central gate. A access to the valve requires an operator to cross the spillway and enter a slip hazard area.so the outlet was sealed some years ago. SunWater plan to install a new outlet on the western side, which will be safely accessible from the embankment.

The site inspections verified the requirement for the following works:

- Repainting of the gate guides (2013);
- Repairs to the wing walls, retaining walls, apron slabs, rock-pitching, balustrade and security fencing. The cost estimate for this work $272k in 2014 is considered far too low for the extent of damage;
- Refurbishment of the hoist mechanisms (2015-2016); and
- The relocation of the outlet works (2012) is required to facilitate controlled releases from the weir and minimise the risk of damage to the spillway gate seals.

E.J. Beardmore Dam

The E.J. Beardmore Dam is located approximately 14 kilometres to the west of the town site. The spillway gates are in excellent condition with minor seepage occurring at a few of the gate seals. SunWater have been progressively refurbishing the gates. The facilities are generally in good condition with normal maintenance requirements for the embankment including, cutting of grass and removal of grass on the crest, as well as grading of the crest to remove wheel rutting.

Some of the road barrier on the left abutment is showing signs of movement with significant tilting towards the downstream side, which may be associated with insufficient compaction of the material where the posts are located based on anecdotal advice from the operator. The concrete structure for the spillway gates is generally in good condition, although some rusting of the cross bolts for the spillway roller gate wheel paths is occurring and the bolts should be tested to ensure that they are structurally sound and repainted as necessary as part of the preventive maintenance.

Recent repairs have been completed for the rip rap on the right abutment to prevent erosion damage of the embankment. The building housing the diesel generator and the incoming power lines are located at a low level in relation to anticipated floods and have resulted in the inability to use the generator as well as a requirement to isolate the mains power. These aspects may have significant operational constraints for the gates; resulting in a high risk should the gates become inoperable during a flood due to loss of power supply.

Significant differential movement has occurred in the past at the wing walls for the embankment on both abutments. This movement is being monitored and markings on the wall indicate that this movement is stable. The instrumentation installed at the dam is in excellent condition and the piezometers have recently been refurbished.

The site inspections verified the following items in the forward works program:

- Refurbishment of the gates and cathodic protection maintenance (2015-2016);
- Major servicing on the diesel motor (2012);
- Clean out the foundation drains (2015);
- Refurbish the trash racks;
- Repairs to the concrete on the spillway apron (2015); and
- Regrading of the embankment (2012).

The recent floods had highlighted the need to move the Diesel Generator and Dam Office/Workshop Building. The toilet block was extensively damaged and will need to be demolished. A replacement flood tolerant which is not on the forward implied works program structure is being considered.

E.J. Beardmore Water Treatment Plant (WTP)

The WTP provides potable water to the two houses, camping grounds and scout camp. SunWater is reviewing the need for this asset and may revert to rainwater tanks rather than running the WTP. As a result, the works proposed for the WTP may be deferred.

Moolabah Weir

The Moolabah Weir is an earth embankment with a concrete slab spillway and energy dissipater over the crest and downstream side of the embankment. The downstream concrete apron is buttressed against a shear key and rock mattress erosion protection is provided downstream of the apron. The rock mattress is in good condition. According to the operators, the downstream concrete slabs are underlain by sand.

Rainfall runoff as well as flow over the crest has resulted in removal of some of the underlying sand leading differential movement at the crest of up to 150 mm. The movement has also led to structural cracking in the middle of some slabs. Furthermore, the inflow of rainfall runoff as well as the flood overtopping has resulted in pressurisation below the downstream concrete apron leading to uplift of a number of slabs against the downstream shear key. The joint opening at the crest resulting from the differential movement has been filled with mastic filler in the past but the movement has continued since the sealing. This movement has been occurring since completion of the weir, and a full repair to the crest and back face is required. Various solutions are available to treat the voids under the slabs. Cement grouting was recommended to fill the voids below the backface slabs and resealing of the joint between slabs and the crest is required. The uplift of the downstream slabs may require removal of these slabs and reinstatement if it is found that they are structurally unstable as a result of the movement that has occurred to date.

The upstream face of the weir is protected against wave erosion using rip rap, which appears to be adequate. Normal preventive maintenance requirements include, removal of grass from the rip rap, cutting of grass, as well as the replacement of the mastic sealant.

The weir is currently used for diversion of flow into the right bank canal as well as forming the headwater pond for the irrigators on the abutments. Failure of the weir with continued slab movement due to rainfall and then overtopping by flood waters is a distinct possibility. Therefore, the effect of weir failure should be evaluated to determine whether the corrective maintenance is required.

The canal intake structure on the right abutment is in good condition and the trash-racks have recently been replaced. The intake control gates are manually operated using a hydraulic system. The gates were not inspected but the system is fully functional and appears to be working well. The planned replacement of the gates is apparently due the age of the gates rather than operational problems. The use of the upstream concrete stop logs for gate maintenance has been stopped for some time due to the inability to provide a complete seal. Maintenance of the gates or the concrete structure is readily carried out now, following the construction of an earth fill bund across the intake to the canal, followed by closure of the canal. This method of closure has been used effectively in the past and there is no reason for change.

9.3.6 Potential Efficiency Gains

There were no suggested efficiency gains from the Capex forecast expenditure review.

9.3.7 Recommendations

The recommendations for the St George WSS is to include the repairs to the Jack Taylor Weir balustrades and revise the cost estimate for the restoration of the wing walls and flood damaged rock pitching.

10. Assessment of St George Distribution System

10.1 Network Service Plan Overview

The St George Distribution System has a total of 51 customers with a yearly Total Water Delivery Entitlement (WDE) of 50,788 ML. SunWater hold 6701 ML of medium priority WAE and 300 ML of high priority WAE for distribution losses. These distribution losses will attract bulk water charges. The allocation of the operating costs and renewals annuity associated with the distribution network is yet to be determined and will be a decision for the Authority.

The Condamine and Balonne Resource Operations Plan specifies the operation and management requirements for this scheme. A Service Manager is located at the St George depot and is responsible for the day-to-day water supply management and delivery of programmed works. The distribution system utilises the Thuraggi water course, which is defined as a water course under the *Water Act 2000.* As such, SunWater has no tenure over this water course. The system includes 112 km of channels and 99 km of drains, as well as four major bulk water assets, namely:

- St George pump station and main channel;
- Buckinbah regulator and pump station;
- Buckinbah main channel; and
- St George low level pump station.

See Appendix A for a scheme map of the system.

10.2 Operational Costs Review

SunWater distributes Operational Costs into two broad categories being, Direct Costs, and Indirect and Overhead Costs. This review is limited to the Direct Operational Expenditure (Opex), while excluding insurance costs. Direct Opex costs are the costs described in Tables 4.3 and 4.4 of the St George Distribution Network Service Plan. The ratio of Direct Opex to Indirect and Overhead Opex is shown below.

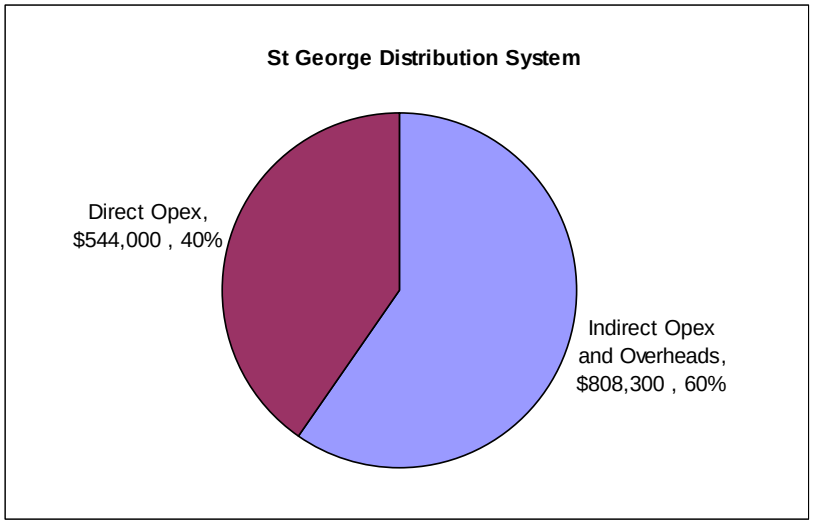

Figure 10.1 St George Distribution System Breakdown of Opex

10.2.1 Forecast Operational Expenditure

When comparing the average Opex for the previous and current price path, there is an increase of approximately 6% in Direct Operational Costs (Direct Opex) for this scheme. The increases are driven by Contractors and Electricity costs as SunWater have made an additional allowance of $50k per annum for contract labour for weed control for the 2011-2016 price path. It was discussed at the St George Stakeholder engagement meeting that weed control was deficient in previous years.

Electricity costs have been escalated in line with the Queensland Competition Authority rulings regarding electricity costs. The electricity consumption is directly proportional to demand as the water in the distribution system pump is lifted from the upriver side of the Jack Taylor Weir into the distribution system. There are pump replacement programs noted in the Network Service Plan and a consequence of these pump replacements, a reduction in the electricity consumption due to higher efficiencies of a new pump may be realised but it will only be a minor saving.

Considering the allocations of Direct Opex, the 2007 period is excluded on the basis that SunWater acknowledge that substantial cost reductions have been achieved through the changes to the business operating model. Also, it should be noted the majority of the “Other” expenditure type is predominately insurance costs and excluded from this review as instructed by the Authority. Therefore, using the remaining 2008, 2009 and 2010 periods the average expenditure for these periods has been used as the forecast ongoing as show in Table 20.

Table 22 St George Distribution Systems Operational Expenditure Type – Actuals and Averages

Category	Actual Expenditure			Average 2008-2010
	2008	2009	2010	
Labour	$407,000	$611,000	$454,000	$490,667
Electricity	$35,000	$32,000	$44,000	$37,000
Materials	$122,000	$130,000	$253,000	$168,333
Contractors	$42,000	$58,000	$45,000	$48,333
Other	$57,000	$61,000	$59,000	$59,000

These averages do not align to the forecast budgets as shown below in Table 23.

Table 23 St George Distribution System Operational Expenditure Type Averages Vs. Forecast

Category	Average 2008-2010	Forecast					
		2011	2012	2013	2014	2015	2016
Labour	$490,667	$454,000	$460,000	$467,000	$467,000	$467,000	$467,000
Electricity	$37,000	$42,000	$42,000	$42,000	$42,000	$42,000	$42,000
Materials	$168,333	$86,000	$88,000	$89,000	$90,000	$91,000	$93,000
Contractors	$48,333	$104,000	$106,000	$107,000	$109,000	$110,000	$112,000
Other	$59,000	$49,000	$49,000	$49,000	$49,000	$49,000	$49,000

Although the figures do not align they have been investigated and justification and responses have been received from SunWater. Labour average is skewed by the cost attribution errors acknowledged by SunWater. Material costs are also skewed due to drought and flood issues in the preceding years.

The pump station is running at a very high utilisation level with all pumps running to maintain the water requirements of the customers. The stakeholders have suggested that the pump station could have automatic resets fitted to the pumps to limit the downtime for pumps after tripping on fault. SunWater's current action is for SunWater personnel to attend the pump station to assess the issues that cause the pump fault. The latter is considered a more appropriate response considering the criticality and size of the pumps in this installation. This is a cost driver and does increase the Direct Opex.

As with the St George Water Supply Scheme, the management of water is a labour intensive activity as was demonstrated to GHD during the site investigations. Most water release sites are remote and have no access to electricity. The water release structures are substantial and require a powered mechanical means to open valves.

At one site inspection, a hydraulic system is used to actuate the valves. The process of connection of the hydraulics, changing the value position and disconnecting the system again is labour intensive. At other sites the valves are adjusted manually (that is, unpowered) with some sites having powered actuators. Powered or unpowered, the valve positioning process is manual requiring the operator to count the number of turns or measure the time a valve is driven to its required position.

Contractor Costs

Contractor costs have increased dramatically caused by a number of factors. SunWater have chosen to dispose of heavy plant equipment in the region, as the utilisation of the equipment is not sufficient to justify its retention. This is considered best appropriate practice for Plant and Fleet Asset Management and aligns with the accepted industry standards for Plant and Fleet Management. The requirement for the equipment is still current and will be supplied as contracted services.

SunWater have also acknowledged that the management of the channels and drainage system has been deficient in the past. SunWater have allowed for additional contracted services resulting in increased forecast contractor's costs to maintain the channel and drainage systems to a more appropriate level.

Low Level Pumping

The additional costs associated with the low level pumping were explained and demonstrated and are also considered appropriate. The low level pump station is below the water line when the dam is full. The pumps for the low level pump station, when not required for service, are located in a safe area above the high water level. While they are not in use they still require maintenance to mitigate any risk of non-operation when they are required. The materials costs are inflated between 2008 and 2010 due to a requirement to pump water from the low level pump station to supply water to customers during a drought period.

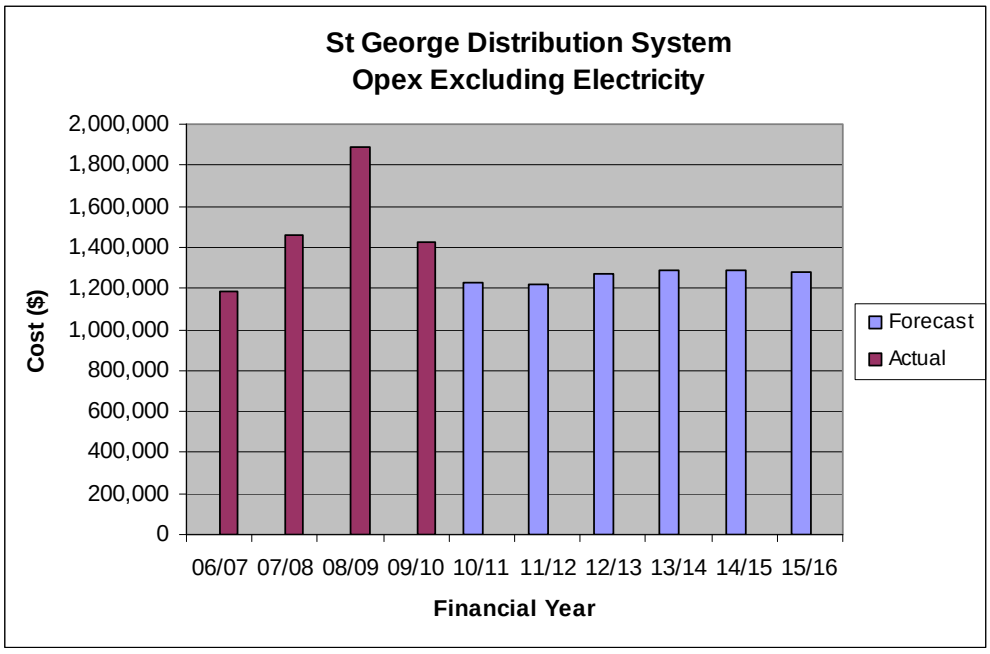

Figure 10.2 St George Distribution Forecast and Actual Opex excluding Electricity

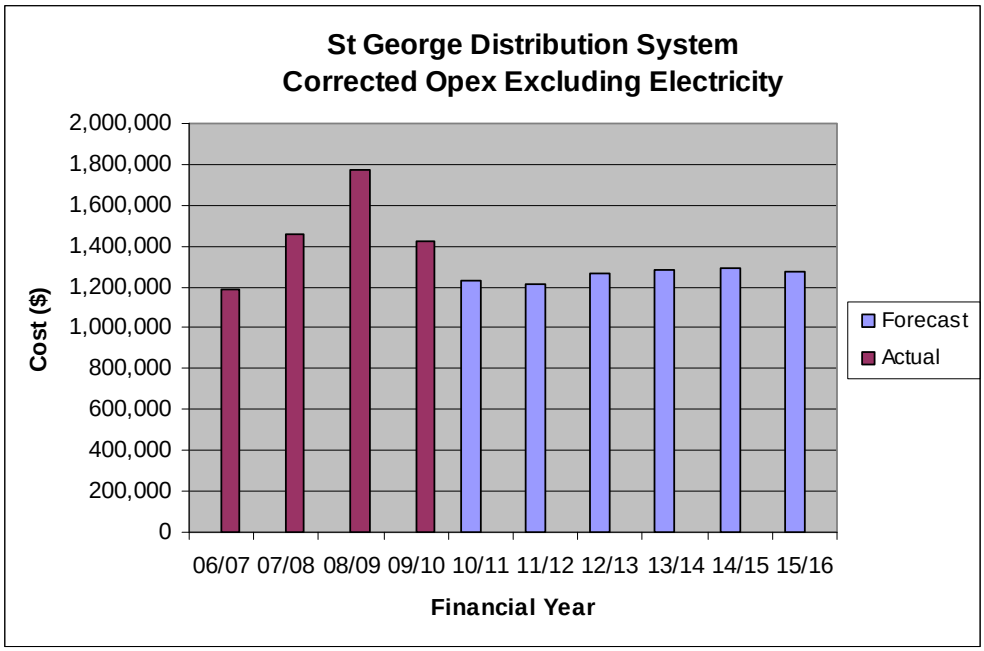

Figure 10.3 St George Distribution Corrected Forecast and Actual Opex excluding Electricity

SunWater have acknowledged allocation errors as justifications for the peaks in Direct Opex as demonstrated in the graphs below. The corrected graph demonstrates a more consistent spend for the Actual spend and is more aligned with the forecast Direct Opex. The peak spend for materials in the 2009 period has been questioned. SunWater have qualified this as occurring due to the installation and operating costs of low level diesel pumps installed in 2010 in response to requests from customers to pump dead storage from Beardmore dam into the distribution system during a prolonged drought.

For the new price path material costs are lower because SunWater in 2011 opted to use contract services for some weed control, and therefore do not need to purchase materials.

