Queensland Competition Authority

Review of SunWater's Network Service Plans - Cluster 4

Review of NSPs

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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. On 1 July 2008 a number of WSSs were transferred to Seqwater.

Ministerial Direction

The Premier and the Treasurer (the Ministers) originally 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:

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

These costs, along with some background supporting details are outlined in Network Service Plans (NSP's) for each of the Water Supply Schemes. The NSP's contain SunWater's estimates of the costs to be shared by irrigators and recovered in irrigation prices.

1.2 Purpose of this 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.

Independent consultants have been engaged to review the prudency and efficiency of the irrigator's share of costs and Arup has been assigned Cluster 4 as outlined below.

Cluster Designation	Water Supply Schemes
1 (Toowoomba)	Cunnamulla, Maranoa River, St.George, Chinchilla Weir, Macintyre Brook, upper Condamine
2 (Bundaberg)	Boyne River & 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.

For expenditure to be prudent Arup has used the premise that 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. As for expenditure to be efficient it must represent the least cost means of providing the required level of service within the relevant regulatory framework. Also assessed is the appropriateness of the methodology used for the attribution of operating costs to irrigation schemes and customers.

Accordingly, the Authority has engaged Arup 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.

This 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.

1.3 Limitations

The work undertaken in developing this report for the Authority is based on the information provided by Sunwater and from site visits to some schemes including meetings and discussions held with irrigator and Sunwater representatives.

With respect to the information provided, Arup have not undertaken any independent verification of its reliability, accuracy or completeness. This study has

We also note the absence of formal criteria from the Authority in assessing prudency and efficiency and therefore have undertaken the assessment based on our best judgement of prudent and efficient practices elsewhere in the industry. The implications of this may indicate some degree of subjectivity across the assessment of all the schemes.

Arup has attempted to address numerous concerns raised by the irrigation community, during consultations. We however note that many concerns are policy related and therefore beyond the scope of this assessment.

1.4 Acknowledgements

Arup would like to acknowledge the contribution of Sunwater staff and specifically regional staff who demonstrated a keen understanding of the schemes which they operate. We also acknowledge the input of the irrigation community in sharing their understanding of the schemes and exploring issues in a collaborative manner.

2 SunWater's Network Service Plans

2.1 Overview

SunWater operates a range of water schemes in a decentralised manner to deliver water to a range of irrigation and industrial customers and is responsible for:

- Delivery of water as per the water access entitlement (WAE)
- Meeting service standards and collecting revenue
- Due diligence and compliance taking into account relevant legislative drivers
- Operations of the schemes; and
- Asset management including augmentation and maintenance

SunWater's irrigation assets can be grouped into two classes; bulk water schemes and distribution channel schemes. SunWater have prepared Network Service Plans (NSPs) for each of their 22 bulk water schemes and 8 channel distribution schemes. Arup have been commissioned to undertake the assessment of network service plans relating to bulk and distribution schemes which sit within Cluster 4 and include:

- Bowen Broken Rivers Bulk Water Supply Scheme
- Eton Water Supply Scheme
- Eton Water Distribution Scheme
- Proserpine River Water Supply Scheme
- Pioneer River Water Supply Scheme
- Burdekin – Haughton Water Supply Scheme
- Burdekin – Haughton Water Distribution Scheme
- Mareeba – Dimbulah Water Supply Scheme
- Mareeba – Dimbulah Water Distribution Scheme

SunWater has contracts with all scheme customers, these contracts specify the services to be provided, the service standards that are required to be met and the obligations of both parties.

SunWater supply water to bulk customers and channel customers. In relation to bulk customers SunWater is obliged to store and deliver water to a customer in accordance with customer rights and in accordance with their water entitlement licences.

In relation to channel customers SunWater is obliged to divert and deliver water available to the customer as per their WAE. Customer water entitlements exist at rivers where channel networks are used to deliver available water from that specific river segment where their WAE exists to the customer owned offtakes.

SunWater has contracts with all its bulk and channel 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 WAEs and available water;
- Estimates of likely demand of other customers;
- Capacity of the bulk water assets; and
- Provisions of the *Water Act 2000.*

The NSP's present SunWater's projected efficient costs for the operations of each scheme and the forecasted renewals expenditure for the upcoming FY 2012 to FY 2016 pricing path. The information provided forms the basis of pricing water for SunWater's customers. Also provided is the same data for the current pricing path 2006 – 2011. All costs in the NSP'S are presented in July 2011 dollars (compensating for inflationary variances).

2.2 Scheme descriptions

The irrigation assets can be grouped into two classes; bulk water schemes and distribution channel schemes. The majority of costs for distribution/channel systems relate to the supply of water to the customer rather than compliance. These supply services include, significant operating costs in scheduling and delivering water, maintaining the distribution system to supply water at the required flow rates & times, and maintaining the assets to ensure continuous supply availability. These duties are listed in table 1, along with more detail to describe work activities. Other duties are compliance related and SunWater is obligated to undertake such services as;

- ROP activities (Water sharing, ROP amendments & modifications, Water accounting, General compliance reporting, Water quality monitoring, Stream flow monitoring and data recording, DERM water monitoring standards, Distribution losses)
- Dam Safety
- Environmental management
- Land management (Weed & pest management, Rates & land taxes, Security & trespass, Access to land owned by SunWater)
- Workplace health & safety
- Financial reporting & taxation
- Irrigation pricing
- Strategic Asset Management Plan

In the case of Bulk Water Supply schemes, the majority of costs relate to scheme assets, which create and maintain a customer's Water Access Entitlement (WAE). In general, these activities relate to the scheduling and releasing of bulk water, reading meters and repairs. There are also significant compliance costs associated with those assets and the ongoing management of WAE's. The delivery of water and other service cost aspects are relatively minor when compared alongside the compliance based activities.

2.3 Operational Expenditure (Opex)

The Opex is set out by activity type with a dollar budget for each year, using actual costs for the existing pricing path and projected costs for the future pricing path. The Opex budget includes:

- Operations
- Preventative Maintenance (Condition monitoring, Servicing and Weed Control)
- Corrective Maintenance (Scheduled and Emergency)
- Electricity

A more detailed explanation of the Opex activities is provided in Table 2.

2.4 Renewals

Renewals expenditure refers to works intended to maintain the ongoing performance and service capacity of the asset or if no longer possible or economical to replace the asset with a modern equivalent. The NSP's specifically exclude from the renewals program; major dam safety upgrades, capacity augmentation and expenditure on non infrastructure assets.

The NSP does also outline the principle of using a renewals annuity to manage the rehabilitation of assets over a 25 year period. The renewals expenditure uses a rolling 25 year period to smooth out lumpy capital expenditure and is based on keeping the assets in good working order out into perpetuity. The renewals program is closely linked and aligned with SunWater's Asset management strategy. As specifically outlined in the *Asset Management Planning Methodology Paper*[1] the three fundamental facets to SunWater's asset management approach are:

- Replace assets as required to maintain overall system service standards
- Refurbish assets through their service lives as necessary to maintain service potential
- Service, monitor and maintain assets to maintain the ongoing operational performance and service capacity of assets as close as possible to the designed standard

To apply this SunWater uses the SAP system and specifically the SAP Work Management System (SAP-WMS) to capture information relating to assets including cost data and risk / condition assessments. This is used to schedule the renewals and replacement for each asset and also captures information including replacement costs and cost information for planned projects. Effectively the underlying objective of the asset management strategy is that the majority of the assets are managed to maintain a specific standard of service in perpetuity.

Of critical importance is the understanding around, "specific standard of service" and the need to maintain 'operational performance and service capacity of assets

[1] Sunwater, *Review of Irrigation Prices – Asset Management Planning Methodology Paper*, October 2010

as close as possible to the designed standard' as it heavily influences whole of life asset management scenarios, level of risk and the development of standards, processes and methodologies and therefore the cost associated in maintaining assets to this level. For this reason, water users need to be consulted to help frame what is an acceptable specific standard of service.

3 Scope and Methodology

3.1 Scope

Arup has undertaken the following scope of works to review SunWater's proposed operation, renewals and rehabilitation expenditures, for prudency and efficiency.

3.1.1 Operational Expenditure (Opex)

- 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 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.

3.1.2 Capital Expenditure for Renewals and Rehabilitation

- 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 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;

3.1.3 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.

3.2 Methodology

3.2.1 Information Request

At the onset of this study an information request was put forward to SunWater early on in the study. These information items were deemed necessary to undertake the assessment of the NSPs. This initial information request was used to structure both further information requests and frame the fieldwork and site visit program.

Arup would like to highlight that the information provided was not sufficient to assess prudency and efficiency and rather required significant effort on our part to interrogate data to extract relevant information. We note that at the completion of this study that significant further work is necessary which will allow sufficient time to drill into specific projects to understand the basis of the costing. Arup did undertake a site visit to obtain greater understanding of the schemes and note that this was not sufficient to drill down into various aspects that make up the NSP.