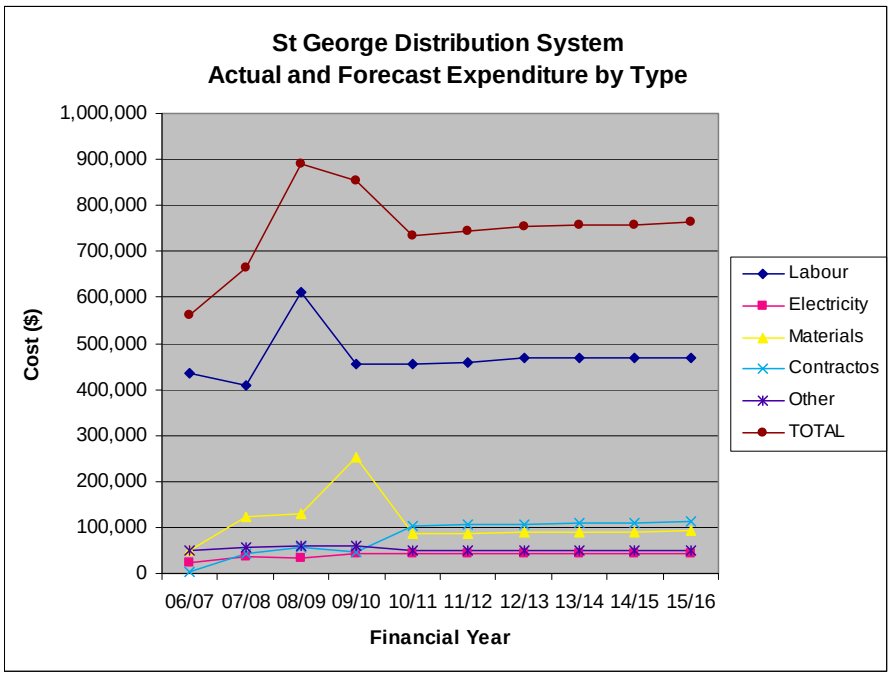

Figure 10.4 St George Distribution Actual and Forecast Opex by Type

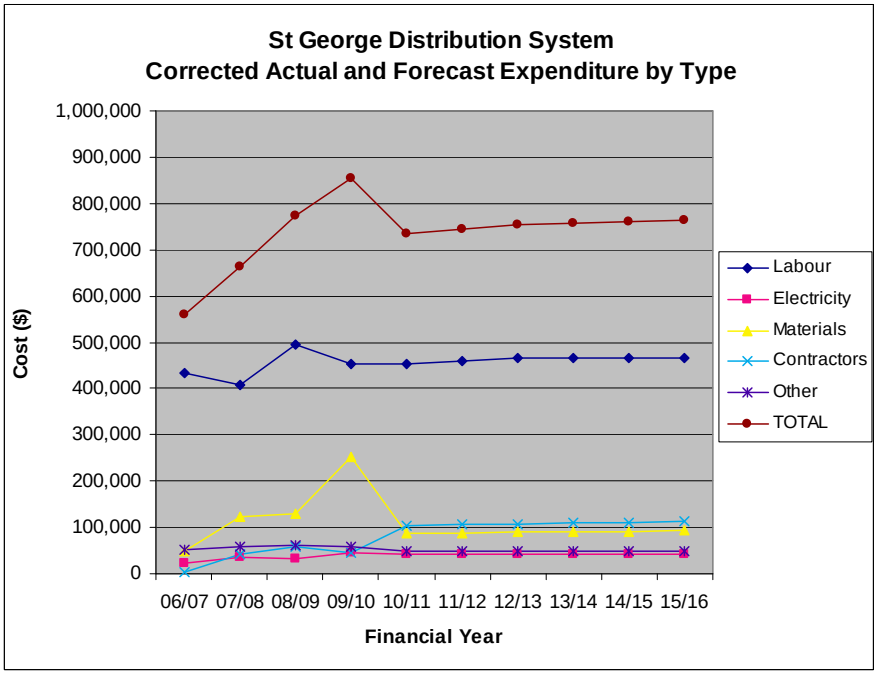

Figure 10.5 St George Distribution Corrected Actual and Forecast Opex by Type

For this analysis, it is problematic to use the averages as an evaluation point due to the extenuating circumstances of recent flood events, extended drought period requiring additional pumping of water and other extraneous events both inside and outside of the control of SunWater. Engineering and operations management judgement was exercised to evaluate the cost allocations for this scheme.

Preventative and Corrective Maintenance

Preventative and Corrective Maintenance is forecast as a 58/42 per cent ratio. This is considered consistent with the requirements for weed management, compliance inspections and reactive responses as required. It is considered that the 60/40 per cent ratio in current Opex would be more appropriate for this scheme. However acknowledging that an amount of backlog maintenance is required this ratio is accepted.

Assessment the distribution of preventative to corrective maintenance is problematic and would usually be conducted against system losses, unaccounted for water and non-revenue water evaluating reductions in these loses against the maintenance expenditure. In this case the complication of natural watercourses used as the transport mechanism, a dam with a high ratio of surface area to depth, actions by other irrigators and so on make it extremely difficult to make this assessment. In applying engineering and operational management judgement, this ratio is determined as reasonable.

Irrigation channels are generally long-lived assets that combined with appropriate periodic maintenance programs can be retained in service indefinitely. The maintenance and inspection program is relatively static from year to year. The forecast provided by SunWater reflects a static program of work to maintain the assets in this scheme.

10.2.2 Feedback from Field Visits

The St George pump station requires refurbishment. These refurbishments are programmed in the Network Service Plan. Stakeholders expressed great concerns about the charging methodology for distribution losses in the scheme. Stakeholders also expressed concern at the costs of facilities and services to protect and serve the community were being passed back to the SunWater customers.

Stakeholders also expressed at length, concerns with the fencing activities SunWater have carried out around channel infrastructure in the St George urban area. GHD visited the contentious site and accept that the fence is required. SunWater have assessed the open channel as a high risk to public safety and as such have fenced the area. A less substantial fence would not have prevented ingress and mitigated the associated risks. Also a fence of any lower build quality would have required increased maintenance. The installed fence will have little if any impact on the Direct Opex costs to the St George Distribution Supply.

Distribution assets visited showed the level of maintenance activity is being carried out as stated. Assets that were currently not used for the system were still in serviceable condition and the preventative maintenance was obviously being kept up to these assets. Minor design issues with meter installations were discussed and a recommendation was passed on to SunWater management verbally.

10.2.3 Potential Efficiency Gains

Meter reading is conducted on a monthly basis and is argued by SunWater to be a necessary requirement to comply with the Resource Operating Plan. As with the other Continuous Share schemes, GHD suggests that having the customer read the meter and enter the reading via the SunWater Online system would be a substantial efficiency gain.

SunWater's counter argument that the customer may not enter the correct reading is not valid on the basis that the customer requires an accurate reading to manage their allocation. It is in customers' best interest to have the most accurate meter reading to allow them to plan their consumption and potential for water trading.

It is required that SunWater would still be required to conduct the quarterly meter read for the purposes of billing and to assess the condition of the meter and its' ancillary devices (solar panel, etc.). The quarterly read would also serve to validate the monthly readings entered by the customer. It could be argued that the customer would gain a benefit from entering the meter reading on a daily basis during periods of peak consumption. The time gained from not having to conduct monthly meter readings could be utilised to complete preventative maintenance activity on either the Water Supply Scheme or Distribution Scheme.

The choice to dispose of Heavy Plant is an efficiency gain already implemented by SunWater and is consistent with industry guidelines and accepted best practice. The gain is a reduction of servicing and maintenance costs and a substantial reduction in capital being tied up in depreciating assets.

10.2.4 Recommendations

GHD would recommend that SunWater negotiate with the customers to have monthly meter reading entered via the SunWater Online Customer account and reduce their own meter reading routine to quarterly.

10.3 Capital Costs Review

10.3.1 Overview

The major assets in the St George Distribution are the St George Pump Station, Main Channel and Drainage, and the Buckinbah Regulator and Pump Station, and Main Channel. The optimised replacement cost (ORC) of the assets was not stated in the NSP.

Over the next five years, the major projects include the replacement of the switchboard at the Buckinbah Pump Station ($138,000 in 2016), refurbishment of five access crossings between 2012 and 2016 ($169,000) and replacement of two of the St George Pump Station pumps in 2012 ($266,000). The program also includes a detailed redesign for the St George Pump Station and construction of new suction lines in 2013. All of these projects were reviewed in SunWater's SAP PM and WMS.

The drivers for each project were valid, and the timing and cost of the works appears to be prudent.

The need for the Buckinbah Pump Station is being reviewed by SunWater and expenditure on replacing the switchboard, based on a Parsons Brinkerhoff Electrical Equipment Review Report, may not be needed. Replacement of two of the St George Pumps is justified on the age, condition and remaining useful life of the pumps. Replacement of the suction lines into the St George Pump Station was based on a condition appraisal in 2009, which revealed extensive corrosion of the pipe work. GHD has not been provided with any options analysis documentation of the St George Pump Station and therefore cannot comment on the future design of this project.

10.3.2 Forecast Renewals Expenditure

The graph below (Figure 10.6) shows the forecast renewals expenditure over the 25 year annuity forecast. The renewals projects include refurbishments to protect the assets, recurrent expenditures on refurbishment of channels, gates and structures. The peak in the expenditure profile for 2025 is to replace gates and structures in the channels. The peak in 2030 is the replacement of fencing and structures, and the 2035 peak is replacing the St George Pump Station suction mains and replacing channel structures at the end of their life. The forecast renewals expenditure was assessed as efficient and prudent.

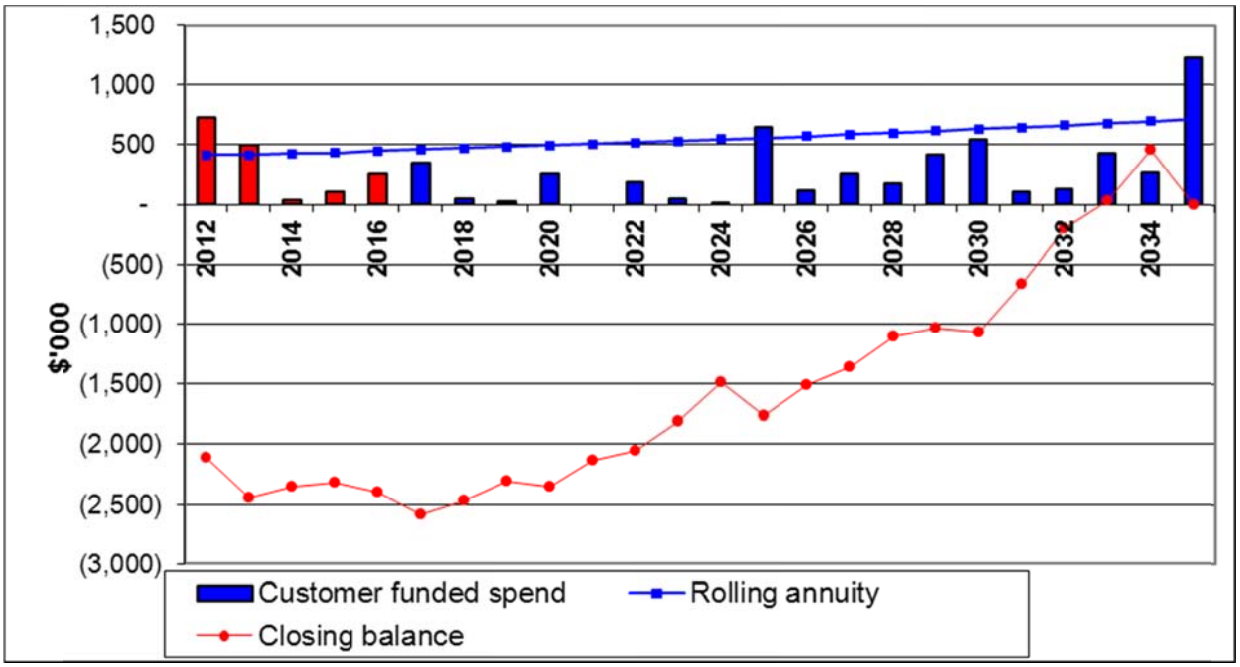

Figure 10.6 Renewals Annuity Graph 2012 to 2036

The following renewal projects, completed over the past five years, were reviewed in SunWater's SAP PM and WMS system:

Table 24 St George Distribution System - Renewals and Refurbishment Projects 2012 to 2016

Facility	Description	Driver	Cost Estimate ($'000)				
			2012	2013	2014	2015	2016
Buckinbah Pump Station	12SGAXX Paint & Maintain Gates & Seals	Condition	23				
	Replace Buckinbah Main Switchboard	Condition	22				
	Replace switchboard subject to decommissioning review study 2011	Condition					138

Facility	Description	Driver	Cost Estimate ($'000)				
			2012	2013	2014	2015	2016
St George Distribution	12SGAXX Implement Recommendations - 2008 FNCG Audit	Condition	42				
	13SGAXX Refurb/Remodel Main Channel	Condition				31	
	Repair Access Crossing - Access Crossing AC06	Safety	33				
	Repair Access Crossing - BBM Access Crossing AC01	Safety			34		
	Repair Access Crossing - BBM Access Crossing AC02	Safety				34	
	Repair access crossing - Channel B1 Access Crossing AC	Safety				34	
	Repair Access Crossing - Channel B2 Access Crossing AC02	Safety					34
St George Drainage	Refurbish Drain Access Crossing - Drain 1 Access Crossing AC05	Safety	33				
	Repair Access Crossing - Access Crossing Drain 3/3 AC02	Safety		34			
	Repair concrete work and stabilise headworks - Drain 3/4 Access Crossing AC03	Safety	33				
	Repair concrete works - Drain 3/4 Access Crossing AC04	Safety	33				
	Repair of Concrete works and headwalls - Drain Access Crossing 3_4 AC02	Safety		34			
St George Pump Station	09SGA-Enhance: Construction of New Suction	Condition		357			
	Prepared detailed design for St George Pump Station refurbishment/replacement	Condition	109				
	Replace Pump. 19 Cusec	Condition	134				
	Replace Pump. 7 Cusec	Condition	132				

Buckinbah Pump Station

The repainting and maintenance of the seals at the Buckinbah Weir is required to preserve the integrity of the gates. The requirement for the project and cost was verified during the site inspections.

The Replacement of the switchboard ($22,000 engineering evaluation and $138,000 replacement cost) has been instigated by an electrical safety report into a sample of SunWater's electrical assets. GHD's engineering staff confirmed that the cost is within an order of magnitude for a switchboard of this size, but cannot verify that it is required at the planned timeframe. The timing of the replacement project will be determined during the 2012 engineering evaluation study.

The need for the Buckinbah Pump Station was discussed with SunWater during the site visits. The pumps may not be needed and SunWater is investigating whether the installation can be decommissioned. The Round Two stakeholder meetings considered whether the pumps should be used instead of the St George pumps. However, there was insufficient hydraulics information to draw any conclusions on the future need for the Buckinbah pumps and, therefore, whether the upgrade of the Switchboard was necessary.

St George Distribution and Drainage

The majority of the projects on the St George Distribution System are required to address safety issues with assess to the channel, control structures and the channel crossings. The channel crossings were designed and installed to previous transport load standards and do not have adequate safety barriers or current load carrying capabilities. All of these projects have been reviewed through the Intersafe program and are supported by mitigation actions from the risk assessments process. Therefore, they are considered prudent and efficient as SunWater cannot ignore its due of care.

Channel repairs and remodelling has been identified from the planned condition assessment processes and it is prudent and efficient to preserve the integrity and hydraulic efficiency of the channel.

St George Pump Station

The replacement of the suction mains into the St George Pump Stations was identified from a condition assessment of the assets in 2008, which identified that the steel pipes have extensive external and internal corrosion. The condition appraisal report recommended replacing the mains as the best option. GHD's engineers confirmed that the replacement was the optimum solution and was required to prevent damage to the pumps from air ingestion and impeller cavitation.

The St George Pump Station is an older installation and is approaching the age where significant refurbishments, renewals and repairs are required. Completing a detailed design study to evaluation future options and costs is warranted and supported by the GHD's site observations. GHD's engineers also confirmed that the two pumps scheduled for replacement are due and the cost estimates are within the order of magnitude for pumps of that size. Further observations of the St George Pump Station are included in Section 10.3.5 - Feedback from Field Visits below.

10.3.3 Renewals Annuity

The St George Distribution commences the new price path with a negative renewals balance of $1,556,000 in 2012. The balance remains negative until 2033, then positive between 2033 and 2035. The interest on the negative balance is a significant cost to the scheme over the next 25 years.

The following renewals projects beyond 2016 were reviewed to determine whether the expenditures were required and whether the timing was appropriate. All of the projects were scheduled on the planned maintenance frequency or useful life of the asset. While the project's forecast cost are within an acceptable order of magnitude based on engineering judgement, the detailed information on each project was not available to complete a detailed analysis of the cost estimates.

Table 25 St George Distribution System - Renewals and Refurbishment Projects Beyond 2016

Description	Driver	Value ($'000)	Year
Replace Aluminium Gate Structure 4559M	Age	117	2017
Replace Structure, 600Mm Meter Outlet	Age	69	2017
Repair Access Crossing	Age	88	2017
Replace Fencing.	Age	142	2020
Replace Control Equipment	Age	57	2020
10SGA36: Reprofile & Regrade Drain	Age	182	2020
Replace Structure, Meter Offtake	Age	73	2025
Replace Vacuum Priming Pump Unit.	Age	57	2025
Replace Structure, 600Mm Meter Outlet	Age	170	2025
Replace Bridge Crossing 2857M Por 97.	Age	207	2027
Replace Switchboard	Age	349	2029
Replace Boundary Fence 6437M - 12874M	Age	116	2030
Replace Structure, 600Mm Meter Outlet	Age	75	2030
10SGA25 Install Fences	Age	168	2030
10SGA24 Install Safety Signage	Age	76	2031
Replace Overflow Structure Por 154	Age	81	2032
Replace Cross Drainage Culvert Chb1.	Age	93	2034
Replace Structure, Flow Meter	Age	266	2035
Replace Structure, 600Mm Meter Outlet	Age	110	2035
Replace Suction Pipe.	Age	704	2035

Past Renewals Expenditures

Over the past five years, the renewals reporting for the St George WSS and St George Distribution systems were combined. The scheme specific projects were segregated by asset descriptions where possible. SunWater has completed a range of minor projects on the scheme assets over the period. The one major project was the construction of the low level Pump Station at the E.J. Beardmore Dam, to allow water to be transferred to the main channel during low dam levels. The cost of this project was $201,493 in 2009. Fencing and repairs to crossings was also a significant cost item in 2010. The majority of the expenditure ($1,700,879) will occur this financial year as an element of the $14 million Intersafe program. The work includes installing handrails, safety barriers and new gates on the channel control structures.

The annuity revenues, expenditures and balances over the 2006 to 2011 period are presented below and in Figure 10.7.

- Opening Balance $457,000
- Revenue $813,000
- Expenditure $3,206,000
- Closing Balance -$1,595,000

The expenditure has exceeded revenue by $2,393,000 over the period, transferring the renewal balance from a positive balance in 2006 to negative annuity balance by 2010. As can be seen in Figure 10.7, the expenditures on refurbishments, repairs and new requirements have exceeded revenues in the last three years of the previous five year period. The primary Capex impact is the Intersafe project to be completed during 2011.