SunWater has been forthcoming in the provision of information and we acknowledge that their systems are not specifically designed for the provision of information to assess prudency and efficiency. While the timeliness of the data provided is considered to have impeded the delivery of this assessment we acknowledge that SunWater did invest significant resources to assist the consultants to understand the processes and the data which we were provided. However we note that the budgets and time allocated for this study have impeded the assessment of prudency and efficiency. We acknowledge that this is the first time that the Authority has been directly involved in the review of the NSPs and we believe that future exercises can be better tailored and executed, building on some of the lessons gained from this current review.

Specifically we recommend that all data and information be coordinated through the QCA to ensure that both parties are cognisant of the level of information being provided and a collective judgement be made around the sufficiency of the information for undertaking the assessment. Additionally we think that the assessment would have been more prudent and efficient if we were able to concentrate on a single scheme which would highlight likely issues with SunWater's operations and production of the NSPs.

3.2.2 OPEX Assessment

The assessment of operational costs is limited to direct operational costs attributed to each scheme as directed by the Authority. The process adopted by Arup for the assessment of prudency and efficiency of direct operational costs include:

- Sight inspections and discussions with SunWater local managers which sought to appraise:
  - potential efficient or inefficient work practices
  - operators knowledge of existing assets, condition and performance
  - day to day operation issues and review of key drivers behind SunWater's projected expenses
- Discussions with irrigation users, to understand key concerns and to verify some of the claims we have attempted to identify key concerns and capture productive suggestions that may have a favourable outcome.
- Assessment of whether SunWater's policies and procedures for the incurrence and attribution of operational expenditure represent market good practice including the relevance of the stated:
- 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;
- Desktop assessment of data provided by SunWater including:
  - Compare historical actual data with forecast date
  - Based on historical trends and field observations, investigate operational forecasts.
  - Understand historical trends in line with actual water usage
  - Understand how the systems have been modified with respect to management of operational expenses

We note that nowhere in this data have we been able to see a direct link between costs and work undertaken. The level of disaggregation has not been sufficient to assess prudency and efficiency and therefore our assessment is limited to processes, procedures and trends.

3.3 Renewals assessment

Arup's prudency and efficiency review of the annuities program has included;

- How capital expenditure needs for renewals are identified
- The process of presenting and quality of business cases to justify expenditure
- The process of reviewing business cases
- The consultation with irrigators with regards to major items of expenditure
- Exploration of the processes used for estimating costs under the renewals program
- Random sampling of a representative number of completed capital works projects under the renewals budget

- An assessment of the cost escalation and discount rate factors used by SunWater in the annuity calculations.
- Justification for projects in the renewals program.
- Options assessments, to ensure alternatives are considered.
- Investigate the large ARR balances being carried forward.

In undertaking this assessment Arup have been provided with two main spreadsheets:

1. Historical R&R projects in excess of $10K
2. Future R&R projects with name of the facility and brief description of the work proposed including total cost and the year in which the work is to be undertaken.

Arup initially identified specific projects focusing on the 2011 – 2016 period as there is likely to be more information relating to these projects and in response were provided outputs from the SAP system. It became clear that this level of information from the SAP system was again too brief to make an assessment of prudency and efficiency. Taking into account time and budgetary constraints, Arup made a final request to SunWater to provide more detailed information regarding the justification behind projects and basis for costing. We have attempted to present this information here and make some judgement on whether SunWater have identified and costed the work in a prudent and efficient manner. We however note that for some schemes more detailed investigation is required where Arup are given access to the member of staff responsible for that project to understand both the reason for the works and the basis for the costing.

4 Assessment of Elements Common to Each Scheme

4.1 Operational Costs Review

4.1.1 Relevance and Adequacy of Supplied Information

The information in the Network Service Plan has been produced to suit a particular target audience (stated as the Queensland Competition Authority). On interview with SunWater management the document was prepared to provide information to SunWater's irrigation customers. Regardless of the intended audience, Arup believes the document is neither sufficient for the proposed analysis under this exercise or for review by stakeholders who have an intimate knowledge of the systems in place and need to be appropriately informed in regards to the costs they are likely to incur.

To address this deficiency Arup have posed direct questions, conducted interviews and attended information sessions provided by SunWater and made the information available to all of the consultant teams conducting similar reviews. The consultant teams have made a collective request both through the Authority and directly to SunWater for disaggregated cost analysis. This would afford the ability to review and "drill down" into the summary costs that are provided in the Network Service Plan. SunWater have supplied the financial model used to develop the Network Service Plans.

In the case of Opex, SunWater refer to three expenditure activities:

- General cost for operations which largely covers day to day operations including labour, materials and electricity
- Preventative Maintenance
- Corrective Maintenance
- The information provided to Arup around Opex breaks down costs as follows:

Table 1: Cost breakdown for Opex

Opex Category	Cost Activity
01 - OPERATIONS	Customer Management
	Workplace Health and Safety
	Environmental Management
	Water Management
	Scheme Management
	Dam Safety
	Schedule and Delivery
	Metering
	Facilities Management

02 - PREVENTIVE MAINTENANCE	Condition Monitoring
	Servicing
	Weed Control
03 - CORRECTIVE MAINTENANCE	Scheduled Corrective Maintenance
	Emergency Maintenance
08 - ELECTRICITY	Energy costs

Specifically we note the following definitions for items under Operations as provided by SunWater.

Environmental Management

- Environmental strategy development, specific to a service contract
- Environmental assessments specific to a service contract
- Liaison and coordination with relevant Government agencies and environmental regulators on site-specific issues

Water Management

- Water quality monitoring and sampling
- Blue-Green algae management
- SDL readings, shoreline inspections
- Monitoring of groundwater levels and salinity levels
- Bore measurements and preparation of data for NRMW and SunWater.
- Scheme Management
- Preparation and provision of reports and statistics for clients, including meetings with clients associated with review of contract progress/performance
- Energy management including the review of electricity consumption, tariffs and accounts
- Land and property management including legal advice
- O&M Manual development, Scheme Strategies, OMS Plans, Facility Contingency Plans and Emergency Action Plans (EAP) for all facilities other than dams.
- Insurance Premiums Paid or Payable;
- Council Property Rates and Charges;
- Land Tax Payable
- Financial charges, interest, etc.
- Credit management with respect to client (Infrastructure owner) - not to be confused with customer management - Client re-negotiations
- System Leakage Management Plans (SLMPs)

Schedule and Delivery

- Scheduling, releasing, operation of pump stations and SCADA
- System surveillance including monitoring of water entitlement and observation of and reporting of any breaches
- Flood operations preparation
- Water harvesting.
- ROP compliance monitoring of water levels and flows and reporting of water information

The information provided to Arup includes:

- historical actual costs for each of the cost activities identified in Table 1 which are further broken down into:
    - labour
    - materials
    - contractors
    - others
    - indirects
    - overheads
- forecast expenditure for the main categories of operations, PM and CM which are then broken down into:
    - costed labour
    - costed overhead
    - indirects
    - travel and accommodation
    - contractors
    - materials
    - plant equipment and vehicles
    - occupancy costs
    - administration costs
    - other asset costs

It should be noted that the form of the two data sets are different and certainly the forecast data is much more difficult to attribute to a specific activity. Certainly to assess prudency and efficiency we would seek to understand in greater detail the activities which have been undertaken, associated costs and how these have been translated into forecasts and what assumptions have been made. The absence of this makes assessing prudency and efficiency in its truest sense difficult.

Table 2: Activity Type across supply schemes

TYPE OF ACTIVITY	BULK WATER SCHEME ***The management of storages and WAE's in accordance with regulatory requirements***	DISTRIBUTION SCHEME ***Management & maintenance of the distribution system, to ensure availability for delivery in accordance with WDE's and in accordance with regulatory requirements.***
Operations	Day to day costs of delivering water & meeting compliance obligations Collating water orders, scheduling releases & delivering water. Cleaning of trash screens Recording & reporting releases, water use & system loses Undertaking dam surveillance	Day to day costs of delivering water & meeting compliance obligations Collating water orders, scheduling releases & delivering water Operating pump stations & regulating structures Cleaning of trash and weed screens Recording & reporting releases, water use and system losses Reading meters Undertaking system surveillance to ensure that customer standards are being met Liaising with customers Notifying customers of interruptions
Electricity	Dam operations and pump stations	Pump stations
Preventative maintenance	Defined as maintaining the on-going operational performance and service capacity of physical assets as close as possible to design standards The inspection, testing or measurement of physical assets to report & record its condition Routine servicing	Defined as maintaining the on-going operational performance and service capacity of physical assets as close as possible to design standards Mechanical & chemical weed control including Acrolein injections Desilting of channels & drains Electrical & mechanical servicing of regulating gates, valves, meters and water level sensors Mechanical & electrical servicing of pumps, motors & filter systems Servicing batteries and back-up systems
Corrective maintenance	Emergency breakdown maintenance which refers to maintenance that has to	Emergency breakdown maintenance which refers to maintenance that has to be carried

	be carried out immediately to restore normal operation or supply customers or to meet regulatory obligation. Non emergency maintenance which refers to maintenance that does not have to be carried out immediately to restore normal operations, but needs to be schedules in advance of the planned maintenance cycle.	out immediately to restore normal operation or supply customers or to meet regulatory obligation. Non emergency maintenance which refers to maintenance that does not have to be carried out immediately to restore normal operations, but needs to be schedules in advance of the planned maintenance cycle. Erosion repairs Flow meter repairs & replacements Removing weed blockages Repairing regulating gates, pumps & control systems Repairing pipe leaks and seals on offtake gates.

Specifically in relation to these three activity types we feel that the information provided does not sufficiently help connect costs with the discharge of specific service obligations, although a further level of disaggregation from information in the NSP has been provided. We however note that there have been numerous operational and procedural changes to the organisation which may make the extraction and reconciliation of such information difficult. These include:

- Organisational review undertaken as a result of the Smarter Lighter Faster (SLIFI) Review undertaken by SunWater in 2009 which sought to streamline the organisation
- Introduction of ROPs and amendments at various points during the 2006-2011 price path

We therefore recommend that SunWater re-evaluate processes to enable future audits to link costs with service obligations. Some disaggregation has been provided and we have utilised this to help understand changes over time. However it should be noted that this information could be further disaggregated and does not afford the ability to "drill down" into the cost to adequately review prudency and efficiency. However in the absence of specific criteria from the QCA with regards to prudency and efficiency we consider the cost information supplied adequate for the level of review proposed.

4.1.2 Policies and Procedures

SunWater have 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 the field personnel are gradually adopting the systems and practice specified in the policy and procedure. Investigations by a third party consultant detailed in a report provided by SunWater describe the Work Instruction documents as not available for a majority of tasks or are deficient. The report does acknowledge that SunWater are taking steps to address the deficiency.

We also acknowledge that SunWater are continually reviewing their policies and procedures to take account of changed market conditions and with the aim of streamlining operations across the organisation. In some instances observing such changes from a regional perspective may give the impression that the changes are inefficient. However, we believe that when observed from a state wide perspective, significant efficiencies are being made. Specific examples include:

- Statewide assessment of switchboard replacement to develop a state-wide strategy
- Undertake a standardised risk assessment of all SunWater assets
- Implementation of SunWater's purchasing policy to take advantage of bulk purchase discounts including purchase of services, plant hire, fuel, meters, chemicals etc;
- Implementation of a light vehicle strategy to change the ratio of 4WDs to 2WDs
- Outsourcing of non-core services

4.1.3 Forecast Operational Expenditure

As previously discussed, SunWater's Operational expenditure forecasts comprises:

- Operations
- Preventative Maintenance
- Planned Corrective Maintenance

In understanding operational expenditure, SunWater note that there are normal (though not easily predicted) annual variations in activities driven by a number of factors including but not limited to:

- Variations in climatic and seasonal conditions (eg drought, floods, hot, dry and rain)
- Volume and clarity of Water in storage
- Demand for water by customers
- Age of and period since assets were refurbished or replaced
- Class of assets

They further go onto to state that these factors outlined above determine what activities and volume of activities are required to be carried out on a yearly basis. Examples of this are detailed below:

- Hot, dry conditions combined with clear water supplied from storages make ideal conditions for aquatic weed growth in channels. This requires an

increase in aquatic weed control in channels and drains in the years that this occurs;

- Ideal growing conditions for grass on access roads, channels and drains determine the number of times slashing is required;
- Volume of water in storage and customer demand drive the workload for schedule and delivery of water;
- The frequency of floods in storages determines the requirement for activating Emergency Action Plans (EAP's) at storages and when and the duration of 24 hour surveillance at the dam is required;
- Due to the class of the asset, some activities are not required to be carried out each year. For example desilting of channels and drains, patch painting, industrial painting of metal work, grading of access roads and berm roads, erosion control in channels and drains and servicing of some equipment;
- Some activities are carried out when the opportunity occurs. For example when storages are low and access can be gained to equipment which is normally under water, the opportunity is taken to carry out activities such as inspections, painting, repairs, replacements etc. Similarly when demand in a channel system is low, the opportunity is taken to desilt, repair in-channel erosion and maintenance of equipment that is normally under water.

On this basis it could be said that water use is not the only driver for Opex and the above factors should also be considered.

The budgets for Opex are based on an 'average year' and as stated in the Service Delivery Paper (provided to Arup 14th March 2011):

"*The costs for each Activity Type in the NSP's has been based on the costs over the past 4 years (excluding spurious costs) plus or minus any other known changes in costs eg increased Acrolein, plant hire, contractors etc. Adjustments have been made for the preventive maintenance in line with the Parsons Brinkerhoff report and costings.*"

Therefore the development of the NSPs and the 2011 budget has been the expenditure incurred over the last 4 years. In forecasting for the 2012 to 2016 period, Sunwater have adjusted the 2011 budget taking into account both historical trends, likely legislative and policy changes and savings as identified in the SLIFI review and recommendations made in the PB report on preventative maintenance.

Operations

In relation to the operations component no document was provided with details of the processes undertaken in developing these forecasts. Arup understand the key drivers affecting the industry including:

- Workplace health and safety
- Environmental obligations (Resource Operating Licences and Plans)
- Dam safety obligations etc

It should be noted that SunWater, given the size and nature of the organisation is required to be vigilant in meeting the above obligations. Certainly we note that in

reality a much smaller water service provider may be more relaxed in its approach to meeting these obligations and may agree to operating at a higher risk level. The risks however to SunWater of not meeting the obligations are significant and a failure to do so will result in significant financial risk to the organisation. We therefore feel that the drivers identified in meeting

Preventative Maintenance (PM)

As stated in the PB report[2]:

"*PM is defined as maintaining the ongoing performance and service capacity of physical assets as closely as possible to their designed standard. PM is cyclical in nature with a typical interval of 12 months or less*."

PM includes three sub-activities; condition monitoring, servicing and weed control. The scope of the PB[3] engagement included:

- identifying all PM related work instructions currently in use (as defined in section 1.3) and their associated costs based on the information provided by SunWater's planners and field staff to form the basis for the planned PM baseline costs
- Establishing a level of confidence of the planned (2010/11) PM baseline costs for up to 30 service contracts by region.

The assessment has been broken down into the various regions and PB has undertaken a confidence assessment for each region using the following criteria[4]:

- Historical costs
- Preventative maintenance documentation – WIs
- Planned preventative maintenance
- Resourcing to undertake WIs
- Fundamentals of preventative maintenance costs.

The combined results of this assessment as suggested by PB state[5]:

OPEX has been lower than would be required to complete the PM program in each region and therefore an indicator that the baseline cost for future periods will need to be higher than historic levels to enable the entire PM program to be completed.

In order to determine whether the baseline costs are prudent and efficient it would be necessary to review the planned PM activities in greater detail (i.e. applying RCM techniques) for each SC to determine whether these are the activities and associated frequencies that a prudent operator would carry out, and to review the unit costs for each of these activities to determine whether these are efficient costs.

A detailed review of these aspects of the PM program was not part of the scope of this review.

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[2] Parsons Brinckerhoff, *Provision of Services for Costing SunWater's Work Instructions*, October 2010, Page 4
[3] Parsons Brinckerhoff, *Provision of Services for Costing SunWater's Work Instructions*, October 2010, Page 7
[4] Parsons Brinckerhoff, *Provision of Services for Costing SunWater's Work Instructions*, October 2010, Page 19
[5] Parsons Brinckerhoff, *Provision of Services for Costing SunWater's Work Instructions*, October 2010, Page 20

The PB review makes a range of recommendations the key of which include:

- Improve staff booking practices to ensure PM work is accurately coded to the correct cost codes and at an appropriate asset level to facilitate whole of life cost analysis and to ensure future instances of mis-coded orders are eliminated
- Ensure all work instructions (WI) are stored in the Hummingbird system
- Improve consistency in maintenance frequencies across regions for similar asset types
- implementing a consistent resource planning system at each region to optimise and better manage use of existing resources
- Integrate the disparate systems currently in use across the regions to track and schedule PM work in SAP PM to eliminate the number of off-line systems.
- Develop documented work instructions for the PM activities where gaps are known to exist and review and revise all existing work instructions
- Bring forward the reliability centered maintenance (RCM) initiative to optimise PM activities

Arup have requested from SunWater a formal statement with regards to how the outcomes of this PM analysis undertaken by PB have been incorporated into the forecasts including details of what initiatives have been put in place or are scheduled to be put in place to incorporate the above requirements. Certainly we note that the forecasts are well in excess of what PB have proposed. Using the information provided and type of disaggregation given it is difficult to see how PB's revised forecasts are integrated into the NSP forecasts.