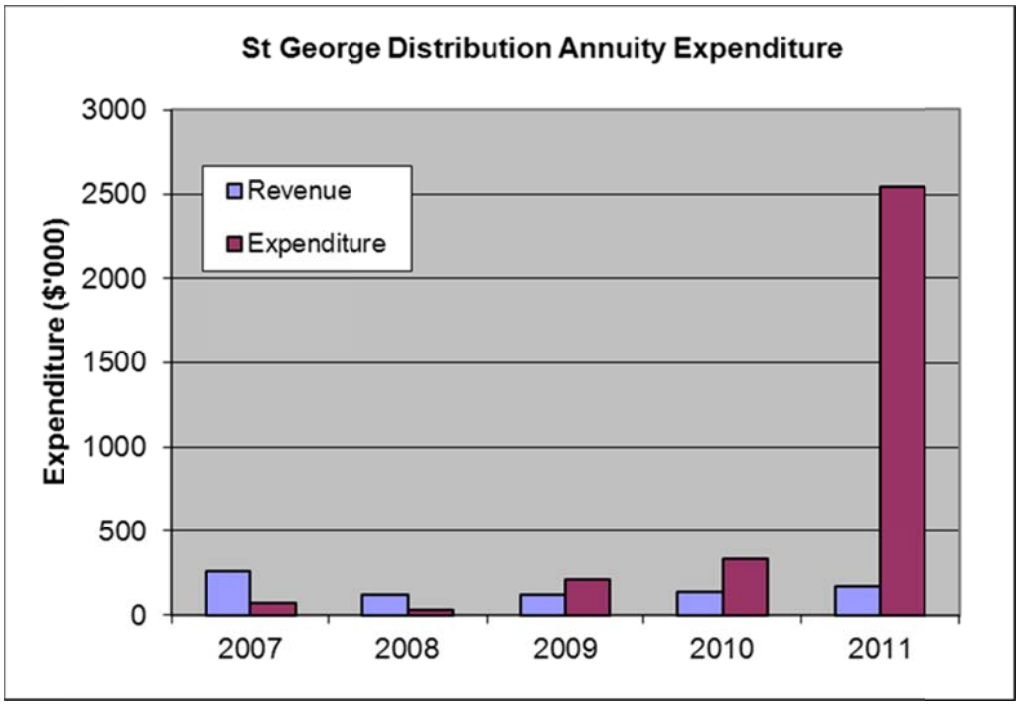

Figure 10.7 Revenue and Expenditure Annuity 2007 to 2011

The following projects, completed between 2006 and 2011, were reviewed in SAP PM and WMS and assessed as prudent and efficient based on the information provided by SunWater's staff and GHD's analysis using engineering experience and judgement.

Table 26 Projects Investigated 2006 to 2011 – St George Distribution

Project	Driver	Cost ($)	Year
St George Channel Meter Replacements	Age	27,428	2007
Purchase and Install three (3) Diesel Motors	Operational	201,493	2009
Repairs to access crossing AC05 St George Main	Safety	6,043	2010
Repairs to crossing 4 Channel B2	Safety	25,201	2010
Repairs to access crossing CHB-2- AC02	Safety	22,530	2010
Install Fencing as per Policy - St George	Safety	57,069	2010
Emergency repairs to access crossing AC06 Channel B2 SGIA	Safety	38,122	2010
Emergency Repairs to Access crossing	Safety	217,069	2010
Repair Access Crossing at 1692.25M - St George Main Channel	Safety	28,700	2011
Intersafe Gated - St George	Safety	1,654,241	2011

Renewals Annuity Balance

As SunWater were unable to provide detail on what projects were planned during the 2006 to 2011 price path or the forecast annuity balance at the end of 2011, a comparison between what was planned and what occurred during the past five years was not possible. The methodology used to determine the opening and closing annuity balances and annuity calculations were checked and found to be correct.

As shown in Figure 10.6, the scheme's opening negative balance will be reduced by the annuity contributions over the next 25 years. During the next five years, the rolling annuity will rise from $415,000 in 2012 to $449,000 in 2016. This is a significant increase from the previous price path, which varied from $122,000 (2009) to $257,000 (2007).

10.3.4 Renewals and Water Consumption

The St George Distribution system is one scheme in the Toowoomba cluster where a relationship between water consumption and renewals expenditure may exist. The pumps at St George Pump and Buckinbah Pump Stations will require a higher level of preventative maintenance as more water is pumped into the channel. A detailed engineering analysis would be required to establish the precise relationship between water consumption and maintenance costs for these assets; however this was not included within the scope of this review project. Similarly, there may be a relationship between maintenance costs and water use for the channels and control gates, however historical information on water used and channels costs was not available from SunWater and detailed analysis was not possible with the information provided to date. For most of the assets, water usage will not be the main driver for renewals costs as age will be the predominant driver for asset deterioration and define the need for renewals expenditures.

10.3.5 Feedback from Field Visits

The St George WSS and St George Distribution Systems were visited and reviewed on 2nd March 2011. GHD was accompanied by the SunWater's Manager Operations South and operations staff for the St George Depot. The inspections included the St George Pump Station, E.J. Beardmore Dam Low Level Pump Station, the Buckinbah Pump Station and selected sections of the distribution channels.

St George Pump Station

The St George Pump Station consisted of three pumps within a dry well on the banks of the Balonne River. The pumps are high flow low head pumps, which transfer water approximately one km to the St George Channel. Three suction mains were anchored within the river channel. The pumps were driven by electric motors in the upper floor of the pump station. Pump No 2 motor was newer and in better condition than Pump 1 and 3 motors. The pump station structure is sound although the access stairway is unlikely to be compliant with current OH&S requirements. The site inspections verified the need for the following projects in the five year forecast (2012 – 2016):

- Construction of the new suction mains. The mains had been surveyed during the drought and corrosion of the external and internal surfaces were verified by thickness testing; and
- Replacement of Pumps 1 and 3 due on age, performance and condition.

The area below the motor and switchgear floor level of the pump station is a confined space for maintenance of the drive shafts and pumps within the tower. An alternative pump station using a wet well with an intake channel to the main river channel is being considered. The use of a channel to the wet well may be questionable given likely siltation of the channel and potential for blockage of the intake. An alternative design incorporating silt separation works may be required, although the present intake pipe system appears to be working well, apart from the corrosion of the pipes, which should be replaced under corrective maintenance.

St George Channel

The St George channel has been fenced with 2.4m high chain link fencing with three strands of barbed wire to minimise the risk of accidental drowning. The installation was driven by risk assessment processes and is justified. The channel was well maintained and in good condition.

Buckinbah Pump Station

The Buckinbah PS consists of two smaller and two larger pumps mounted on a weir structure. The weir and pumps are used for providing head to the downstream canal when the upstream levels are low. The pumps were installed in 1970 and they and the switchboard are due for replacement. The concrete structure is in a fair condition with some cracking on the abutment slabs that may be associated with differential movement. The debris screens are working effectively and operation of the weir is adequate. The site visit verified the need for the following works:

- Replacement of the pumps; and
- Repair of the cracking abutment slabs.

GHD considers the cost for the pump and motor replacements appeared to be underestimated. SunWater advised that the future of the pump station was under review and the need to replace the switchboard may not be required. .

10.3.6 Potential Efficiency Gains

There were no suggested efficiency gains from the Capex forecast expenditure review.

10.3.7 Recommendations

The recommendations for the St George Distribution Capex review include:

- Consider retaining the suction system to the St George Pump Station and consider whether submersible pumps are a cost benefit over the current arrangement; and
- Consider whether retention of Buckinbah Pump Station is required and review the cost of replacing the pumps and switchboard.

11. Assessment of Upper Condamine Water Supply Scheme

11.1 Network Service Plan Overview

The Upper Condamine Water Supply Scheme has a total of 100 bulk customers with a yearly Total Allowable Water Use (WAE) of 33,797 ML. This allowance comprises 30,410 ML of medium priority WAE and 3,387 ML of high priority WAE. SunWater proposes to allocate 90% of operating costs and 11% of the renewals annuity to medium priority WAE. Costs classified as Indirect or Overhead operating costs are excluded from the scope of this review.

The Condamine and Balonne Resource Operations Plan specifies the operation and management requirements for this scheme. A Senior Operator is located at the Pittsworth depot and is responsible for the day-to-day water supply management and delivery of the programmed works. This scheme consists of nine major bulk water assets:

- Leslie Dam;
- Talgai Weir;
- Yarramalong Weir;
- Yarramalong Pump Station;
- Nangwee Weir;
- Lemon Tree Weir;
- Cecil Plains Weir;
- Melrose Weir; and
- Wando Weir.

The scheme utilises Sandy Creek, the Condamine River, and the Condamine North Branch, which are, defined water courses under the *Water Act (2000)*. As such, SunWater has no tenure over these water courses.

See Appendix A for a map of the scheme.

11.2 Operational Costs Review

SunWater distributes Operational Costs into two broad categories being, Direct Costs, and Indirect and Overhead Costs. This review is limited to the Direct Operational Expenditure (Opex), while excluding insurance costs. Direct Opex costs are the costs described in Tables 4.3 and 4.5 of the Upper Condamine WSS (Water Supply Scheme) Network Service Plan. The ratio of Direct Opex to Indirect and Overhead Opex is shown below.

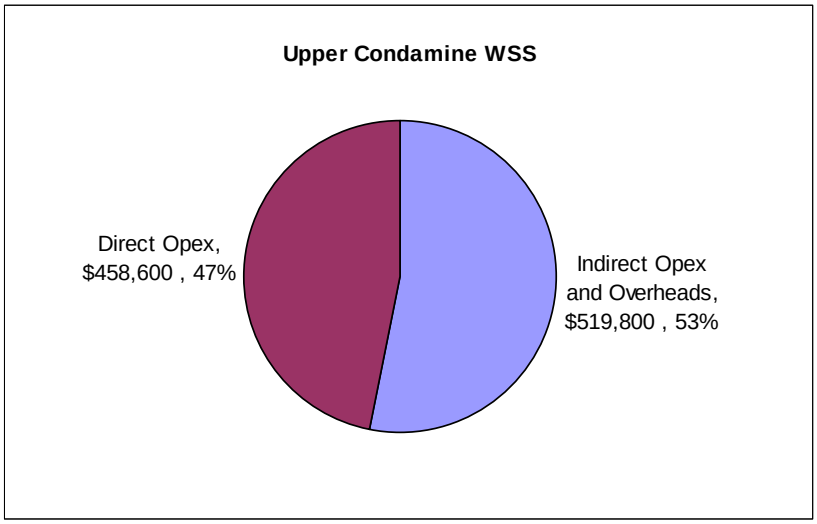

Figure 11.1 Upper Condamine WSS Breakdown of Opex

11.2.1 Forecast Operational Expenditure

When comparing the average Apex for the previous and accurate price path, there is a small reduction in Direct Operational Costs (Direct Opex) for this scheme. Electricity costs have been the main cost driver in this scheme as explained below.

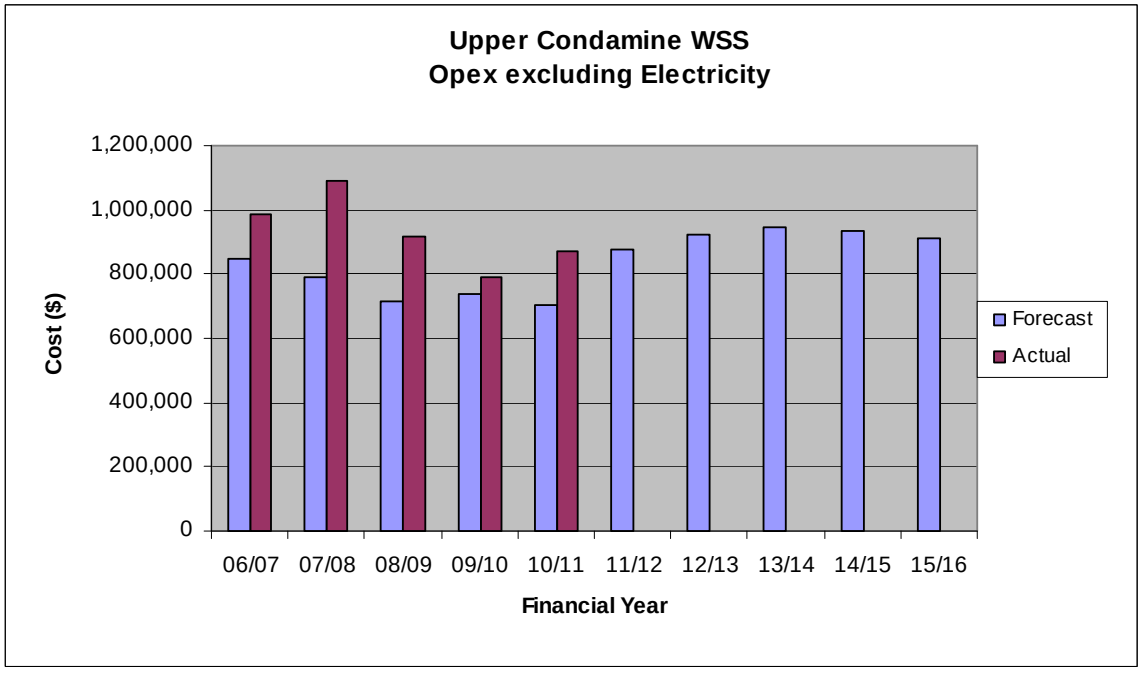

Figure 11.2 Upper Condamine WSS Forecast and Actual Opex excluding Electricity

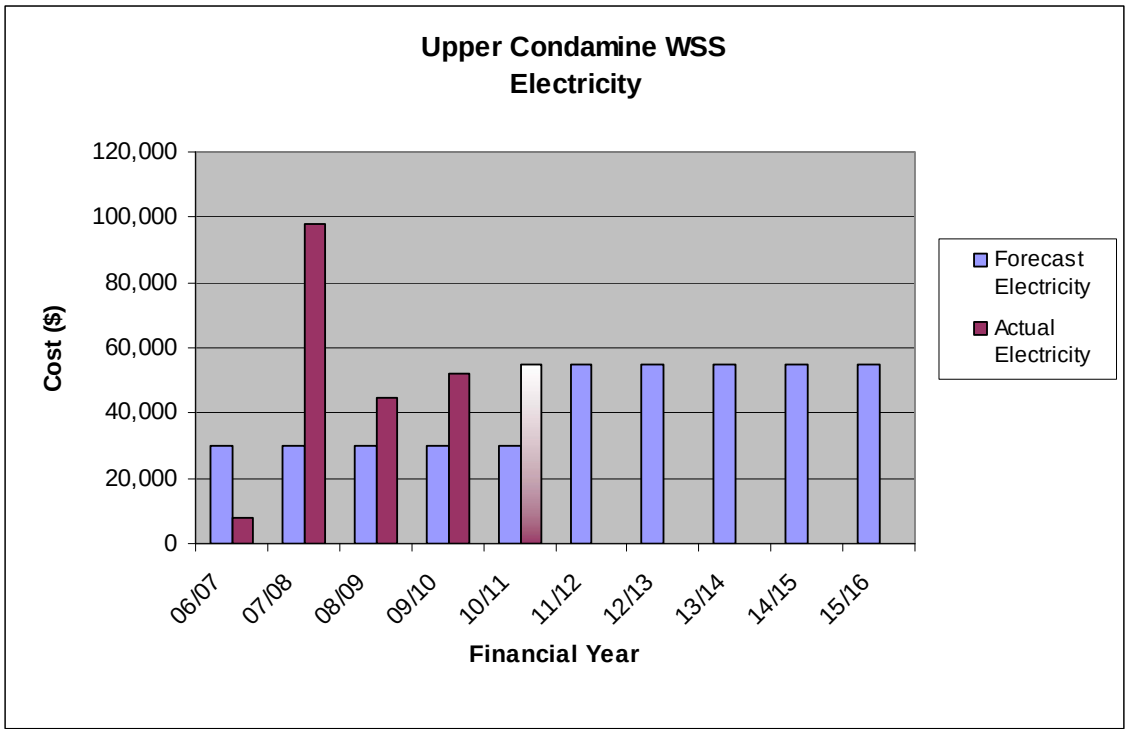

Figure 11.3 Upper Condamine WSS Electricity Costs

SunWater have explained the expenditures on higher pumping requirements in 2008. SunWater stated the following:

> *"The 2008 high electricity costs due to high water allocation deliveries and other water deliveries (credit water, risk A & river harvesting - 29,541 ML) in the North Branch which required pumping water from river to North branch (electricity for Pampas via Brookstead was approximately $67k)."*

Electricity consumption is forecast to continue to be high, as SunWater forecast that the reasons for the pumping of water to North branch will continue to be a requirement. This is reflected in the forecast for the proposed price path.

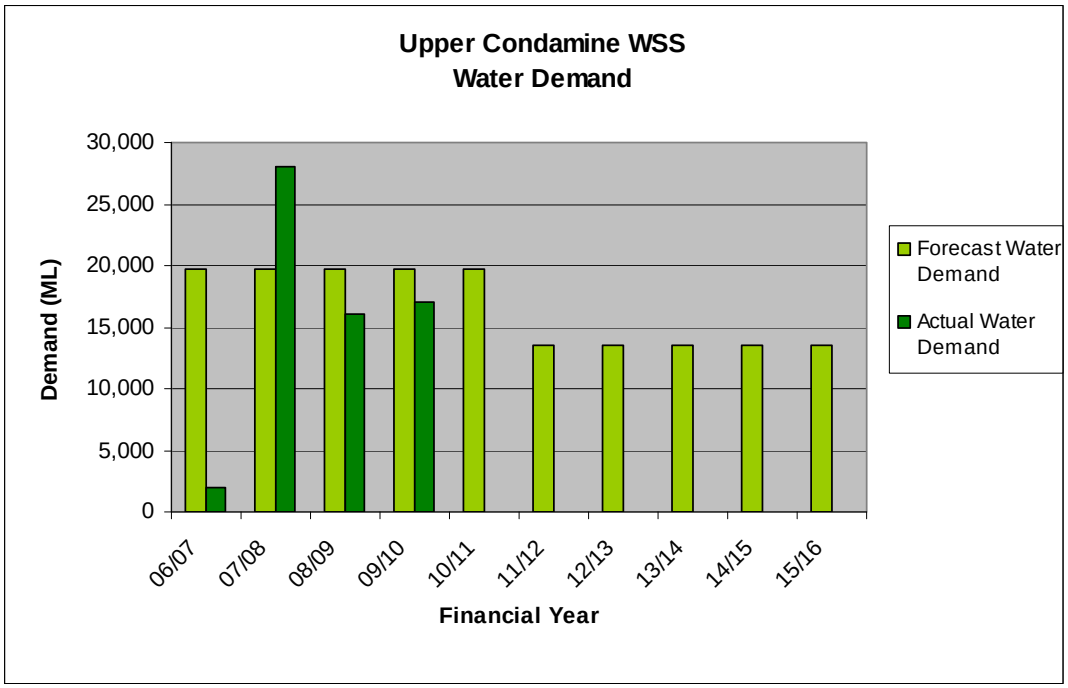

Figure 11.4 Upper Condamine WSS Water Demand

The Condamine and Balonne Resource Operating Plan specifies that water allocations are calculated at the beginning of each water year with recalculations occurring within 5 business days of the first day of each month. The Network Service Plan states SunWater is required to reconcile the water balances on a "daily basis". As part of this recalculation process SunWater have stated that monthly meter reading is required. SunWater have acknowledged this is a drafting error in the document and does not reflect the calculations of the forecast costs.