Corrective Maintenance (CM)

Corrective maintenance is defined by SunWater[6] as:

Work required when an asset is not performing or delivering required service or when work is identified as a result of preventative maintenance or operation.

We note that there has been no similar review of CM as there has been with PM. Discussions with SunWater indicate that CM forecasts are based on actual spent in the last 4 years and a review of the schemes has indicated that SunWater have sought to review the balance between CM and PM. However we have not been provided any formal documentation indicating the exact methodology which they have used to predict forecasts for CM.

We specifically refer to the adoption of the RCM approach recommended by PB[7]. The RCM approach if adopted would seek to optimise the process by which maintenance is undertaken and in doing so would also optimise the balance between PM and CM. At this stage there has been no indication from SunWater about the status of undertaking such an assessment though we note that the forecast of PM and CM has altered the balance between PM and CM from historic years.
Without adopting some type of RCM approach, classifying the PM and CM budget as efficient is not possible.

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[6] SunWater, *Asset Refurbishment Planning: Methodology for Condition Assessments of Assets*, Feb 2008, Page 4

[7] Parsons Brinckerhoff, *Provision of Services for Costing SunWater's Work Instructions*, October 2010, Page 20

4.1.4 Review of 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 and electricity costs are escalated at CPI. Contractors and materials have been escalated at 4%. Arup have undertaken a brief review of each of these escalation factors which are discussed below.

Labour

As stated above direct labour costs are assumed to increase in nominal terms at 4% per annum until the completion of SunWater's Enterprise Bargain Agreement (EBA) in June 2012 after which they have assumed that salaries and wages will rise in line with inflation (~2.5%). SunWater further state that any wage increases above inflation are likely to be offset through productivity improvements.

Arup have specifically looked at the Labour Price Index (LPI) and the Average Weekly Ordinary Time Earnings (AWOTE) as two key measures for labour and we have specifically focused on the electricity, gas and water sector (EGW) as sourced from the Australian Bureau of Statistics (ABS) as sited in report by BIS Shrapnel[8].

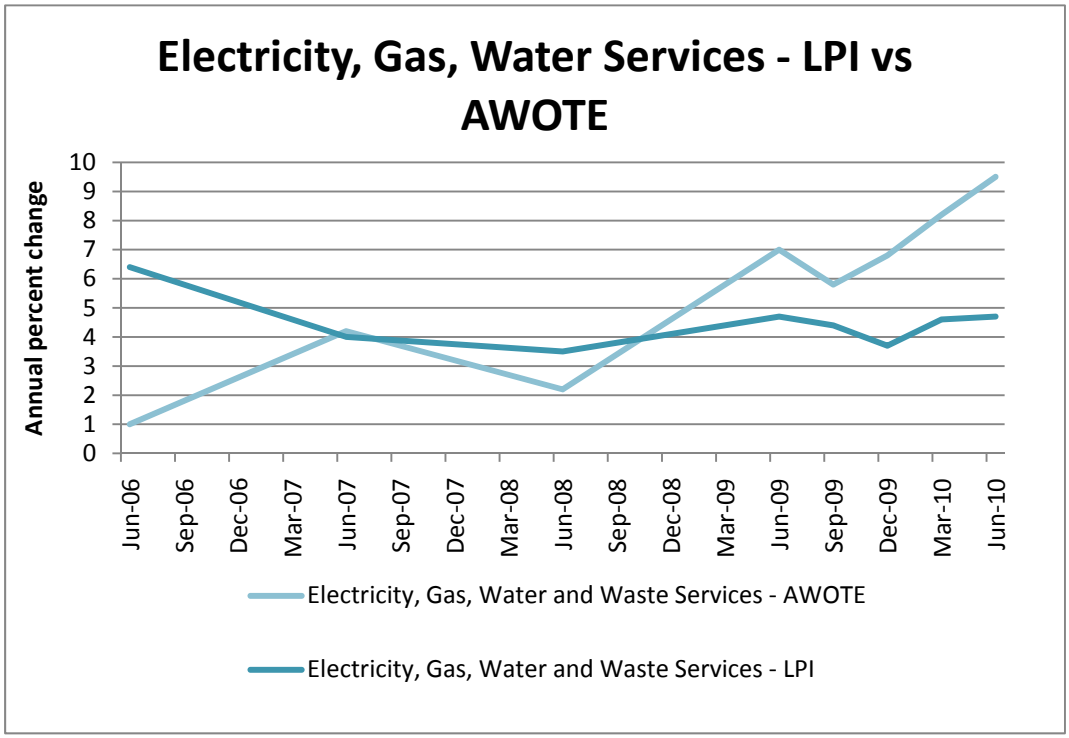

Figure 1: Electricity, Gas and Water Services - Annual percentage change in LPI and AWOTE (source originally from ABS but sited in BIS Shrapnel Report)

Both line items indicate that the increase in labour costs will be well above inflation. We also note that wages in this sector are higher than the national average largely owing to skills shortages due to the higher level of skill required

[8] Prepared by BIS Shrapnel for Powerlink Queensland, *Labour Cost Escalation Forecasts to 2016/2017 – Australia and Queensland*, November 2010

by personnel in this sector. While we have not undertaken an in-depth analysis we would question the lower than average rate proposed by SunWater post June 2012. While an interim value of 4% is in line with the LPI is appropriate, given the trend in LPI we would suggest that a CPI figure post 2012 is likely to underestimate the actual rise in labour costs particularly when the benefits provided by productivity cannot be quantified. We would recommend that a labour rate stay at 4% as a minimum keeping in mind that productivity in part is associated with the quality of labour which the organisation can attract.

Materials and Contractors

SunWater has used a 4% per annum rise escalation in the cost of materials and contractors. In its background paper[9] SunWater states that the escalation factor is based on forecasts and historical data. In evaluating forecasts SunWater have referred to work by CostWeb which refers to non-residential construction costs for long term trends within the construction sector. More importantly however SunWater refers to MacroMonitor's, Australian Construction Cost Trends 2010 report and from this report state:

- *construction costs are forecast to grow by 4.5% in 2010, above 5% in 2011 and at around 6% in 2012; and*
- *engineering construction costs are forecast to escalate at 4.9% in 2010/11 and 6% in 2011/12*

This is considered to be one of the most comprehensive up to date examinations of the energy, gas and water sectors. Specifically in Macromonitor's news release[10] the director of the organisation has noted:

" *total water and wastewater construction increased from $3.5 billion in 2006/07 to $7.4 billion in 2008/09. Construction is forecast to climb higher again in 2009/10 to $8 billion, but work should progressively drop back over the five years to 2014/15.*"

This is supported by Arup's observation of the water sector where demand for skilled contractors and materials will need to compete with the energy and gas sectors both of which are experiencing significant growth, specifically in relation to coal seam gas. Arup believe that the use of Macromonitor's work represents the most up to date and appropriate assessment of the sector and we believe that SunWater's 4% escalation factor is appropriate given the trends predicted in this report. We believe the use of CPI underestimates the level of activity and demand within this sector.

Electricity

SunWater has proposed to use the Consumer Price Index (CPI) as the escalator for electricity tariffs as an input to determining the costs per megalitre ($/ML) of its bulk water and distribution schemes each year. The following year, it is proposed that SunWater be allowed to approach the Queensland Competition Authority (QCA) to adjust its water costs in the following year to account for any deviation in the actual costs of electricity (franchise tariffs) from CPI. This methodology is

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[9] SunWater, *Background Paper – Cost Forecasting Assumptions*, January 2011

[10] MacroMonitor, www.macromonitor.com.au, News release Wednesday 24th March 2010

known as an 'overs and unders' approach and is generally considered to be revenue neutral.

The 'overs and unders' approach is used within a number of sectors, including the heavily regulated electricity sector, to correct revenue over-or-under collections within a regulated revenue cap framework. This is the mechanism by which Queensland electricity distributors Ergon Energy Corporation and ENERGEX collect and adjust their revenue annually. These businesses operate within similar constraints to SunWater given the potential variability in volumes [of electricity] which are consumed annually within Queensland. Of considerable note was the estimated decrease in electricity load of around 2.1%[11] in 2010 which had an impact on the calculations for the Benchmark Cost Retail Index (BRCI) which is used to determine electricity price increases each year. This reduced electricity consumption was caused by lower than average temperatures in Queensland in late 2010. SunWater has noted similar challenges predicting demand for water, which is driven by both customer demand and variability in stream flows in different physical locations throughout the state.

Although the approach of using 'overs and unders' to adjust its revenue in line with costs each year is accepted in some regulatory frameworks, there remains considerable risk and some increased costs associated with using CPI as an escalator for future electricity price increases. Since the introduction of the BRCI as the electricity pricing methodology in Queensland five years ago, electricity costs have risen by more than 52%12, whilst CPI has only increased by a little more than 13%13 in the same period.