Water Ordering is stated in the Network Service Plan as requiring that "bulk water customers must contact the SunWater Operations Officer by phone or fax to place their orders." Additionally, the Network Service Plan states that a customer enquiring about accounts and service delivery can be directed to the SunWater Customer Support Group. SunWater has reasoned that the cost of Online or Integrated Voice Recognition (IVR) services for this scheme would be too expensive. SunWater argues that the number of water products available to the customer makes these systems more complex to establish and manage.

An increase in labour cost has been forecast for the price path. This is considered acceptable in the context of the increased pumping requirements in the scheme. Other costs are not significant and are in line with actual expenditure.

Considering the allocations of Direct Opex, the 2007 period is excluded on the basis that SunWater acknowledge that substantial cost reductions have been achieved through the changes to the business operating model. Also, it should be noted the majority of the "Other" expenditure type is predominately insurance costs and excluded from this review as directed by the Authority. Therefore, using the remaining 2008, 2009 and 2010 periods the average expenditure for these periods has been used as the forecast ongoing.

Table 27 Upper Condamine WSS Operational Expenditure Type – Actuals and Averages

Category	Actual Expenditure			Average 2008-2010
	2008	2009	2010	
Labour	$232,000	$216,000	$193,000	$213,667
Electricity	$98,000	$45,000	$52,000	$65,000
Materials	$54,000	$30,000	$26,000	$36,667
Contractors	$49,000	$27,000	$53,000	$43,000
Other	$130,000	$140,000	$141,000	$137,000

These averages align reasonably to the forecast budgets as shown below with the exception of Labour and Contractors. However the increase in Labour is equalised by the decrease in Contractors.

Table 28 Upper Condamine WSS Operational Expenditure Type Averages Vs. Forecast

Category	Average 2008-2010	Forecast					
		2011	2012	2031	2014	2015	2016
Labour	$213,667	245,000	249,000	252,000	252,000	252,000	252,000
Electricity	$65,000	55,000	55,000	55,000	55,000	55,000	55,000
Materials	$36,667	33,000	33,000	33,000	34,000	34,000	35,000
Contractors	$43,000	28,000	28,000	29,000	29,000	30,000	30,000
Other	$137,000	90,000	90,000	90,000	90,000	90,000	90,000

Analysis of the Direct Opex by expenditure type is shown below.

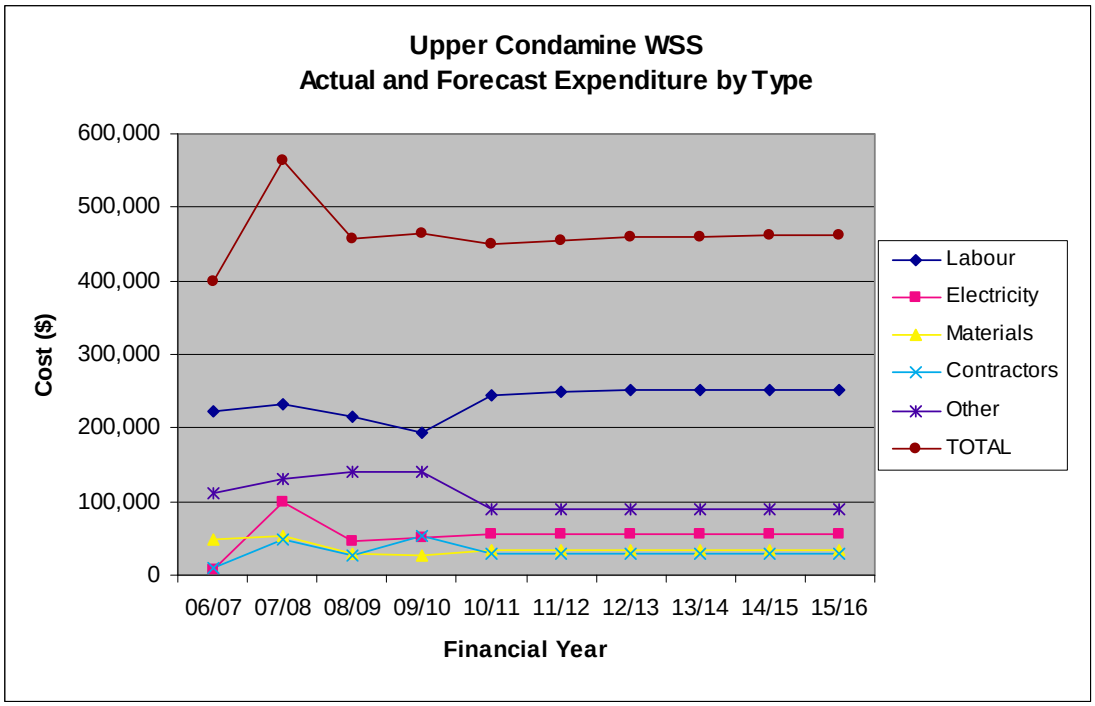

Figure 11.5 Upper Condamine WSS Actual and Forecast Opex by Type

Compliance

Considering the expectations for compliance with Australian and Queensland Government regulation and initiatives, the management water allocations, corrective and preventative maintenance, these costs are considered efficient. SunWater have forecast the required expenditure using the current cost requirements as the basis. Considering the regulatory requirements are unlikely to change, the management and administration costs of this scheme would be consistent with the actual expenditure incurred in the current price period. Allowing for anomalies such as floods, the method for calculating the forecast using actual historical cost is considered robust.

Preventative and Corrective Maintenance

Preventative and Corrective Maintenance is forecast as a 70/30 precent ratio. This is considered consistent with the requirements for weed management, compliance inspections and reactive responses as required. Assessment the distribution of preventative to corrective maintenance is problematic and would usually be conducted against system losses, unaccounted for water and non-revenue water evaluating reductions in these loses against the maintenance expenditure. In this case, the complication of natural watercourses being used as the transport mechanism, actions by other irrigators and so on make it extremely difficult to make this assessment. In applying engineering and operational management judgement, this ratio is determined as reasonable.

Leslie Dam

Leslie Dam is a referable dam and as a consequence has additional compliance requirements. This is a cost driver for the Direct Opex as the additional inspection and reporting required equates to an increase in the Preventative Maintenance program. This scheme also has 6 weirs - all with inspection and reporting requirements that drive the Direct Opex cost.

Substantial costs are forecast for the Recreation Facilities in the scheme. The Queensland State Government has ruled that this cost is to be passed on to SunWater's customers.

Dams and Weirs

Dams and Weirs are generally long-lived assets that combined with appropriate periodic maintenance programs can be retained in service indefinitely. The maintenance and inspection program is relatively static from year to year. The forecast provided by SunWater reflects a static program of work to maintain the assets in this scheme.

Contractor and Materials

Contactor and Materials costs are considered appropriate. This consideration is made by understanding that SunWater no longer maintains machinery such as backhoes in the region and relies on contractors. This decision was made on the basis that the utilisation of the equipment did not justify the retention of the equipment. Materials expenditure also considered appropriate. SunWater have advised the main expense in this cost line is for poisons for weed management.

Water Demand

Consumption is not considered a driver for Direct Opex. The expenditure on Direct Opex is required to maintain the service through management of the assets, compliance with regulation and the provision of water to customers. All of these costs are incurred irrespective of the volume of water sold to customers, released to maintain environmental flows or lost through natural causes. Those that gain the most benefit from the scheme must carry an allocation of these costs. On this basis, the allocation of cost is considered appropriate.

11.2.2 Feedback from Field Visits

This scheme was not visited during the review. However, the Stakeholder comments detailed in the Macintyre Brook and St George Scheme Reviews would likely be consistent with the views of the Upper Condamine WSS Stakeholders.

11.2.3 Potential Efficiency Gains

An automated system to collate customer orders would reduce the potential for errors. Acknowledging the complexity of having several water products available to the customer, it is still considered that an automated online system for the more commonly used products would provide some efficiency gains.

A reduction in the number of water products available to the customer could be rationalised, decreasing the complexity of the management of the Upper Condamine Water Supply Scheme. Although the current complexity is a driver of Direct and Indirect Opex cost for the scheme, it is likely that the customers would not support this efficiency gain.

11.2.4 Recommendations

A customer ordering system for commonly used water products should be offered online to reduce the amount of manual handling of customer orders.

11.3 Capital Costs Review

11.3.1 Overview

The major assets within the Upper Condamine WSS include the Leslie Dam, Yarramalong P.S., and the Talgai, Yarramalong, Lemon Tree, Melrose, Wando, Nangwee and Cecil Plains Weirs. The optimised capital replacement cost (ORC) of the storages is $164,920,394 as at 1st July 2011.[17]

Over the next five years, the major capital projects include:

- Leslie Dam - Repair pitting and corrosion to conduit lining - $119,000 in 2012. The project is instigated by a condition appraisal which identified corrosion damage in the bell mouths on two outlets and to the conduit lining, needs to be repaired;
- Leslie Dam - Replace a 685 mm diameter valve - $119,000 in 2015. The work is required to replace a valve at the end of its effective life and is supported by condition appraisal reports in 2004 and 2006;
- Leslie Dam - Refurbish spillway gates - $156,000 in 2016. This work has been established by condition appraisal on Gates No 1 and 2;
- Leslie Dam - Replace water treatment plant - $175,000 in 2016. The treatment plant was constructed in 1985 and will exceed the standard life of 30 years. A condition appraisal has not yet been completed;
- Yarramalong Pump Station - Refurbish pump No. 3 and upgrade control system - $111,000 in 2012. The pump work is a scheduled preventative maintenance on a six year cycle. The control system will exceed its standard service life in 2012; and
- Yarramalong Pump Station - Refurbish pump No. 2 - $ 134,000 in 2016. The driver for this project is the same as that for Pump No 3.

The drivers for each project were sound, and the timing and cost of the works appears to be prudent.

11.3.2 Forecast Renewals Expenditure

The graph below (Figure 11.6**)** shows the forecast renewals expenditure over the 25 year annuity forecast period. The renewals projects include refurbishments to protect the assets, recurrent expenditures on refurbishment of pipework, gates and structures. The peak in expenditure profile for 2019 is primarily due to the replacement of the cableways on Leslie Dam. A Dam Spillway Upgrade at the Dam is the major component in the 2020. The peak in 2021 results from replacement of the gate winch cables. The peaks in 2029 and 2030 are mostly replacement of control systems and pumps at the Yarramalong Pump Station and the expenditure in 2032 is mostly the replacement of the alternators at Leslie Dam. The forecast renewals expenditure was assessed as valid and prudent.

[17] Annexure A.2 Table A-1 Network Service Plan

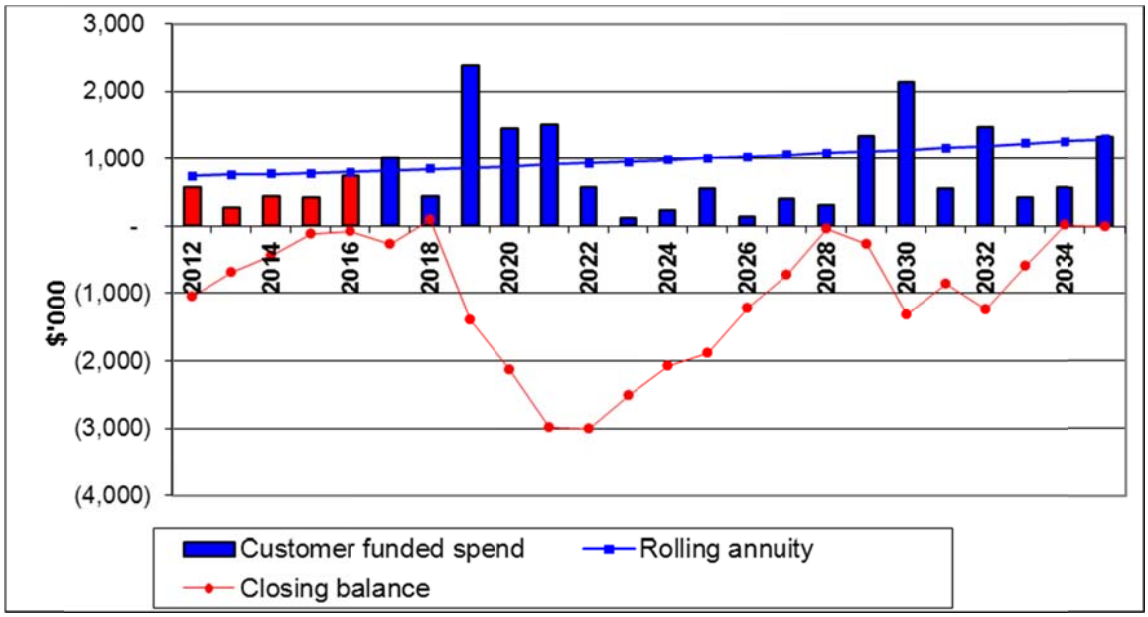

Figure 11.6 Renewals Annuity Graph 2012 to 2036

The following renewal projects were reviewed in SunWater's SAP PM and WMS system:

Table 29 Upper Condamine WSS - Renewals and Refurbishment Projects 2012 to 2016

Facility	Description	Driver	Cost Estimate ($'000)				
			2012	2013	2014	2015	2016
Leslie Dam	09UCO-5 Yearly Dam Safety Inspection	Compliance			52		
	09UCO-Refurbish: Paint upstream face	Condition		65			
	10UCO11Refurbish: Foundation Drains	Condition				51	
	12UCOXX Install Anchored Buoys	Safety	46				
	13UCOXX Refurbish: Paint Upstream Face	Condition		53			
	14UCOXX Refurbish Unlined 685mm M/S Pipe	Condition			56		
	Investigation Contaminated Land Sites	Compliance	56				
	Paint downstream face of gate	Condition					75
	Refurbish: Paint upstream face	Condition	63		67		
	Repaint downstream face of gate	Condition				75	75
	Repair pitting and corrosion of conduit lining	Condition	119				
	Replace Valve, 685Mm Gate John	Condition				119	
	Replace Water Treatment	Condition					175

Facility	Description	Driver	Cost Estimate ($'000)				
			2012	2013	2014	2015	2016
Yarramalong Pump Station	10UCO32 Refurbish Pump and Motor	Condition					78
	Refurbish: Pump No 2	Condition					56
	Refurbish: Pump No 3	Condition	53				
Yarramalong Weir	14UCOXX Refurbish: Sheet Piling is Wearing	Condition			64		

Leslie Dam

Most of the projects planned on Leslie Dam over the next five years are planned maintenance projects completed to restore or preserve the assets. The projects were supported by condition assessment reports or the defined frequency predicted by aging materials. All of these projects are needed to preserve the assets. Installing buoy lines, dam safety inspections and investigation of contaminated lands are required to comply with SunWater's legislative and statutory obligations.

Yarramalong Pump Station

Refurbishment of the pump and motors at Yarramalong was based on the age of the pumps and the last time they were refurbished. The Pump 3 had a recent condition assessment to support the timing of the project.

Yarramalong Weir

The refurbishment of the sheet piling at the Yarramalong Weir has been instigated by a condition assessment report and is needed to protect the toe of the weir from undermining.

11.3.3 Renewals Annuity

The Upper Condamine WSS commences the new price path with a negative renewals balance of $31,000 in 2012. The balance remains negative until 2018, then positive in 2018, but returns to a negative balance beyond 2019 due to the planned expenditures between 2019 and 2021. The interest on the negative balance is a significant cost to the scheme in 2012 ($132,000 or 18% of the rolling annuity) and during the high negative balance in 2021 to 2023 (peaking at $363,000 or 39% of the rolling annuity).

If the expenditures in 2019 to 2021 could be delayed and spread over the 2023 to 2028, the impact of interest on the annuity balances could be reduced.

The following renewals projects beyond 2016 were reviewed for SunWater SAP PM & WMS to determine whether the expenditures were required and whether the timing was appropriate. All of the projects were schedule on the planned maintenance frequency or useful life of the asset. While the projects' forecast cost are within an acceptable order of magnitude based on engineering judgement, the detailed information on each project was not available to complete a detailed analysis of the cost estimates.

Table 30 Upper Condamine WSS - Renewals and Refurbishment Projects Beyond 2016

Facility	Description	Driver	Value ($'000)	Year
Leslie Dam	Replace Plc, Sqd (24 Off)	Age	139	2017
	Replace Crane Control Equipment	Age	86	2017
	Repaint downstream face of gate	Age	265	2017
	Replace Cableways	Age	2,076	2019
	Dam Safety spillway upgrade (2019)	Age	3,245	2019
	Replace Switchboard	Age	378	2020
	Replace Cable	Age	446	2020
	Replace Control Equipment	Age	281	2020
	Replace Switchboard	Age	192	2020
	Replace Cable	Age	1,115	2021
	Refurbish: Painting and reseal gates (4 off)-actual costs	Age	85	2021
	Refurbish: Replace bulkhead guides	Age	206	2022
	Refurbish: Paint upstream face	Age	92	2025
	09UCO-REFURB: WTP Raw Water Pumps - SWB	Age	88	2025
	Refurbish: Blast and paint the LHS 914 mm river conduits as identified in 5-yearly dam safety (2004)	Age	109	2027
	Refurbish: Paint upstream face	Age	97	2027
	Replace Safety Fencing (Disch Ch.)	Age	79	2029
	10UCO11REFURBISH FOUNDATION DRAINS	Age	77	2030
	11UCO-Refurbish: replacement of ram seal	Age	87	2031
	11UCO01REFURB: PAINT UPSTREAM FACE-GT05	Age	80	2031
	Replace Plc, Sqd (24 Off)	Age	191	2032
	Replace Alternators	Age	910	2032
	09UCO-Refurbish: Paint upstream face	Age	115	2033
	13UCOXX REFURB/ PAINTING AND NEW SEALS	Age	124	2033
	Refurbish: Paint upstream face	Age	115	2033
	Replace Control Equipment	Age	405	2035
	Repaint downstream face of gate	Age	133	2035
	10UCO11: REFURBISH FOUNDATION DRAINS	Age	91	2035
Leslie Dam WTP	Replace switchboards as per design 2012	Age	295	2017
	Replace Treatment Plant Unit	Age	197	2021
	Enhance: Upgrade Water Treatment Plant	Age	130	2034

Facility	Description	Driver	Value ($'000)	Year
Yarramalong PS	Replace Elect – Switchboard	Age	114	2017
	Refurbish: Pump at Yarramalong PS	Age	125	2018
	Replace Computer, Unysis	Age	73	2022
	Refurbish: Yarramalong Pump Station - Refurbish Pump No 2	Age	64	2022
	10UCO32 REFURBISH PUMP AND MOTOR	Age	102	2022
	Refurbish: Replace bulkhead guides - actual costs	Age	64	2022
	Replace Surge Protection, Critec (27 Off)	Age	77	2024
	Refurbish: Yarramalong Pump Station - Refurbish Pump No 2	Age	84	2028
	10UCO32 REFURBISH PUMP AND MOTOR	Age	118	2028
	Replace Control Equipment	Age	748	2029
	Replace Pump Column	Age	94	2030
	Replace Submersible Pump/Motor	Age	363	2030
	Replace Pump Column	Age	94	2030
	Replace Submersible Pump/Motor	Age	432	2030
	Refurbish: Yarramalong Pump Station - Refurbish Pump No3	Age	126	2030
	Replace Pump Column	Age	94	2030
	Replace Submersible Pump/Motor	Age	432	2030
	Refurbish: Pump at Yarramalong PS	Age	85	2033
	Refurbish: Yarramalong Pump Station - Refurbish Pump No 2	Age	97	2034
	10UCO32 Refurnish Pump and Motor	Age	212	2034
	Replace Siphon Unit 1 (D/S Unit)	Age	354	2035
	Replace Siphon Unit 3 (U/S Unit)	Age	111	2035
	Replace Control Equipment	Age	87	2035
Yarramalong Weir	Replace Pump Column	Age	81	2017
	Replace Submersible Pump/Motor	Age	717	2018
Nangwee Weir	Replace Access Road	Age	85	2029
Wando Weir	Replace Trash Racks	Age	131	2031

Past Renewals Expenditures

Over the past five years, SunWater have completed the following significant projects on the Upper Condamine WSS:

- 2007 – Leslie Dam - Painting of the conduits ($73,537), and replacement of the right hand guard valve ($128,916). Yarramalong Pump Station – Overhaul the Control System ($66,640);

- 2008 - Leslie Dam - Replacement of the left hand guard valve ($137,716); and
- 2010 - Yarramalong Pump Station – Refurbish a pump and motor ($61,516).