The risk for SunWater (and its customers) in applying an assumption of CPI to electricity prices each year is that there will be a higher cost of debt which SunWater will need to carry forward and ultimately pass onto its customers. This is because SunWater itself will need to manage the cost differential between the actual electricity tariff billed by Ergon Energy Queensland (EEQ) or other contestable retailer and that which it collects as a component of its water charges. This cost differential will not be able to be recovered until a reopening of the regulatory decision based on cost movement outside defined parameters. Arguably there may also be an increased risk associated with electricity pricing for the period commencing 1 July 20[12], with both the introduction of a national price on carbon and also a new electricity pricing framework in Queensland to be introduced[14]. The new electricity pricing framework is likely to be based on a building block approach whereby each cost input to a tariff is calculated each year. At this stage it is uncertain how this new methodology will impact on individual tariffs in Queensland given that the last time tariffs were deconstructed was in the early to mid-1990's.

The Federal Government has indicated that from 2012, carbon will be priced at $23 / tonne of carbon dioxide equivalent (CO2e) produced by electricity generators. Based on an average emissions intensity in Queensland of 0.89 tonnes

[11] Queensland Competition Authority, Final Decision on Notified Electricity Prices for 2001-12.
[12] Queensland Competition Authority, *Final Decisions for the period 2006-07 – 2011-12*.
[13] CPI of 13.68% calculated by using actual annual inflation figures for 2007- 2010 together with the March quarter results for 2011 (of 3.33%).
[14] Assumption of a new electricity pricing framework in Queensland based on a direction from the Queensland Government 11 May 2011 http://www.qca.org.au/electricity-retail/RevEPandTS/

CO2e[15] for electricity production, on aggregate, this will add approximately $20 per megawatt hour (MWh) to wholesale electricity prices in Queensland (assuming that the full impact of the carbon price is passed through by generators onto wholesale prices). There potentially will be some variability in the impact based on the generation mix used to supply electricity at different times of the day (with particular respect to time-of-use tariffs).

Aside from wholesale electricity costs, the other major cost contributor to electricity prices are network tariffs (distribution and transmission), with distribution being responsible for the greater majority of the costs. Each year ENERGEX publishes a Statement of Expected Price Trends which indicates the likely increases to be applied to the network component of each of the retail tariffs.

Although SunWater purchases its electricity from Ergon Energy Queensland, the QCA will be required to use ENERGEX's network tariffs for future pricing given Queensland's Uniform Tariff Policy which subsidises regional Queensland electricity supplies.

4.1.5 Allocation of Opex to Customer Groups

In its NSP, SunWater has proposed that operating costs be allocated to the relevant customer groups (ie Medium priority Water Access Entitlements (WAE) and high priority WAEs) proportional to the total WAE in the scheme. As an example in the case of the Burdekin Water Supply Scheme, where 89% of the total WAE is medium priority, SunWater therefore propose to recover 89% of operating costs from this customer group.

This approach differs to what was undertaken in the 2006-2011 price path. As discussed in the 2010 issues paper by Pricewaterhouse Coopers[16] (PwC) states that lower bound costs were allocated by using price conversion factors to convert all high priority WAE to medium priority WAE by giving a higher weighting factor to high priority customers.

High priority allocations provide a greater reliability for accessing water. Therefore there are times when water is delivered to high priority customers at the expense of medium priority customers. As stated above the NSPs prepared by SunWater, recommend that the OPEX cost be allocated on the basis that the share of the costs allocated to the Medium Priority group should be proportional to the share of that group holds of the total allocation. It is not stated but implies that the remainder of the costs are then allocated to the High Priority group. Again this method favours the High Priority group in that it assumes the Medium Priority group will receive their full water allocations.

A more equitable system should make allowance for the fact that lower priority groups may not receive their full allocations of water and therefore should not have to pay the same cost as someone who will.

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[15] National Greenhouse Gas Inventory, 2008.

[16] PricewaterhouseCoopers , *Allocating Capital Costs of Bulk Water Supply Assets*, An issues paper prepared for the Queensland Competition Authority, (2010)

We suggest as an alternative that the allocation of distribution asset costs, both CAPEX and OPEX, could be made using a Distribution System Utilisation Factor (DSUF). We reviewed the PwC report on the allocation of Bulk Supply headworks CAPEX costs on the basis of Headworks Utilisation Factors (HUF) and make the following comments:

- The rationale and methodology for using the HUF seems appropriate to allocating Headworks CAPEX costs.

- Further, the same rationale and methodology would also seem to be appropriate to the allocation of Headworks OPEX costs. The PwC report contends that headworks operating costs are not driven by storage capacity and as such HUFs are not applicable, but we would counter that the benefit of the OPEX (availability of the headworks) derived by the various priority groups is still related to their effective utilisation of that capacity, i.e. the HUF

As the capacity of the distribution assets is equal for all priority entitlement groups, the DSUF would only need to account for the relative likelihood that the capacity is utilised, ie historically on average how much of a particular priority group entitlement allocation has actually been delivered as compared to another priority group.

We suggest that the DSUFs would be calculated as follows:

$$DSUF_{high\ priority} = \frac{EU_{HP} \times P_{HP}}{EU_{HP} \times P_{HP} + EU_{MP}}$$

$$DSUF_{medium\ priority} = \frac{EU_{MP}}{EU_{HP} \times P_{HP} + EU_{MP}}$$

$$P_{HP} = \frac{Av_{HP}}{Av_{MP}}$$

Where:

Av_{HP} = % average allocation of High Priority entitlement water actually received over last 10 years
Av_{MP} = % average allocation of Medium Priority entitlement water actually received over last 10 years
EU_{HP} = high priority entitlement units
P_{HP} = high priority premium
EU_{MP} = medium priority entitlement units

NB: Arup have proposed a period of 10 years as we believe that it is necessary to capture the variability that has occurred over the last two price paths keeping in mind that climate variability is best captured in the medium term.

The entitlement charges would then be calculated as follow:

$$EC_{HP} = \frac{DSUF_{HP}}{EU_{HP}} \times Cost$$

$$EC_{MP} = \frac{DSUF_{MP}}{EU_{MP}} \times Cost$$

COST = annual cost (CAPEX or OPEX)
EC_{HP} = high priority entitlement charge
EC_{MP} = medium priority entitlement charge

The following example shows the impact of adopting this method over the SunWater method:

For a sample scheme, we assume that the annual costs to be allocated is $2.5 million.

	High Priority	Medium Priority
SunWater Method		
Water Allocation (ML)	5000	40000
% Allocation	11.1%	88.9%
Annual Cost Allocated	$277,778	$2,222,222
Cost/ML	$55.56	$55.56
DSUF Method		
Water Allocation (ML)	5000	40000
Average allocation delivered	90%	60%
DSUF	15.8%	84.2%
Annual Cost Allocated	$394,837	$2,105,263
Cost/ML	$78.97	$52.63

As can be seen, the High Priority group would be paying a premium under the DAUF method, reflecting the greater water supply security, whereas the Medium Priority group see a discount to reflect their lower supply security.

We however note that the above methodology assumes that the entitlement charges are levied annually irrespective of whether water allocations are delivered or not, ie. Charging is not based on a consumption charge plus a fixed access charge.

4.2 Capital Costs Review

4.2.1 Relevance and Adequacy of Supplied Information

SunWater classifies renewals expenditure as all non routine expenditure.

The information provided in the NSP with regards to renewals forecasting is considered limited. It neither qualifies the reasons behind the opening balances which in some cases are significant nor provides sufficient detail with regards to forecast expenditure items. Certainly the description provided with regards to some large expenditure items are limited and are likely to generate spurious assumptions in the community.

Arup and the team of consultants have been provided with the following data sets:

- Historical annuity expenses from 2007 to the early 2011 which includes budgeted amounts and actual spend which is discussed further below;
- Forecast annuity expenses up to 2036 the basis for which is discussed below.

Using these lists Arup requested further details from SunWater

4.2.2 Renewals Planning

Renewals planning and forecasting for the future price path is driven by SunWater's Asset Management Planning process. The asset management planning methodology is discussed in detail in the 2010 paper[17] and a process diagram presented in Figure 2. The paper discusses the methodology by which SunWater manages its assets to maintain a specific standard of service in perpetuity taking into account the useful life of assets.

For the period from 2011 to 2036 SunWater have generated a schedule of works which will come under the renewals program. These schedule of works are automatically generated from the SAP Asset Management System when an asset is nearing its attributed useful life. In the year prior to the year proposed for renewal a more detailed assessment of the need for the work including prioritisation with other works is undertaken.