In 2011, the expenditure is made up of approximately 50 minor projects with a total value of over $316,000. The annuity revenues, expenditures and balances over the 2006 to 2011 period are below and in the following table and graph.

- Opening Balance -$31,000
- Revenue $671,000
- Expenditure $1,281,000
- Closing Balance -$1,086,000

The expenditure has exceeded revenue by $610,000 over the period, transferring the renewal balance from a slight negative in 2006 to a significant negative annuity balance by 2011. As can be seen in Figure 11.7, the expenditures on refurbishments, repairs and new requirements have exceeded revenues in all but one of the previous five year period.

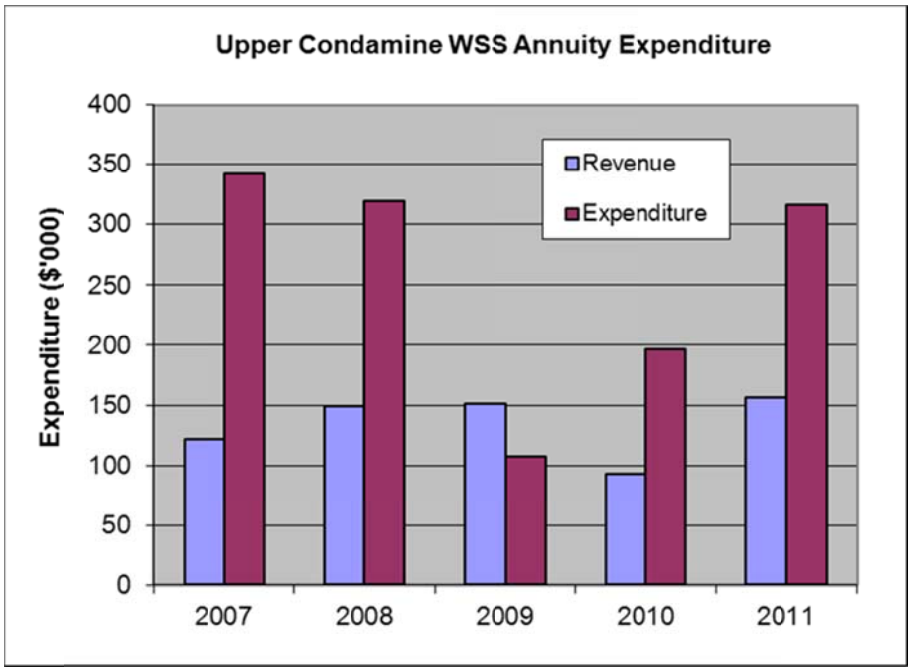

Figure 11.7 Revenue and Expenditure Annuity 2007 to 2011

The following projects, completed between 2006 and 2011, were reviewed in SAP PM and WMS and assessed as prudent and efficient based on the information provided by SunWater's staff and GHD's analysis using engineering experience and judgement.

Table 31 Upper Condamine WSS - Renewals and Refurbishment Projects 2006 to 2011

Project	Driver	Year	Cost ($)
Leslie Dam: Blast and Paint LHS 914mm River Conduits	Condition	2007	73,537
Yarramalong P/S: Overhaul Control System and Elec System	Condition	2007	66,640
Leslie Dam: Replace Guard Valve With Butterfly Valve	Condition & Operational	2007	128,916
Replace guard valve with butterfly valve.		2008	137,716
Refurbish Pump & Motor - Yarramalong Pstn Pun 1	Condition	2010	61,516

All of the projects had condition and risk assessments supporting the need for the project. The replacement of the guard valve also had a good project description that allowed the reviewed to gain a sound understanding of the project scope and to verify the cost elements in the project cost summary.

Renewals Annuity Balance

As SunWater were unable to provide detail on what projects were planned during the 2006 to 2011 price path or the forecast annuity balance at the end of 2011, a comparison between what was planned and what occurred during the past five years was not possible. The methodology used to determine the opening and closing annuity balances and annuity calculations were checked and found to be correct.

As shown above, the scheme's opening negative balance will need to be reduced by the annuity contributions over the next 25 years. During the next five years, the rolling annuity will rise from $742,000 in 2012 to $804,000 in 2016. This is a significant increase from the previous price path, which varied from $122,000 (2006) to $156,000 (2011).

11.3.4 Renewals and Water Consumption

The Upper Condamine system is mainly composed of static assets, which deteriorate naturally through aging. The movable assets appear to be operated well within their design parameters and replacement, based on useful life predictions, is appropriate. While the pumps and motors in the Yarralonga Pump Station will deteriorate at a faster rate if used beyond their current duty cycles, the direct relationship between usage and maintenance costs could not be determined with the information available from SunWater. The rate of asset deterioration is unlikely to be affected by water use and therefore is not considered an impact on the renewals forecasts.

11.3.5 Feedback from Field Visits

The Upper Condamine WSS was not inspected during the field visits on advice that the system was flood affected and the forecast Capex project may need to be revised. Later advice from SunWater was that minimal damage had occurred to the system assets and the forecast expenditures were not likely to change significantly.

11.3.6 Potential Efficiency Gains

There were no suggested efficiency gains from the Capex expenditure review.

11.3.7 Recommendations

The recommendation from the Upper Condamine Capex review is to spread the planned capital expenditures between 2019 and 2021 to reduce the impact of interest changes on the annuity balance.

12. Conclusion

12.1 Observations

12.1.1 Direct Operational Expenditure

A prime driver of Direct Operational Expenditure in each of the schemes is labour. A large percentage of the labour is spent conducting compliance activity associated with the Resource Operating Licence (ROL), Resource Operating Plan (ROP), Dam Safety and other mandatory compliance activities. Additional to this are a number of activities required by other government departments to gather information or maintain information gathering stations.

For individual schemes it would not be prudent to try and capture the costs associated with these activities. However, collectively these activities amount to a significant cost. Stakeholders have expressed substantial concerns that they were paying for services that benefit the greater community and did not see that this was acceptable for one segment of the community to have to carry such a financial burden.

SunWater, as the main owner/operator of assets and schemes of this type, could negotiate with the regulators and government departments currently requiring the reporting and information gathering activities to adopt a better approach. Currently, SunWater has demonstrated that, for the Direct Operational Expenditure, it is working efficiently and within the bounds of the regulated environment in which they have to run their business.

Preventative and Corrective Maintenance

Analysis of the distribution of maintenance costs has been assessed for each scheme and considered prudent and efficient for each scheme. It is apparent that past experiences have driven the planning processes for the ratio of preventative and corrective maintenance for each scheme.

Water Management

The labour intensive nature of water management methodology to meet the requirements of government, deliver the water ordered by customers while managing the assets in the schemes is considered acceptable. Drawing comparisons between the schemes on the Toowoomba cluster is difficult and is exacerbated by the individual complexities of each scheme. The complexity of water products available to customers for the ordering of water adds to the costs of these schemes. However, if the customer requires this complexity to be retained, then the cost will be passed on.

Some of the labour cost could potentially be reduced if automation of water releases was achieved. Unfortunately, this is unlikely to work, as the current infrastructure designs require manual involvement and maintenance to maintain the water flows. The alternative would be significant capital expenditure, which will cost significantly more in both the short and long term.

Efficiency Gains

SunWater is making changes in the management of their business and are applying industry accepted standards and approaches to management of the assets. One example is the disposal of the Heavy Plant items from the region, as the utilisation of each plant item does not justify retention of ownership. This aligns with Institute of Public Works Engineers of Australia (IPWEA) asset management guidelines and principals.

12.1.2 Capex Procedures

SunWater has an extensive suite of asset management based documents that comprehensively define their various processes, procedures, plans and systems. The documented methodologies are being applied in the preparation of the renewals and refurbishment programs. The delivery of the program of works now follows a defined and robust project management process and projects are procured in accordance with the published procurement guidelines and delegation authorities. The method in which SunWater plans and schedules projects within the SAP PM module is prudent and demonstrates good practice.

Condition Appraisal and Risk Assessment

SunWater's use of Condition Appraisal and Risk Assessment to forecast refurbishment works, review standard asset lives and to prioritise works is prudent and effective in preserving the asset's functionality and meeting the target levels of service.

Cost Benefit Analyses

There was little evidence provided by SunWater for the South West cluster water supply schemes to demonstrate that options analyses or cost benefit analyses were on the projects over the past five years. The critical review of projects is no longer completed on projects beyond the first year in the forward works program. Whether completing analysis on the Whetstone Weir would have changed, the outcomes of this project could not be determined with the information provided by SunWater.

12.1.3 Replacement and Preventative Maintenance Linkages

The process of resetting preventative maintenance routines was investigated as part of the review of Capex projects. SunWater demonstrated that the project action plans included updating the asset attributes in the asset register, revising the maintenance strategies and routines, updating documents and drawings and writing off of disposed assets. The process also included a project close out report that provided a good summary of the project, including why the project was completed, what work was done, what assets were involved, the final costs and who was responsible for the project.

12.1.4 Opex Efficiency Gains from Capex Projects

SunWater may be able to achieve increased efficiencies in Opex from renewals of current assets with different designs or equipment that is more efficient. With the exception of pump replacements, the Capex review did not find any projects that could have a measurable impact on the Opex costs. Changes to the meter reading frequency may have an impact on the required labour. However, as the meter reading is completed coincidentally with other activities, other service deficiencies may be experienced.

12.1.5 Customer Consultation

SunWater agreed that they had not conducted customer consultation effectively in the past five years and intended to improve in the next five years. The Whetstone Weir project was a good example of when SunWater had failed to manage their customer's expectations or keep the irrigators informed on the reasons for cost increases.

12.1.6 Renewal Annuity Balances

The way the previous annuity balances were calculated could not be fully investigated with the data and information provided by SunWater. Without historical information on what was planned back in 2006, the effectiveness of the past five years could not be evaluated. The review of the methodology for calculating the rolling annuity and annuity balances was reviewed and found to be correct. While the validity of the methodology was excluded from the scope of this consultancy as directed by the Authority, the impact of interest rate changes based on 11.25% per annum has a significant impact on the annuity balances.

Many of SunWater's assets are relatively young in relation to their useful lives and the majority of the renewals expenditures will be increased are well beyond the 25 year annuity forecasts. For example, dam and weirs have a 200 year standard life and are within the first 25% of their useful lives. Similarly, control gates have 100 years standard lives and are within the first half of their useful lives. These are high cost assets and their renewals are not within the current annuity calculations. The impact of these assets on the rolling annuity costs will be very significant when they become due as they approach their planned replacement date.

12.2 Annuity Period

SunWater have used a 25 year rolling annuity to calculate the annualised annuity values for each scheme. The annual annuity costs will be used in the five year price path to set the fixed price element of the water price. The length of the annuity period was set as the longest period that SunWater could confidently forecast renewals costs.

GHD's observation of the projects costs and timing beyond year one is that both are set by the standard schedule for planned maintenance and renewals of each asset. The cost estimates used in the forward estimates are based on an order of cost estimate based on the last time the activity was completed, or the replacement value of the asset.

However, the SAP PM system SunWater uses to forecast renewals projects uses an effective life for each asset type and risk exposure of the individual assets to predict a useful life of each asset and next renewal cycle. The cost of the renewals is based on the replacement value of the asset stored in the asset register of SAP PM. The system can be used to forecast projects with the same level of confidence as that used to produce the projects detailed in the NSPs.

GHD normally would recommend that a life cycle costing should be based on the longest life of all assets in a utility's inventory to construct an annuity model and to calculate average annuity from the anticipated costs over the life of the assets. As sound asset management practice, this ensures that the whole of life costs of all assets have been considered in the annuity model.

SunWater's weirs and dams have an effective life of up to 200 years for the lower risk assets. The replacement of these assets is not included in the current 25 year model, because the assets are generally less than half the way through their useful life. Therefore, the current 25 year model understates the real cost of suppling irrigation water by ignoring the high costs of replacing the long life assets.

12.3 Benchmarking

The investigation into benchmarks for SunWater's Opex and Capex failed to identify any performance parameters, which could be equitably used to compare SunWater with other Rural Water Supplies. The accounting practices, types of schemes, climate, topography, nature of the customer base, water management practices and yield capacities of the systems are variable across Australia and could not be used unless a fair comparison of similar data became available.

12.4 Recommendations

The following recommendations for adjustments to Direct Opex and Capex, and potential efficiency gain for the 2011-2016 Price Path are set out below.

12.4.1 Escalation Factors

Over all the schemes in the Toowoomba Cluster, SunWater have escalated cost for labour at 4% in line with an Enterprise Bargaining Agreement until June 2012. Subsequent to this period labour cost are escalated at CPI. Electricity is escalated at CPI. Contractors and materials have been escalated at 4%.

The Queensland Competition Authority has ruled, in previous price setting reviews that escalations are to be set at CPI. GHD has considered SunWater's arguments for a different approach and makes the following recommendations.

Labour

SunWater provided a Background Paper to the Authority titled "Cost Forecast Assumptions" which provides some discussion around escalation factors. Labour has been escalated at their Enterprise Bargain Agreement until 2012 and then reverts to inflation. GHD considers that this is a reasonable approach.

Contractors and Materials

Contractors and Materials are escalated at 4%, which SunWater argues is a conservative escalation. GHD is unable to see the rationale for the development of the 4% escalation and is therefore not able to validate why this is a conservative escalation.

Electricity

SunWater has escalated Electricity at CPI, and have acknowledged the Benchmark Retail Cost Index (BRCI). However, SunWater contends that the BRCI is not stable or consistent enough to use as an escalator and that, adjustments would need to be made annually or at the next price-setting period. This argument could be applied to any number of indices utilised by SunWater or any other regulated body in a price setting process. GHD would not support this approach and considers that this is neither prudent nor efficient.

GHD concluded that the above information provided by SunWater as the basis for the cost escalations for Direct Opex is not sufficient, as it does not provide the rationale for the development of the escalators. A number of indices are provided as evidence for the selection of the cost drivers, however the arguments for the application of these drivers are not well defined. Therefore, GHD cannot find these escalation factors prudent or efficient.

12.4.2 Chinchilla Weir Water Supply Scheme

Operational Expenditure

No recommendations for adjustment to Direct Opex over the 2011-2016 Price Path are made for this scheme.

Capital Expenditure

No recommendations for adjustment to Capex over the 2011-2016 Price Path are made for this scheme.

Potential Efficiency Gains

Efficiency gains for this scheme could be achieved with the implementation of electronic water ordering through Integrated Voice Recognition (IVR) or the SunWater Online solution. However, SunWater have indicated that customers in this scheme are not willing to pay to implement these services and, considering the low volumes allocated to this scheme, SunWater's position is considered reasonable.

No other Direct Opex or Capex efficiency gains are recommended for this scheme.

12.4.3 Cunnamulla Water Supply Scheme

Operational Expenditure

No recommendations for adjustment to Direct Opex over the 2011-2016 Price Path are made for this scheme.

Capital Expenditure

No recommendations for adjustment to Capex over the 2011-2016 Price Path are made for this scheme.

Potential Efficiency Gains

Efficiency gains for this scheme could be achieved with the implementation of electronic water ordering through Integrated Voice Recognition (IVR) or the SunWater Online solution. However, SunWater have indicated that customers in this scheme are not willing to pay for these services and, considering the low volumes allocated to this scheme, SunWater's position is considered reasonable.

No other Direct Opex or Capex efficiency gains are recommended for this scheme.

12.4.4 Macintyre Brook Water Supply Scheme

Operational Expenditure

No specific recommendations for adjustments to Direct Opex over the 2011-2016 Price Path are made for this scheme.

However, GHD would recommend that the process issues identified by Stakeholders in regards to the Indirect and Overhead costs should be addressed by SunWater.

Capital Expenditure

No specific recommendations for adjustment to Capex over the 2011-2016 Price Path are made for this scheme.

However, whether the cost over-runs on the Whetstone Weir rehabilitation project should be included in the opening renewals balance is a matter for consideration by the Authority.

Potential Efficiency Gains

GHD would recommend that SunWater negotiate with the customers and the water supply regulator to have monthly meter reading entered via the SunWater Online Customer account and reduce their own meter reading routine to quarterly. This would be a substantial Direct Opex efficiency gain.

While there were no opportunities for Capex efficiency gains evident in the forward works program, the rising cost of the Whetstone Weir replacement project during project delivery indicates that SunWater's options analysis process was not followed at the planning stage.

GHD would recommend that SunWater's project procurement procedures be reviewed to ensure project options and cost benefits are undertaken before commencing projects that require significant capital expenditure. GHD would also recommend that SunWater consult regularly with the irrigators on their expenditure plans and project delivery procedures for larger projects.

12.4.5 Maranoa River Water Supply Scheme

Operational Expenditure

No recommendations for adjustment to Direct Opex over the 2011-2016 Price Path are made for this scheme.

Capital Expenditure

No recommendations for adjustment to Capex over the 2011-2016 Price Path are made for this scheme.

Potential Efficiency Gains

No Direct Opex or Capex efficiency gains are recommended for this scheme.