In supporting its asset management methodology SunWater has identified criteria for including projects into its renewals plan which include[18]:

- Assess the decline in condition of an asset that is beyond acceptable risk;
- Mitigate unacceptable risk; and
- Realise a commercial invest

In determining this SunWater has an adopted risk assessment methodology for assessment of infrastructure assets. A risk rating is assigned with consideration to:

- Workplace health and safety

[17] Review of irrigation prices – Asset Management Planning Methodology Paper, October 2010, SunWater
[18] SunWater, Asset Refurbishment Planning Guideline, Issue 2., December 2009.

- Environment
- Financial
- Production / operations; and
- Stakeholder relations.

Dependent on the level of risk the asset may either be run to failure or prioritised for early replacement

- If progressed, review of options for the replacement of the equipment and such options analysis are undertaken for replacement activities in excess of $50,000.
- Costing of replacement is initially based on an asset valuation exercise commissioned by SunWater and undertaken by Cardno in 2008[19] and 2010[20]. This is in addition to an exercise undertaken in 1997 where a bill of materials was created for all assets to further assist with costing processes.

The drawback of the renewals planning methodology is that the actual works undertaken may deviate significantly from what is forecast. To help reduce this uncertainty, the alternative would be to undertake more regular options assessment for some of the larger projects identified at an earlier stage. However the costs of doing this work would not be small and the accuracy somewhat limited given the rate at which technological advances are being made. We therefore believe that the approach adopted by SunWater as being prudent and relevant for what is effectively a method of accounting.

As highlighted by SunWater, the renewals annuity approach is effectively a funding strategy designed to provide 3 things:

- It is a smoothing mechanism to soften expenditure shocks/peaks, that would otherwise occur if costs were recovered as and when refurbishment works were delivered
- It is a mechanism to ensure intergenerational equity between users
- The annuity is a maintenance of an ongoing balance which still enables the operator to focus on jobs that need to be serviced

In light of this we consider the planning methodology to be reasonable and adequate for the purpose of developing a network service plan and derivation of a renewals annuity.

[19] Cardno for SunWater, *SunWater Asset Revaluation*, June 2008

[20] Cardno for SunWater, *Reassessment of SunWater's Bulk Water Asset Valuations*, October 2010

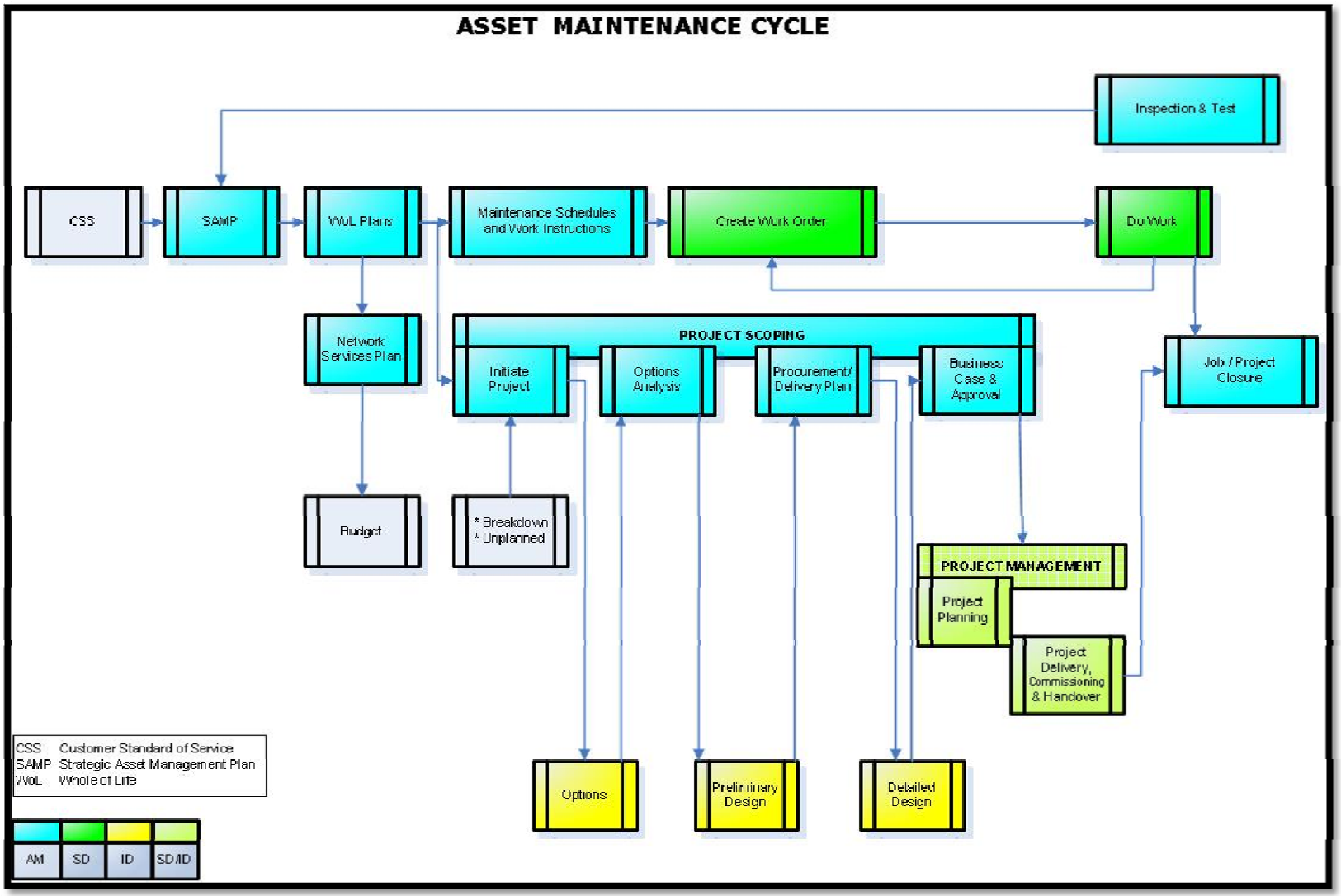


Figure 2: SunWater Asset Maintenance Cycle

4.2.3 Renewals Forecasting

The forecasting of costs under the renewals program has been shown to be based on replacement cost. The replacement costs are based on asset valuation exercises undertaken by SunWater. Based on discussions with SunWater staff asset valuation is based on the following:

- For assets older than 1997, SunWater carried out a major asset valuation project in 1997 which included creation of an asset register and the preparation of bills of materials for existing assets
- Unit rates were updated in 2000
- SunWater have since undertaken two major asset valuation exercises both undertaken by Cardno. Specifically these include:
  - SunWater Asset Valuation – Report on Procedures (2008)
  - Re-assessment of SunWater's Bulk Water Asset Valuations (2010)
- The main deliverable from the former study included:
  - A table of indices for conversion of 1997 rates to 2008 rates
  - A table providing unit rate codes, indices and updated unit rates
  - A MS Access database which can be used to modify unit rate data
- While this study helped provide greater level of accuracy around asset valuation it did note that further detailed analysis of many major earthworks items was necessary to develop a more accurate Bill of materials
- The scope of the asset valuation exercise from 2010 included:
  - Provision of revised valuations for two typical large dams owned by SunWater (Burdekin Falls and Fairburn Dams)
  - Provision of updated unit rates for the material codes used in the two dams
  - Provision of appropriate uplift factors from 1997 to 2010 for all bill of materials items relating to bulk water assets
  - Development of current replacement costs inclusive of owners's overheads and regional factors for bulk water assets
- All assets prior to the year of renewal have a planning order developed for them which will develop more accurate costing based on actual costs for similar asset types etc.

In developing costings we consider that SunWater have made regular attempts to update costs within the SAP system to ensure that renewals forecasting is more accurate.

4.2.4 Renewals Annuity Methodology

The 20 year rolling annuity spreadsheet has a number of key financial parameters that need to be benchmarked against other government like assets. These parameters are:

Table 3: Benchmarking indexation values

Parameter	SunWater	Benchmark	
		Victorian (ESC)	NSW (IPART)
WACC rate –nominal **WACC rate - real**	12.113% 9.378%	5.8 5.8	7.4% 6.5%
Inflation rate	2.5%	2.5 – 3.0%	2.5 – 3.0%
Interest Rate (assume this is related to overcharges not paid by irrigators)	12.113	12 – 12.25%	11.5%
Interest on balances	2012 – 6% 2013 > 5%	6%	6%

*Taken from ESC & IPART websites after recent deliberations on like Water authorities

4.3 Review of Recreational Costs for Relevant Schemes

Within Cluster 4 three schemes segments are known to incur recreation costs. Recreation costs have been raised as a concern for irrigators and are thus reported here. While Arup cannot comment on the mode of recover for these costs, we can comment on the costs themselves. At this stage we have only been given access to the costs in relation to labour, direct, indirect and overheads from 2007 to 2016. It is only through observing the actual costs incurred from 2007 to 2010 that we can comment on future costs.

The following figures provide the breakdown of costs for:

- Burdekin Scheme (largely recreation at Burdekin Falls Dam)
- Eton Scheme (largely recreation at Kinchant Dam)
- Bowen Broken Scheme (largely recreation at Eungella Dam)

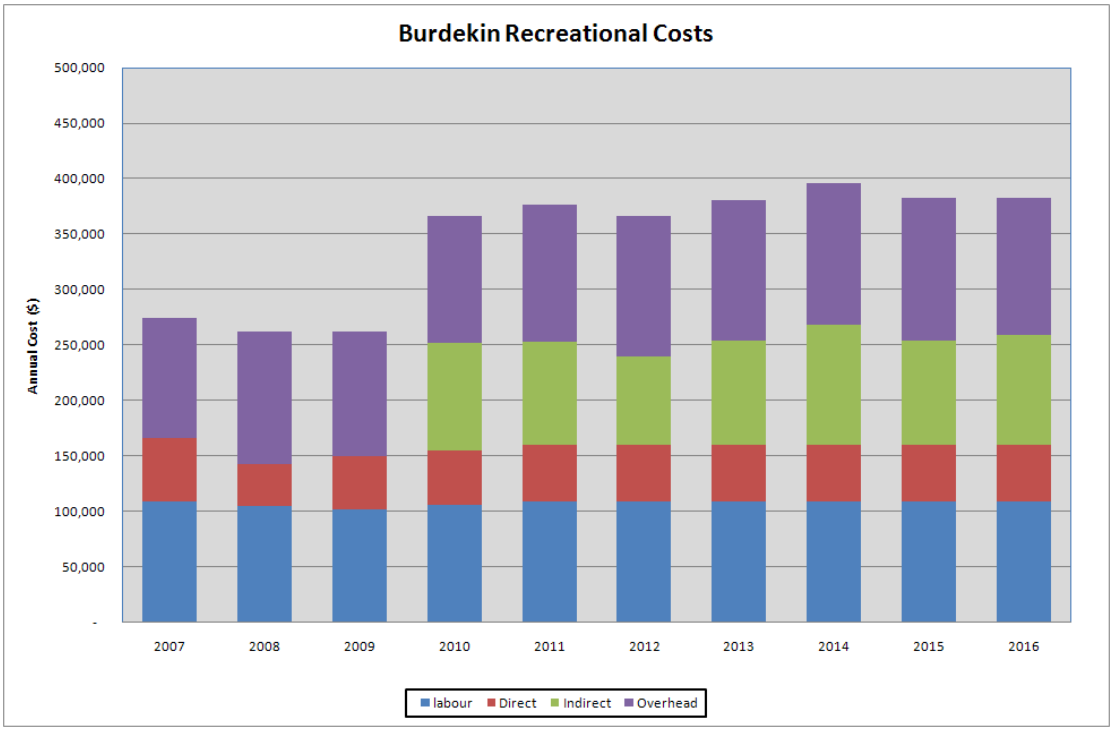


Figure 3: Breakdown of Burdekin Recreation Costs

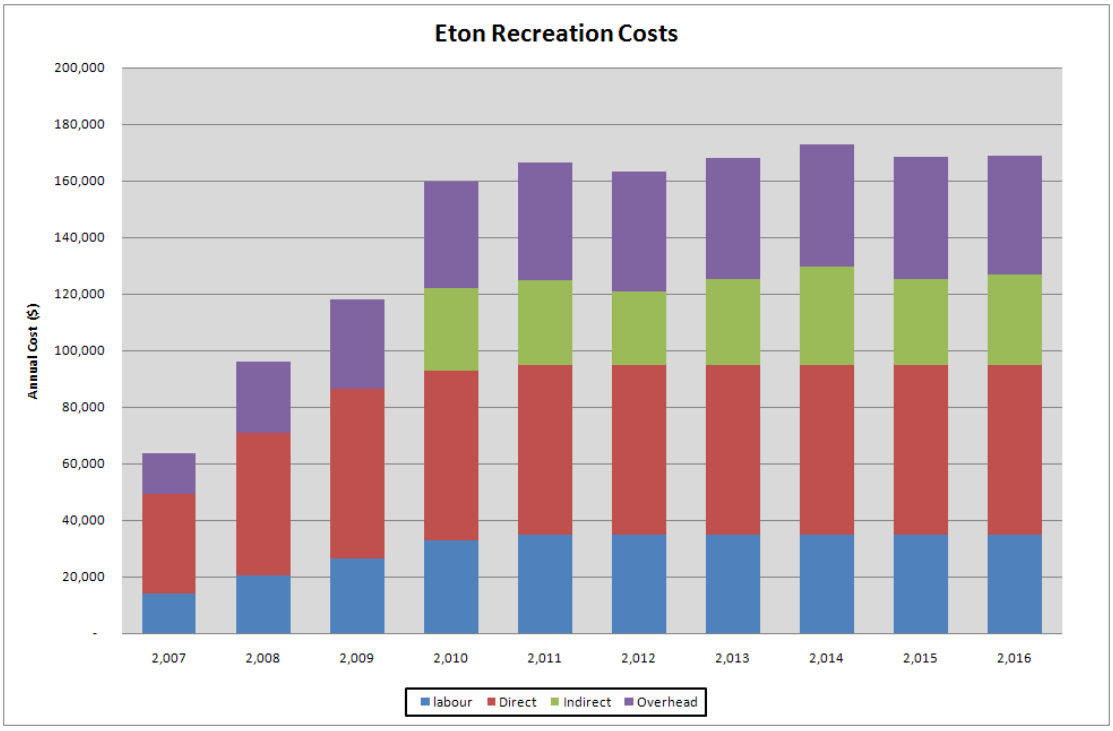


Figure 4: Breakdown of Eton Recreation Costs

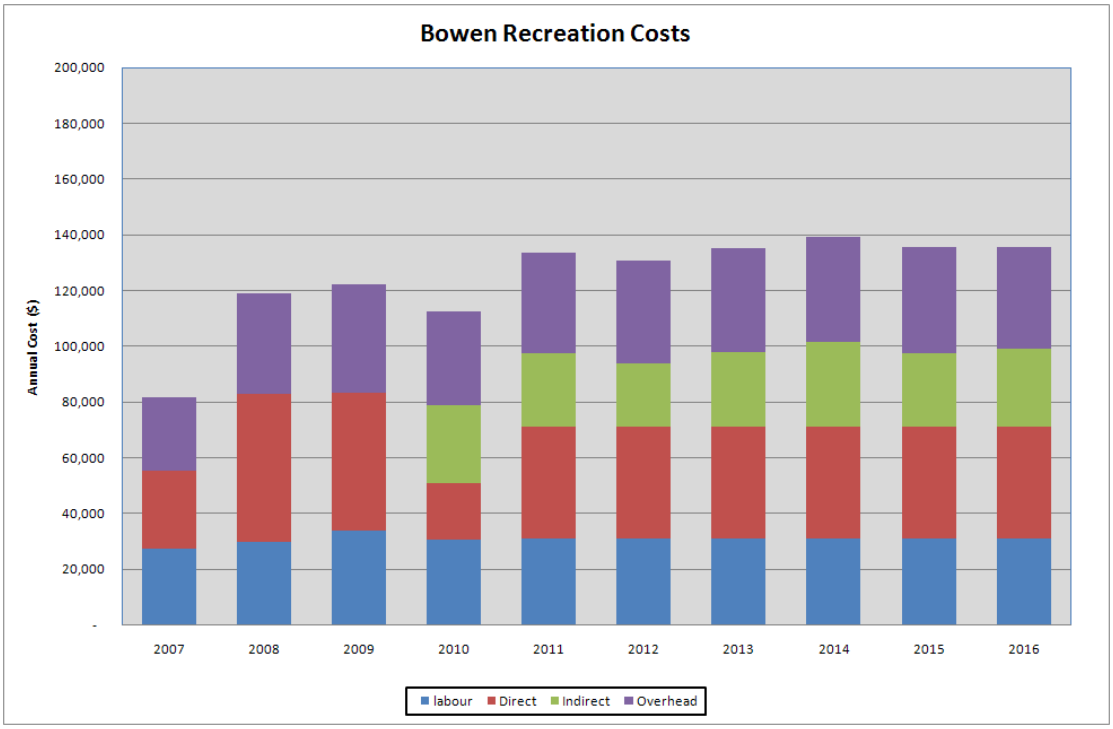


Figure 5: Breakdown of Bowen Recreation Costs

As can be seen in the charts provided generally direct and labour costs are not projected to increase significantly than what was incurred in 2010. However SunWater has now included an indirect cost component into these costs. Although a review of this is beyond the scope of this consultancy, SunWater has indicated that this is a product of the accounting system where in previous years indirect costs were allocated to service contracts at a different level in the costing system.