12.4.6 St George Water Supply Scheme

Operational Expenditure

No recommendations for adjustment to Direct Opex over the 2011-2016 Price Path are made for this scheme.

Capital Expenditure

GHD would recommend SunWater adjust projected Capex expenditure for Jack Taylor Weir to include the repairs to the balustrades and revise the cost estimate for the restoration of the wing walls and flood damaged rock pitching.

No other recommendations for adjustment to Capex over the 2011-2016 Price Path are made for this scheme.

Potential Efficiency Gains

GHD would recommend that SunWater negotiate with the customers and the water supply regulator to have monthly meter readings entered via the SunWater Online Customer account and reduce their own meter reading routine to quarterly. This would be a substantial Direct Opex efficiency gain.

No other Direct Opex or Capex efficiency gains are recommended for this scheme.

12.4.7 St George Water Distribution Scheme

Operational Expenditure

No recommendations for adjustment to Direct Opex over the 2011-2016 Price Path are made for this scheme.

Capital Expenditure

GHD would recommend SunWater review of the design option for the St George Pump Station Refurbishment Project as discussed in detail in the Capex Review of this scheme.

GHD would recommend SunWater review of the need for retention of the Buckinbah Pump Station as discussed in detail in the Capex Review of this scheme.

No other recommendations for adjustment to Capex over the 2011-2016 Price Path are made for this scheme.

Potential Efficiency Gains

GHD acknowledges SunWater's decision to dispose of heavy plant equipment in the region, as its utilisation is not sufficient to justify its retention. The financial gain is a reduction of servicing and maintenance costs and a substantial reduction in capital being tied up in depreciating assets.

GHD would recommend that SunWater negotiate with the customers and the water supply regulator to have monthly meter readings entered via the SunWater Online Customer account and reduce their own meter reading routine to quarterly. This would be a substantial Direct Opex efficiency gain.

No other Direct Opex or Capex efficiency gains are recommended for this scheme.

12.4.8 Upper Condamine Water Supply Scheme

Operational Expenditure

No recommendations for adjustment to Direct Opex over the 2011-2016 Price Path are made for this scheme.

Capital Expenditure

GHD would recommend that spreading the renewals expenditure would reduce the impact of interest costs on the annuity balances and therefore on the rolling annuity.

No other recommendations for adjustment to Capex over the 2011-2016 Price Path are made for this scheme.

Potential Efficiency Gains

GHD would recommend SunWater rationalise the number of water products available to customers of this scheme and reduce the complexity in management of the Upper Condamine Water Supply Scheme. This would provide some efficiency gains.

GHD acknowledges SunWater's comments that, although the current complexity is a driver of Direct and Indirect Opex cost for the scheme, it is unlikely that the customers would support SunWater's rationalising the number of water products customer have available to them.

GHD would recommend SunWater implement an automated system to collate customer water orders. The current process of customers having to make water orders via manual process is considered inefficient. While GHD acknowledges the complexity of the variety of water products currently available to SunWater's customers, GHD would consider that an automated online system for the more commonly used products would provide some efficiency gains.

12.4.9 Opex and Capex Methodologies

The review of the Cluster 1 (Toowoomba) water schemes concluded that SunWater has adopted effective management, planning and procurement processes, which have been generally implemented. The processes are effective and prudent.

12.4.10 Capex Program Review

The review of the Capex forward works program for the schemes concluded that the program of works was based on a sound decision process and should result in efficient and prudent expenditures over the next five years. The review of the past five years showed that some projects had not been managed effectively and cost or scope controls my not have been effective.

12.4.11 Asset Lives

Many of SunWater's assets, such as the dams and weirs, and relatively young and have long effective lives of up to 200 years. The majority of the assets are not due for replacement within the next 100 years and their replacement costs do not have any impact on the 25 year annuity timeframe.

12.4.12 Project Justification and Cost Benefit

SunWater did not provide any clear evidence that cost benefit and options analysis was completed for all projects, regardless of complexity or cost. GHD considers that several projects completed over the past five years and programmed within the next five years would benefit from a simple cost benefit and options analysis review.

12.4.13 Cost Estimating and Controls

The Whetstone Weir project demonstrates that SunWater's past project scope and cost control processes were ineffective. In addition, the lack of engagement with the irrigators in the volatile project planning process resulted in negative attitudes and options on SunWater's capabilities to manage projects.

12.5 Conclusions Summary

The Opex and Capex review of SunWater NSPs concludes the following.

1. SunWater has valid and sound methodologies for developing their forward cost estimates, but the information and data provided by SunWater did not allow a full evaluation of their forward costs. Additional requests for information of sufficient detail for proper evaluation were made of SunWater by the Authority on behalf of all reviewing consultants. Unfortunately, provision of the required information was not timely, not in sufficient detail and hence, hindered the evaluation process.
2. SunWater's escalation factors for labour cost are considered prudent and efficient.
3. SunWater's escalation factor of 4% for contractors and materials could not be justified.
4. SunWater has escalated Electricity at CPI, in lieu of Benchmark Retail Cost Index (BRCI), citing that the BRCI is not stable or consistent enough to use as an escalator and that adjustment would be needed annually or at the next price-setting period. SunWater's argument does not provide sufficient justifiable reason for GHD to accept this approach.
5. Chinchilla Weir Water Supply Scheme – GHD would not recommend any adjustment to Direct Opex or Capex of the 2011-2016 Price Path, however some efficiency gains could be made by implementing electronic water ordering.
6. Cunnamulla Water Supply Scheme – GHD would not recommend any adjustment to Direct Opex or Capex of the 2011-2016 Price Path, however some efficiency gains could be made by implementing electronic water ordering.
7. Macintyre Brook Water Supply Scheme – GHD would not recommend any specific adjustment to Direct Opex or Capex of the 2011-2016 Price Path. Whether the cost over-runs on the Whetstone Weir rehabilitation project should be included in the opening renewals balance is referred to the Authority for consideration. GHD would recommend efficiency gains could be achieved by having customers read and enter their meter readings via the SunWater Online Customer accounts and SunWater reduce their own meter reading routine to quarterly.
8. Maranoa River Water Supply Scheme – GHD would not recommend any adjustment to Direct Opex or Capex of the 2011-2016 Price Path, nor were any efficiency gains identified.
9. St George Water Supply Scheme - GHD would recommend SunWater adjust projected Capex expenditure for Jack Taylor Weir to include the repairs to the balustrades and revise the cost estimate for the restoration of the wing walls and flood damaged rock pitching. GHD would not recommend any other adjustment to Direct Opex or Capex of the 2011-2016 Price Path.
   GHD would recommend efficiency gains could be achieved by having customers read and enter their meter readings via the SunWater Online Customer accounts and SunWater reduce their own meter reading routine to quarterly.
10. St George Water Distribution Scheme - GHD would recommend SunWater review of the design option for the St George Pump Station Refurbishment Project and review of the need for retention of the Buckinbah Pump Station. GHD would not recommend any other adjustment to Direct Opex or Capex of the 2011-2016 Price Path. GHD would recommend efficiency gains could be achieved by having customers read and enter their meter readings via the SunWater Online Customer accounts and SunWater reduce their own meter reading routine to quarterly.

11. Upper Condamine Water Supply Scheme – GHD would recommend that spreading the renewals expenditure would reduce the impact of interest costs on the annuity balances and therefore on the rolling annuity. GHD would not recommend any other adjustment to Direct Opex or Capex of the 2011-2016 Price Path. GHD would recommend efficiency gains could be achieved by rationalising the number of water products available to customers and implementing an automated system to collate customer water orders for the more commonly used products as an alternative to SunWater's current manual water ordering system..
12. Opportunities exist in most of the water supply schemes to reduce Direct Opex costs, refine future project Capex costs and implement efficiency gains.

13. Data Sources and References

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SunWater Limited

Undated. Presentation to Irrigators on Whetstone Weir

February 2011. Supplementary Background Paper – Customer involvement in renewals expenditure

February 2011. Supplementary Submission – Bulk water price differentiation

January 2011. Background Paper - Asset Management Planning Methodology

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January 2011. Network Service Plan - Cunnamulla Water Supply Scheme

January 2011. Network Service Plan - Macintyre Brook Water Supply Scheme

January 2011. Network Service Plan - Maranoa River Water Supply Scheme

January 2011. Network Service Plan - St George Water Supply Scheme

January 2011. Network Service Plan - St George Distribution System

January 2011. Network Service Plan - Upper Condamine Water Supply Scheme

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05 January 2009. Asset Condition Assessment. Users Manual. Version 5.2

16 February 2007. Asset Risk Assessment. Users Manual. Version 5.0

07 February 2007. Asset Refurbishment Planning: Methodology for Condition Assessment of Assets. Standard No AM.21. Revision 1

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April 2006. Statewide Irrigation Pricing Working Group. Tier 1 Report

January 2006. Asset Management Policy, Standard No AM.01. Revision 1

June 2005. Tier 1 Working Paper No. 10, Refurbishments and Augmentations

May 2005. Report Whetstone Weir. Structural Stability Analysis and Inspection. Ref: G – 50005-01-09-03

February 2004. Asset Management Policy, Standard No: Am.01, Revision 1

Meetings and Consultation

15th March 2011 - SunWater Asset Management (Caroline Hurst), 2007 to 2011 Renewal Projects review.

1st and 2nd March 2011 – Site Inspections with Peter Collett (SunWater).

2nd March 2011 – St George Irrigators Stakeholder Meeting attended by: Scott Armstrong, Ian Brimblecombe, John Knights, Hamish McIntyre, Rob Jakins, Bill Knights, David Moon, Cleave Rogan, Glenn Rogan, Peter Collette (SunWater), and Peter Waters (SunWater).

1st March 2011 – Macintyre Irrigators Stakeholder Meeting, attended by: Anthony Doljanin, Rick McDougal, and Peter Collett (SunWater).

24th February 2011 – Stakeholder and QCA Meeting.

16th February 2011 – SunWater Asset Management (Caroline Hurst), Asset Management Processes and 2012 to 2016 Renewal Projects review.

14th February 2011 –SunWater's Systems (Phil Miller, Peter McGahan), Financial Model, Work Management System and SAP PM.

8th February 2011 – Kick off meeting with QCA.

2nd February 2011 - Review of Opex and Capex Initial Meeting with SunWater.

Appendix A

Scheme Maps

Chinchilla Weir WSS

Cunnamulla WSS

Macintyre Brook WSS

Maranoa River WSS

St George WSS

St George Distribution System

Upper Condamine WSS

Document: Z:\data\corporate_data\water_supply_schemes\chinchilla\drawings\arcinfo\system-layout-a3.mxd
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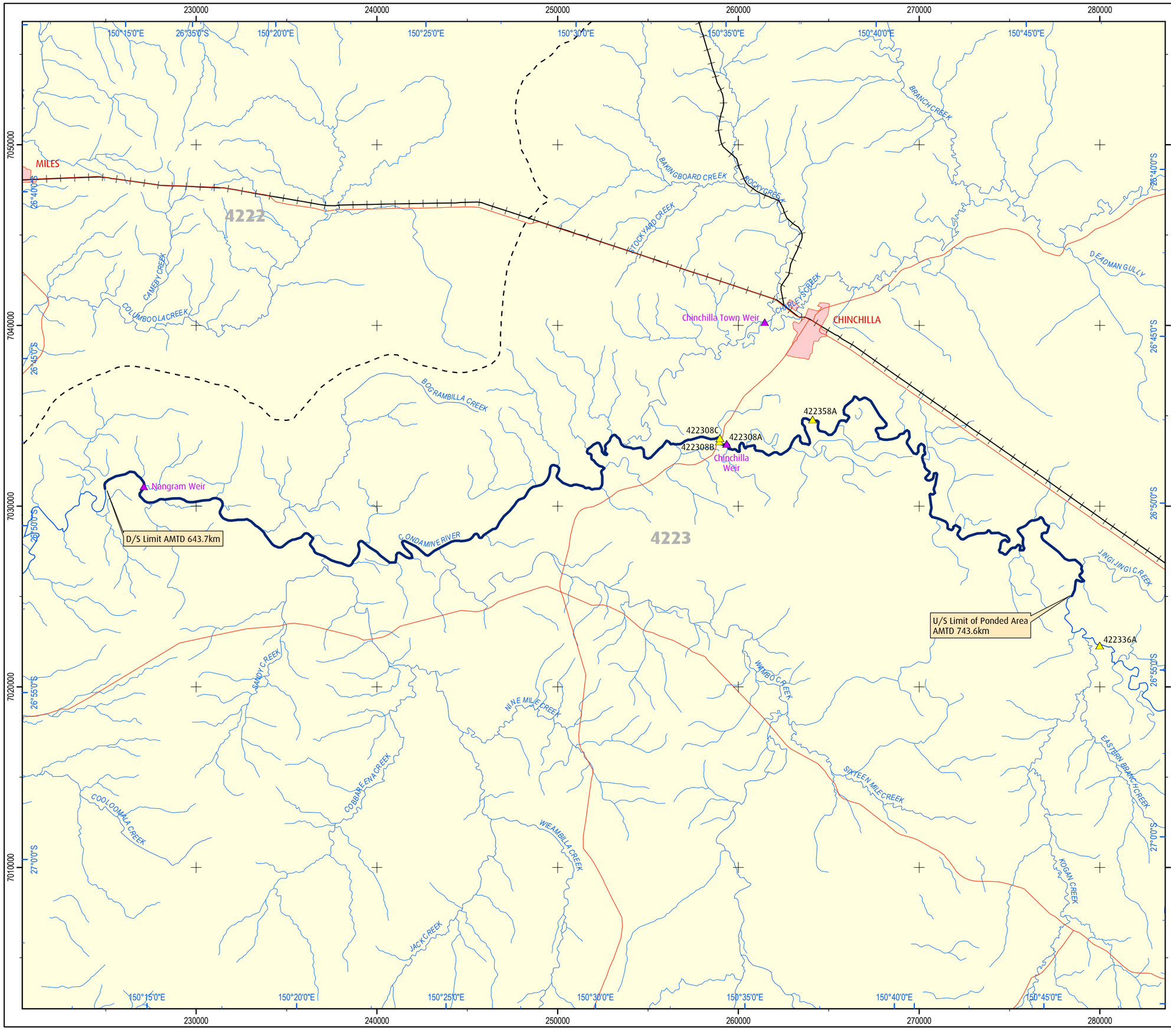
Map Produced By:
SunWater, Engineering Services
PMB 5013, Ayr, QLD, 4807
Ph. 47830555, Fax 47836372



LOCALITY PLAN

N
W E
S

LEGEND

- Weir
- Stream Gauging Station
- Water Quality Station
- Water Supply Scheme
- Sub-Basin Boundary
- Major Roads
- Railway
- Gully
- Creek
- River
- Urban Area

NOTES

1. Stream Gauging and Water Quality Stations shown do not necessarily belong to SunWater.

MAP INFORMATION

Black tics indicate 10,000m intervals of the Universal Transverse Mercator Grid, Zone 56 (Mapping Grid of Australia), Australian National Spheroid. Blue tics indicate Latitude and Longitudinal at 5 minute intervals. Coordinate System: Geocentric Datum of Australia, Transverse Mercator projection.

SCALE 1:200,000 (Before Reduction A3)

0 1 2 4 6 8 10 km

PRELIMINARY PLAN

CHINCHILLA WEIR WATER SUPPLY SCHEME

SYSTEM LAYOUT
AUGUST 2002

SunWater
Engineering Services
www.sunwater.com.au

Prepared	*IDH*	Checked		Approved	
Revision	Date	Remarks			
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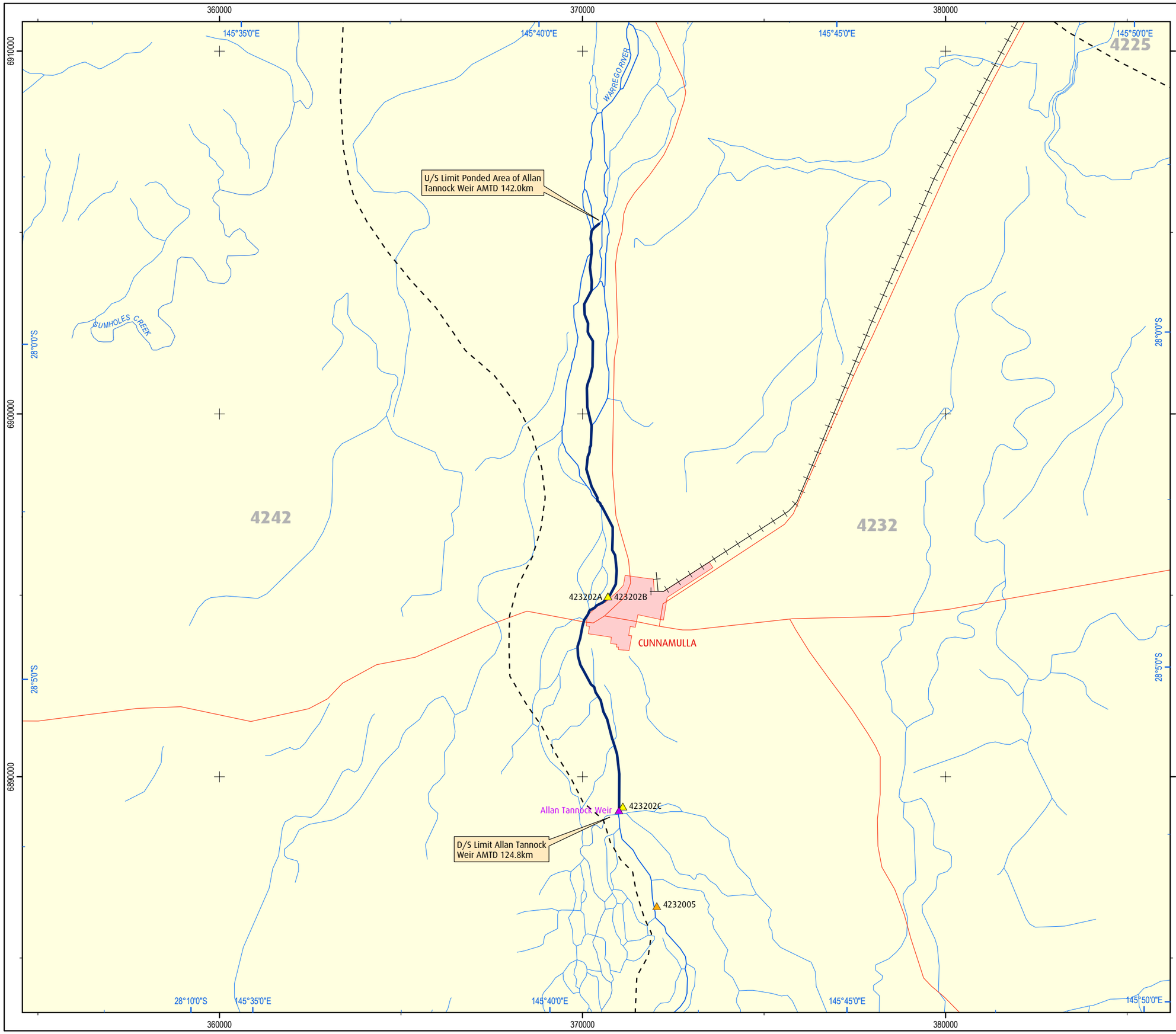

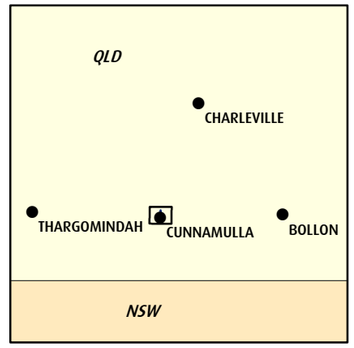

LOCALITY PLAN

N
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LEGEND

- Weir
- Stream Gauging Station
- Water Quality Station
- Water Supply Scheme
- Sub-Basin Boundary
- Major Roads
- Railway
- Gully
- Creek
- River
- Urban Area

NOTES

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MAP INFORMATION

Black tics indicate 10,000m intervals of the Universal Transverse Mercator Grid, Zone 55 (Mapping Grid of Australia), Australian National Spheroid.
Blue tics indicate Latitude and Longitudinal at 5 minute intervals.
Coordinate System: Geocentric Datum of Australia, Transverse Mercator projection.

SCALE 1:100,000 (Before Reduction A3)

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PRELIMINARY PLAN

CUNNAMULLA WEIR WATER SUPPLY SCHEME

SYSTEM LAYOUT
AUGUST 2002

SunWater
Engineering Services
www.sunwater.com.au

Prepared	*IDH*	Checked		Approved	
Revision	Date	Remarks			
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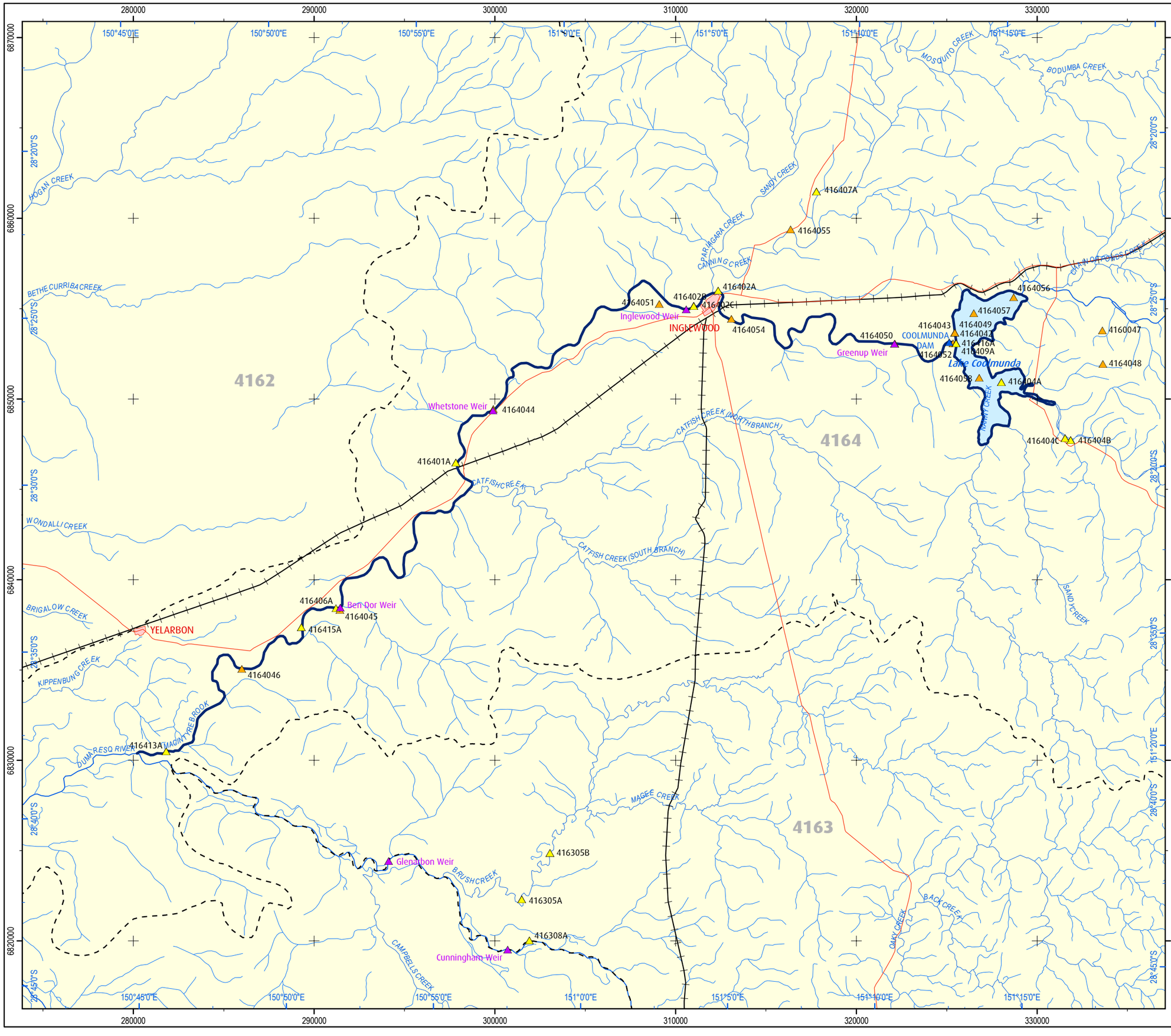

LOCALITY PLAN

N
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LEGEND

- Dam
- Weir
- Stream Gauging Station
- Water Quality Station
- Water Supply Scheme
- Sub-Basin Boundary
- Major Roads
- Railway
- Gully
- Creek
- River
- Urban Area

NOTES

1. Stream Gauging and Water Quality Stations shown do not necessarily belong to SunWater.

MAP INFORMATION

Black tics indicate 10,000m intervals of the Universal Transverse Mercator Grid, Zone 56 (Mapping Grid of Australia), Australian National Spheroid. Blue tics indicate Latitude and Longitudinal at 5 minute intervals. Coordinate System: Geocentric Datum of Australia, Transverse Mercator projection.

SCALE 1:200,000 (Before Reduction A3)

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PRELIMINARY PLAN

MACINTYRE BROOK WATER SUPPLY SCHEME

SYSTEM LAYOUT
AUGUST 2002

SunWater
Engineering Services
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Prepared	IDH	Checked		Approved	
Revision	Date	Remarks			
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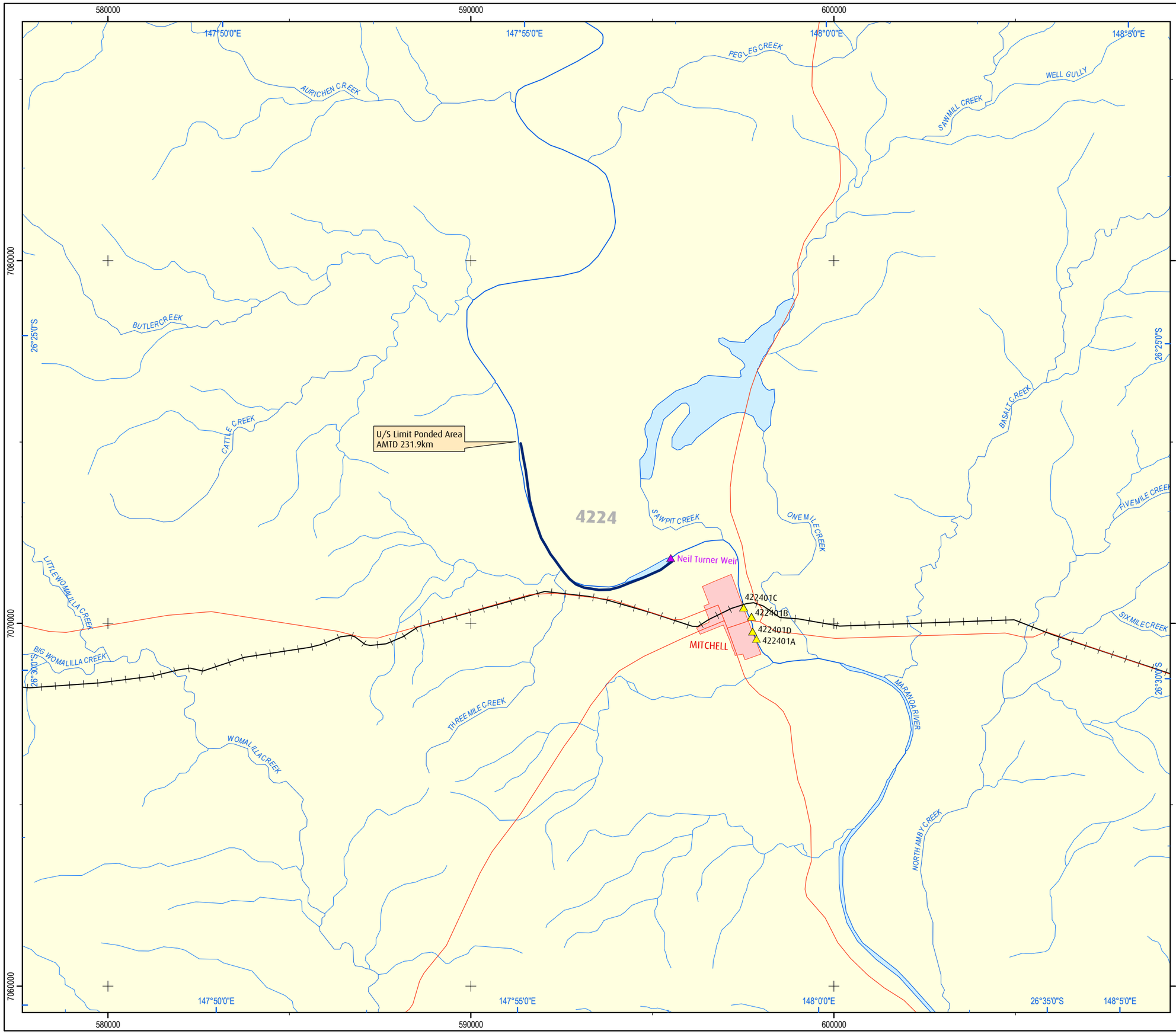

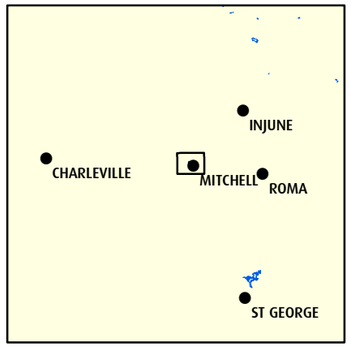

LOCALITY PLAN

N
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LEGEND

- Weir
- Stream Gauging Station
- Water Quality Station
- Water Supply Scheme
- Sub-Basin Boundary
- Major Roads
- Railway
- Gully
- Creek
- River
- Urban Area

NOTES

1. Stream Gauging and Water Quality Stations shown do not necessarily belong to SunWater.

MAP INFORMATION

Black tics indicate 10,000m intervals of the Universal Transverse Mercator Grid, Zone 55 (Mapping Grid of Australia), Australian National Spheroid. Blue tics indicate Latitude and Longitudinal at 5 minute intervals. Coordinate System: Geocentric Datum of Australia, Transverse Mercator projection.

SCALE 1:175,000 (Before Reduction A3)

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PRELIMINARY PLAN

MARANOA WATER SUPPLY SCHEME

SYSTEM LAYOUT
AUGUST 2002

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Prepared	*IDH*	Checked		Approved	
Revision	Date	Remarks			
Drawing Number	A3-??????				

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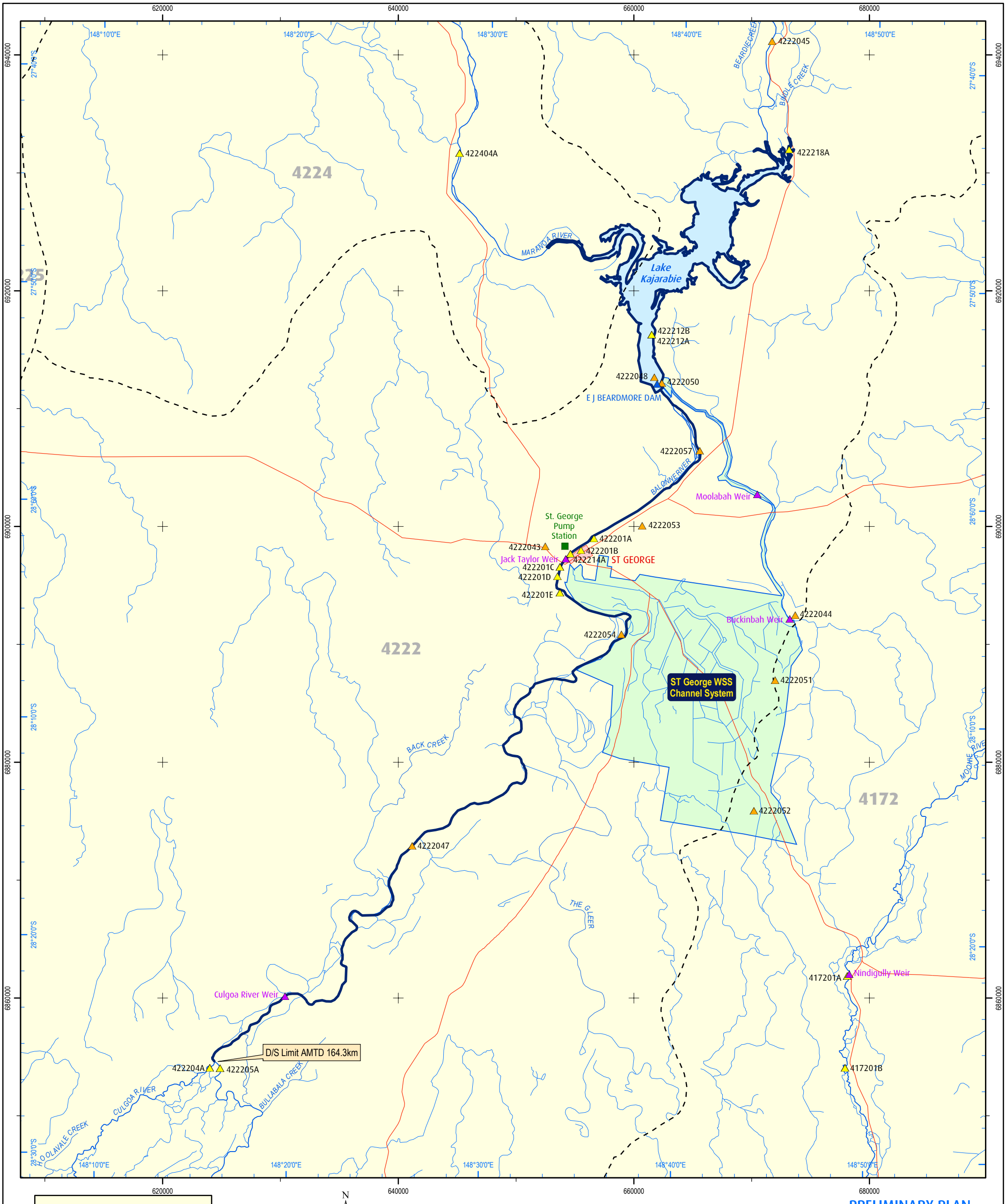

LOCALITY PLAN

N
W E
S

LEGEND

- Dam
- Weir
- Stream Gauging Station
- Water Quality Station
- Pump Station
- Water Supply Scheme
- Sub-Basin Boundary
- Major Roads
- Railway
- Gully
- Creek
- River
- Urban Area
- Lakes

SCALE 1:300,000 (Before Reduction A3)

0 1.5 3 6 9 12 15 km

NOTES

1. Stream Gauging and Water Quality Stations shown do not necessarily belong to SunWater.

MAP INFORMATION

Black tics indicate 20,000m intervals of the Universal Transverse Mercator Grid, Zone 55 (Mapping Grid of Australia), Australian National Spheroid.
Blue tics indicate Latitude and Longitudinal at 10 minute intervals.
Coordinate System: Geocentric Datum of Australia, Transverse Mercator projection.

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PRELIMINARY PLAN

ST GEORGE WATER SUPPLY SCHEME

SYSTEM LAYOUT OCTOBER 2002

Prepared	*IDH*	Checked		Approved	
Revision	Date	Remarks			
Drawing Number	A3-??????				

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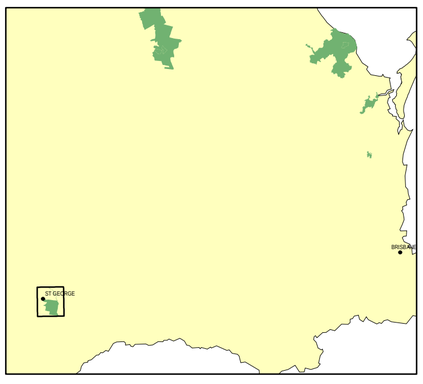
E J Beardmore Dam
Moolabah Weir
Jack Taylor Weir
Buckinbah Weir
ST GEORGE MAIN CHANNEL
BUCKINBAH MAIN CHANNEL
THURAGGI INVERSION CHANNEL
CHANNEL 1
CHANNEL 2
CHANNEL B1
CHANNEL 3
CHANNEL 4
CHANNEL 5
CHANNEL 6
CHANNEL 7
CHANNEL 2/1
CHANNEL 2/2
CHANNEL B2/3
CHANNEL B2
DRAIN 1
DRAIN 2
DRAIN 2/1
DRAIN 2/1/1
DRAIN 3/1
DRAIN 3/2
DRAIN 3/4
DRAIN 3
DRAIN 4/1
DRAIN 4/1/1
DRAIN 4/2
DRAIN 4/3
DRAIN 35

650000 655000 660000 665000 670000 675000 680000
148°35'0"E 148°40'0"E 148°45'0"E
27°54'60"S
28°0'0"S
28°5'0"S
28°10'0"S
28°15'0"S
6910000 6905000 6900000 6895000 6890000 6885000 6880000 6875000

SHIRE OF BALONNE



Legend

- Digital Cadastral Database
- Watercourses

SunWater Infrastructure

- Channel
- Drain
- St George Water Supply Scheme
- dam_weir

Scale 1:60 000 (before reduction)

1000 500 0 1000 2000 3000 4000 5000 Metres

NOTES

1. Digital Cadastral Database(DCDB) information current as at 18th January 2001.

MAP INFORMATION

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Latitude and Longitude values are shown in blue inside the neatline at minute intervals. Every fifth tic is labelled.
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Transverse Mercator projection.
Cartography by D. Watt, SunWater, Engineering Services, Ayr

ST GEORGE WATER SUPPLY SCHEME
SCHEME LAYOUT
MARCH 2001

Engineering Services
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320000 340000 360000 380000 400000

6960000 6940000 6920000 6900000 6880000

151°10'0"E 151°20'0"E 151°30'0"E 151°40'0"E 151°50'0"E 152°60'0"E

27°30'0"S 27°40'0"S 27°50'0"S 28°6'00"S 28°10'0"S

Tipton Weir
D/S Limit AMTD 10.0km
D/S Limit Cecil Plains Weir AMTD 891.1km
CECIL PLAINS
Cecil Plains Weir
422316A
422354A
422346A
422345A
422332A
422331A
4223079
422326A
LOCKYER CREEK DAM
143202B
143202A
143203C
143203B
HELIDON
TOOWOOMBA
4223080
4223076
4223078
143214A
Flagstone Creek Recharge Weir No2
4223074
1432
422324A
422322A
4223049
PITTSWORTH
CAMBOOYA
422349A
Lemon Tree Weir
422347B
422347A
U/S Limit Condamine River North Branch Outlet Yarramalong Pipeline AMTD 97.0km
Yarramalong Pump Station
Yarramalong Weir
422348A
422353A
422335A
4223018
422352A
NOBBY
4223
422323A
MILLMERRAN
4162
422307A
422334A
CLIFTON
4223059
422328A
422327A
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Talgai Weir
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422317B
4223102
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4223055
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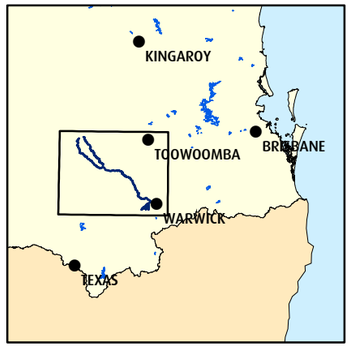
422315A
422305485
422315B
422310A
422310B
422310C
4223052
422395A
LESLIE DAM
4223056
4223058
WARWICK
4223057
4223075
Lake Leslie
4223071
422356A
422357A
4164

LOCKYER CREEK
GOWRIE CREEK
ROCKY CREEK
GATTON CREEK
SPRING CREEK
WESTBROOK CREEK
LINTHORPE CREEK
GILBERT GULLY
CRAWLERS CREEK
WILLIS CREEK
CONDAMINE RIVER
FOURTEEN MILE CREEK
HOPGSON CREEK
EMU CREEK
MATMA CREEK
BUDGEE CREEK
HONEYSUCKLE CREEK
WESTERN CREEK
LEONARD (BACK CREEK) GULLY
PADDYS CREEK
GRASSTREE CREEK
CANAL CREEK
KINGS CREEK
BORA CREEK
ROCKY CREEK
BACK CREEK
SANDY CREEK
SANDY GULLY
FRIDAY GULLY
REEDY CREEK
MIDDLE CREEK
THANE CREEK
BOOLA CREEK
GUNN CREEK (SOUTH BRANCH)
NICOLS CREEK
CATTLE CREEK
PARAGARA CREEK
MOSQUITO CREEK
BRANCH CREEK
SKUHLE CREEK
LAMBING CREEK
HUNTS GULLY CREEK
LAGOON CREEK
GREYMARE CREEK
BERGER CREEK
GLEN CREEK
SANDY GULLY
SPLIT YARD CREEK
GLENGALLAN CREEK
BACKWATER CREEK
DALRYMPLE CREEK
BANKS CREEK
OAKY CREEK
BODUMBA CREEK
MAIN TYRE BROOK



LOCALITY PLAN

N W E S

LEGEND

- Dam
- Weir
- Stream Gauging Station
- Water Quality Station
- Pump Station
- Water Supply Scheme
- Sub-Basin Boundary
- Major Roads
- Railway
- Gully
- Creek
- River
- Urban Area

NOTES

1. Stream Gauging and Water Quality Stations shown do not necessarily belong to SunWater.

MAP INFORMATION

Black tics indicate 10,000m intervals of the Universal Transverse Mercator Grid, Zone 56 (Mapping Grid of Australia), Australian National Spheroid. Blue tics indicate Latitude and Longitudinal at 5 minute intervals. Coordinate System: Geocentric Datum of Australia, Transverse Mercator projection.

SCALE 1:350,000 (Before Reduction A3)

0 1.5 3 6 9 12 15 km

PRELIMINARY PLAN

UPPER CONDAMINE WATER SUPPLY SCHEME

SYSTEM LAYOUT AUGUST 2002

SunWater
Engineering Services
www.sunwater.com.au

Prepared	IDH	Checked		Approved	
Revision	Date	Remarks			
Drawing Number	A3-??????				

Appendix B

SunWater Question Log

Date Submitted	Date Response Received	Format	Scheme	Question	Response
25/02/2011		Email	All	Could you also have the information that was agreed to be provided at the briefing with Phil Miller on Monday, 14th February urgently forwarded to me.	
25/02/2011	3/03/2011	Email	Chinchilla	Bulk water operating costs have averaged $88k pa over current price path. What efficiencies are being made to project costs of $68k pa for next price path? Pg6	2007 costs are high and influence the 5 year averge. The 2007 costs are before the implementation of the current Business Operating Model (BOM) . Pre BOM used a different indirect cost allocation method. 2007 cost are not indicative of ongoing costs. Forecast is based 2011 forecast. Note the level of indirect cost in 2007. See cost by expense type.
25/02/2011	3/03/2011	Email	Chinchilla	Why are only 71% of the operating costs are being allocated? Have to assume other 29% allocated to high priority customers? Pg7	Yes
25/02/2011	3/03/2011	Email	Chinchilla	Why are water orders only able to be made over phone?	This is the must efficient and cost effective method for this scheme given its geography and customer make up. Customer do not want and cannot pay for the implementation of internet or IVR services.
25/02/2011	3/03/2011	Email	Chinchilla	Please provide contract labour costs for Western Downs Regional Council to make releases so that we can make an assessment.	The cost is $200 per event (opening or closing valve). Occurs average 10 times per year with annual cost of $2,000. Other work is done by quote if required. It takes a SunWater staff person 5 hours round trip to open or close the valve.
25/02/2011	3/03/2011	Email	Cunnamulla	Bulk water operating costs have averaged $54k pa over current price path. What efficiencies are being made to project costs of $48k pa for next price path? Pg6	refer Chinchilla comment
25/02/2011	3/03/2011	Email	Cunnamulla	The NSP notes that the new or additional compliance requirements from the ROP have lead to increased compliance costs. Why the are costs estimated to be lower in new price path?	The cost of water quality monitoring generally has increased and are included in these costs.
25/02/2011	3/03/2011	Email	Cunnamulla	Why does this scheme have to prepare submissions and cost forecasts to the ACCC as well as QCA. Other schemes in this cluster make no mention of this requirement. Pg23	This is a requirement for all schemes situated in the Murray Darling Basin (MDB) which now falls under the Commonwealth Government Water ACT. The ACCC has powers under this act (refer ACCC web site) and SunWater must comply. The ACCC/MDB is mentioned in other schemes within this cluster.
25/02/2011	3/03/2011	Email	McIntyre Brook	In sections 98 and 99 of the ROP for McIntyre Brook Scheme certain conditions are set for the licence holder to conduct water balance reconciliations at a higher frequency. Can SunWater demonstrate that these conditions have been met to justify the daily process noted in the NSP?	Yes. It is a requirement under the ROP that a reconciliation is done atleast every 30 business days. Daily processing is done to keep information current.
25/02/2011	3/03/2011	Email	McIntyre Brook	How are water releases achieved? Is this a manual process or is it automated?	Manually
25/02/2011	3/03/2011	Email	McIntyre Brook	Meter replacement within 1 day. What size, type of meter? How often does this occur? Why 1 day response?	1 day response where meter is effecting the customer ability to take water. Meters vary in size and type (50mm to 300mm) depending on customer standard.
25/02/2011	3/03/2011	Email	McIntyre Brook	Explain the meter maintenance program.	Condition assessment of meters carried out every 3 years with a run to failure for intervening period. Meter failures or breakdowns are picked up during monthly meter readings.
25/02/2011	3/03/2011	Email	McIntyre Brook	Who reads the customer meters?	SunWater
25/02/2011	3/03/2011	Email	McIntyre Brook	Bulk water operating costs have averaged $950k pa over current price path. What efficiencies are being made to project costs of $899k pa for next price path? Pg6	$251k for contractors in 2007 of which $208k related to previously identified coding errors, costs going forward were established on the basis of this being known.
25/02/2011	3/03/2011	Email	McIntyre Brook	Dam safety upgrades are projected at $558k in 2015 and $5449k in 2016. What are these upgrades? Are they capex or opex? Pg6	These are capex, but are likely to be exclude from price and funded by Government. Upgrade is to comply with regulatory staandards for dam safety. See papers on QCA webs site.
25/02/2011	3/03/2011	Email	McIntyre Brook	Why can't customers in this scheme lodge trade applications online? Pg 16	Being a continuous share scheme customers can trade both cap and water. The changes required to the SWIMS system to perform these transactions online are considered to costly for number of transactions handled in any one year. This requirement will be looked at during the SWIMS replacement project and if a cost benefit exists to enable online applications this business requirement will be included.

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25/02/2011	3/03/2011	Email	McIntyre Brook	What percentage on the Service Managers time is allocated to this scheme. Pg 19	Service Manager's time is allocated as an indirect cost therefore he is apportioned in proportion to direct labour applied to each of the schemes in this cluster.
25/02/2011	3/03/2011	Email	Maranoa	How are the customer water releases achieved?	The customers are on the weir pond.
25/02/2011	3/03/2011	Email	Maranoa	Can you explain the $51k Contractor expenditure in 2009?	There were a number of schedule corrective maintenance works at the Weir i.e repair rock protection mattress, place bedding sand over rock protection mattress, and repair construction joints
25/02/2011	3/03/2011	Email	Maranoa	Can you explain the increase in average labour actual expenditure of $4500 (2007-2010) to forecast expenditure of $8000 (2011-2016) in the NSP?	SunWater staff will perform all works related to this service contract instead of utilised commercial contractors (commercial contractors costs have been reduced)
25/02/2011	3/03/2011	Email	Maranoa	For the previous price path, can you explain the $483k forecast in relation to the actual expenditure of only $206k. Why was the forecast so high?	Not sure what is meant here?
25/02/2011	3/03/2011	Email	St George	SLMP indicates improvements required to metering. When was this first identified? What are you doing about it? Will the costs be OPEX or CAPEX? Is this not a Capital Investigation program? (page 23)	First identified in SLMP in 2007. SunWater waiting for the State to implement regulation for metering standard inline with the National Water Initiative. It will be CAPEX and will involve replacing dethridge wheels with another type of water meter that meets the standard.
25/02/2011	3/03/2011	Email	St George	Table 4-3 Materials and Contractor costs have been significant between 2007 and 2010. There is a significant allocation for 2011-16. Explain and justify for both periods.	2007-2010 Material costs was high between 2008-2010 due to $52k Fuel & oil costs for low level pump costs (one off) and $50k for sale of channel harvesting water costs was budgeted in St George water supply instead of St George Distribution, whilst $50k commercial contractors increase for 2011-2016 due to weed control contractor being utilised instead of SunWater staff.
25/02/2011	3/03/2011	Email	St George	Electricity costs have escalated from $8k in 2007 to $55k in 2011. What has been the driver for the increase in cost?. (Page 28)	Data shows electricity going from 23K to 42K across the period. Not sure where 8-55 comes from?
25/02/2011	3/03/2011	Email	St George	Can you explain the significant increase in labour for the 2010 period.	The significant increase in labour for 2010 compared to 2009 in St George Supply due to coding errors, $76k of activity - 01-05 and $41k of activity -03-01 were incorrectly booked to St George Distribution instead of water supply.
25/02/2011	3/03/2011	Email	Upper Condamine	Can you explain the $98k electricity expenditure in the 2008 actual?	The 2008 high electricity costs due to high water allocation deliveries and other water deliveries (credit water, risk A & river harvesting - 29,541ML) in the North Branch which required pumping water from river to North branch (electricity for Pampas via brookstead was approximately $67k).
25/02/2011	3/03/2011	Email	Upper Condamine	Are IVR or Online systems available to customers to order water?	No - IVR and Online water ordering is not available. Upper Condamine has several products that can be available at the same time and this would require significant changes to the system. It is not considered cost effective to upgrade the system. Customers utilise answering machines, fax or speak directly with the operators.
25/02/2011	3/03/2011	Email	Upper Condamine	Please confirm that meter readings are completed quarterly not monthly as stated in the NSP.	Confirmed. This is drafting error in the Upper Condamine NSP. The cost have been forecast based on Quarterly meter reading.
8/03/2011	10/03/2011	Email	Upper Condamine	Is the increased pumping requirement on going and as such the reason for the increase of electricity costs from $8k to the forecast $55k?	Yes - Upper Condamine electricity has been based on projected usage within the pumped section - see page 28 of the NSP and SunWater's supplementary paper on electricity
8/03/2011	10/03/2011	Email	St George	Has the SLMP been approved? Does the action plan in the SLMP note the delay in meter replacement? Have you done any economic study of the potential revenue impacts of meter replacement in the St George Distribution Scheme? If there is an economic study please provide a copy.	Yes The SLMP was approved by DERM - 11 May 2008. Any actions and expenditure dependent on obtaining Commonwealth grant funding under a healthy headwaters initiative which did not eventuate and on resolution of the DERM/NWI metering policy. There have been no economic studies made for St George of potential revenue impact due to meter replacement. Meter replacement presently are only for failed meters. All others pending DERM Policy requiring meters to be upgraded to the new NWI standards. The DERM policy requirement is developing, refer to separate document - copy of recent correspondence from DERM indicating all meters need to meet NWI standard by 2020. We are discussing the implications of this with QCA. Each NSP has a preliminary estimate of the costs to upgrade, (refer St George Distribution p 33 as an example) where the issue is flagged as a risk, but no costs have been included in the NSP forecasts.

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8/03/2011	10/03/2011	Email	Maranoa	Using the Tier 1 report to calculate 2007-2010 period forecast, the sum of the forecast OPEX equates top $483k. For the same period, the sum of actual OPEX spend equates to $206k. Both numbers are total OPEX (i.e. including Operational Cost with Overheads and Indirect as we are not able to separate the costs for the previous period). Please explain the reasons for the difference. What did not occur that was forecast to occur? Please provide any justifications for the non-spend.	SunWater has implemented major business structure and process reforms to reduce the level of overhead and indirect costs allocated to the scheme, and this is reflected in comparison with 2006 IPR forecasts.
8/03/2011	10/03/2011	Email	All	Could you also please provide the list of projects, and their cost forecasts, that were planned to occur under the asset refurbishment annuity for the 2006/07-20010/11 price path. Currently we have the list of projects and expenditures that were actually undertaken, but we also require the details of those that were planned. This information is required for the following schemes: 1. Chinchilla Weir WSS 2. Cunnamulla WSS 3. Macintyre Brook WSS 4. Maranoa WSS 5. St George WSS 6. St George Distribution 7. Upper Condamine WSS	Recieved: Doc#1044914 - Notification of State Implementation Plan for Non-Urban Water Metering.PDF Unfortunately the data that you have requested regarding the 2006-11 renewals projects is not available. SunWater's asset refurbishment program operates from a live database, and the data set you have requested is not stored in the system. If I understand the thinking behind your question correctly, you appear to be seeking to compare the planned renewals program for the 2006-2011 period against the actual works completed during the period. The purpose of which would seem to be to assess the efficiency of the plan, or to test whether the work was completed. If this is the intention then I have to advise that to adopt such an approach is to misunderstand the nature of the refurbishment planning process and the purpose of the renewal annuity. SunWater's Asset Planning Methodology Paper sets out in some detail our approach to the ongoing planning for refurbishment. From this paper you will note that the 25 year program is developed based on standard lives, and standard work programs. It is not, and never will be a capital works program. The actual refurbishment work undertaken each year is based solely on the parameters of condition, risk, and service delivery requirements of the assets. Accordingly, the database is updated daily to reflect to current condition of the assets and the actual work required. The renewals annuity is a funding strategy designed to provide 3 things. Firstly it provides a smoothing mechanism to the process of price setting to avoid price shocks that would otherwise occur as the refurbishment works are delivered. Secondly, it is a mechanism to ensure intergenerational equity between users. The assets being managed are very long lived, and they need to be serviceable for the long term, spanning several generations of users. The use of the annuity ensures that past, present and future generations contribute in an equitable manner. More reading on this concept is available by reviewing the SCARM principles for pricing in rural water. Finally, the third and very important feature of the annuity is the maintenance of an ongoing balance. This feature ensures that only the jobs that need to be done actually are, and at the same time ensures that the asset owner is incentivised to ensure that asset serviceability is maintained. As I understand it, the role of GHD in the opex and capex review is to assess the asset management systems going forward in terms of will they maintain the service potential of the assets and are they prudent given the systematic approach being taken. And for past expenditure, have we maintained the service potential of the assets and can expenditure be justified in terms of a compliance requirement and/or maintenance of long term service potential. I hope that this satisfies your enquiry, but I am happy to discuss further. Your other questions are answered in the attached sheet. Please note the developments around meter upgrade compliance costs as reference in our response to your St George SLMP questions. A copy of recent correspondence from DERM relating to this issue is attached. We are discussing the implication of this with the QCA.

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10/03/2011	14/03/2011	Email	St George Distribution	Could you please also explain why there is a significant increase in Materials costs in 2010 for the St George Distribution System. The cost increases from $130,000 in 2009 to $253,00 in 2010, while the forecasts for the coming period are much lower.	This is mainly due to the installation and operating costs of low level diesel pumps installed in 2010 in response to requests from customers to pump dead storage from Beardmore dam into the distribution system during prolonged drought. Also, in the forward years material costs are lower because in 2011 we opted to use contract services for some weed control and therefore do not need to purchase materials.
15/03/2011	15/03/2011	Verbal / Email	All	Screen Prints for Renewals	Recieved: LESLIE DAM.doc
	1/04/2011	Verbal / Email	All		Recieved: Extract LBC Data Conversion down to sub activity.xls The attached file has Preventative Maintenance, Corrective Maintenance and Operations split by sub-activity. While the data still reconciles to the NSP data, the extra level of detail is revealing some historical coding anomalies which mean the data should be interpreted with some caution at this lower level of detail. Particular points to note include: There are examples of coding to the wrong operating sub-activity 2007 has the majority of anomalies because many expenses were retrospectively re-categorised to fit into the Business Operating Model structure and this wasn't a 100% precise process While some sub-activity coding is incorrect, the activity coding is generally correct There are some differences in sub-activity coding conventions between service contracts, however coding within a service contract will be consistent over time

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