The maintenance of the recreation areas includes:

- Clearing grass
- Signage
- Maintaining facilities
- Managing health and safety

While we acknowledge that there is a debate amongst the irrigation community on whether they should bear these costs, we find that projected direct and labour costs are consistent with what is currently being incurred. SunWater has not provided further breakdown of the costs to help us understand how the costs relate to the various recreational management activities that they undertake and therefore we are unable to say if they are either prudent or efficient. In discussions with SunWater there is however an active push to hand over ownership of recreational areas to relevant councils to minimise cost to irrigators.

5 Burdekin Bulk Water Supply

5.1 Scheme Summary

The Burdekin Haughton Water Supply Scheme is managed from the Ayr regional center. The bulk water service involves the storage & delivery of water to customers in accordance with their water access entitlement (WAE) and the management of storages and WAE's in accordance with the regulatory requirements.

The scheme's bulk water components are:

- Burdekin Falls Dam
- Gorge Weir
- Blue Valley Weir
- Clare Weir
- Val Bird Weir
- Giru Weir
- Healeys Pump Station
- Reed Beds Pump Station

The capacity of the bulk water assets and their replacement cost as at 1 July 2011

Table 4. Bulk Water Assets

Asset	Capacity when Full	Optimised Replacement Cost
Dams		
Burdekin Falls Dam	1,860,000 ML	$718,176,292
Weirs		
Gorge Weir	9,095 ML	$1,670,338
Blue Valley Weir	3,820 ML	-
Clare Weir	15,900 ML	$66,421,187
Val Bird Weir	615ML	$14,551,806
Giru Weir	1,025ML	$6,619,246
Other Bulk Water Assets		
Land		$36,515,625
Stream Gauges		-
Meters		$0
Share of the Haughton pump station and main channel		$0
Working capital		$141,471
-	-	-
Total		$844,095,965
Capital contributions received from irrigators		$15,852,112

The storages above are listed in the Burdekin Basin ROP and as such, SunWater has obligations in relation to their management and operation. SunWater uses a network of hydrographical gauging stations for scheduling water deliveries and to generate stream flow data for ROL compliance reporting.

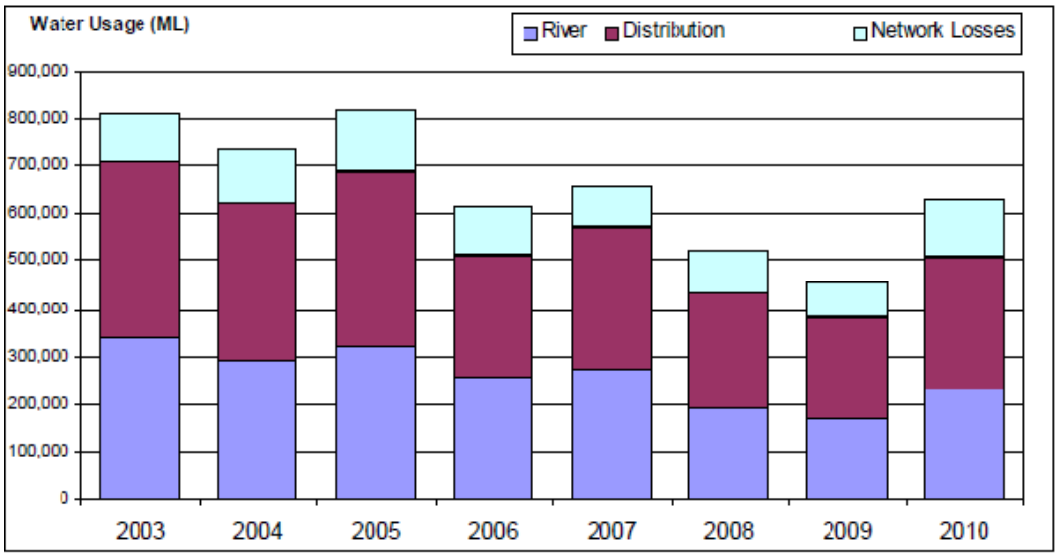


Figure 6 Burdekin Water Supply Scheme – Water Usage

The scheme's WAEs are listed in the Burdekin Basin ROP. They are located on the regulated section of the Burdekin and Haughton Rivers. The scheme has 369 customers. The scheme comprises of 979,594 ML of medium priority WAE and 99,998 ML of high priority WAE.

Services provided centrally are allocated to the scheme using a cost allocation methodology. A review of these allocations is not part of Arup's scope and is being reviewed by others. Unique to this scheme however, is the Tom Fenwick pump station and the use of the Haughton Main channel to pump and distribute water to other bulk water users. The NSP calculates the usage of these two assets to perform this duty at about 4% of their total workload and as such SunWater are allocating 4% of the associated costs to the bulk water supply. The allocation review needs to assess whether the 4% allocation is based on Medium priority WAE's only, or based on total flows. The bulk water being passed through these assets is for the Townsville City Council potable water supply and as such represents a large volume of water.

5.2 Irrigator comments & key concerns

Ref	Comment
1	Water losses have increased, calls into question efficient management of the scheme system i.e. gone from 30ML to 45ML
2	Some users are not paying their way, examples given i.e. DERM & Townsville City Council wrt potable supply
3	Irrigators see that local SunWater staff are very busy, and the question is whether centralisation of some duties has gone too far.

4	Has legal advice on the fencing policy been sought, and has SunWater's response been too conservative.
5	SCADA systems have not worked well
6	Numerous comments about lack of consultation and irrigators seeking more stakeholder engagement.
7	Numerous questions on the appropriateness of the annuities program to manage capital refurbishment.
8	SunWater have a lack of incentive to reduce costs.

5.3 Operations

Arup have reviewed the information provided by SunWater in conjunction with the site visits to assess the prudency of operational forecasts. To assess prudency the first step is to understand the trend changes in costs from historic to forecast. The following charts present the disaggregated cost information provided by SunWater which help to further break down the information provided in the NSPs. We have also looked at any correlation between water use trends and operational costs.

In this particular scheme and based on discussions with regional staff we generally note:

a) Operational activities for the scheme are noted in the Burdekin Scheme Manual[21]

b) Service delivery strategies have achieved efficiencies in better utilisation of their labour force and as a result there is a change in the distribution of costs and duties between preventative maintenance and corrective maintenance (refer above table).

c) For this particular scheme a new Resource Operations Plan was introduced in 2008, with further recent amendments in October 2010. This regulatory obligation initially increased operational costs, but with further experience SunWater has improved its efficiency in how these services are performed.

d) The SLIFI review has also reduced costs at the regional level. Savings have been in the following areas;

- Local administrative staff has gone from 23 customer service staff to 6 and a Brisbane base call centre.
- A vehicle strategy that reduces the number of vehicles leased and a change to favour 2WD's over 4WD's where possible, has reduced costs
- Disposed of houses in Clare and Ayr, reduces costs and any associated preventative & corrective maintenance.
- Amalgamation of Dalbeg and Millaroo offices and transfer to Millaroo
- Disposed of depot & land
- Adoption of IT Thin client technology

[21] Burdekin Haughton Water Supply Scheme – Scheme Operation Manual, Sunwater

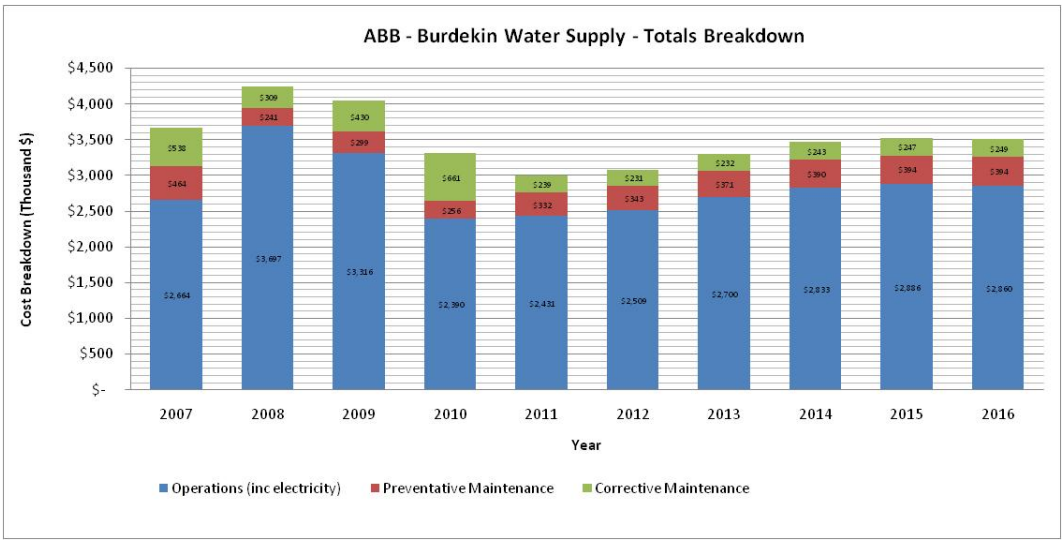


Figure -7: Burdekin Water Supply - Breakdown of Overall Operational Expenditure (Historic and Forecast)

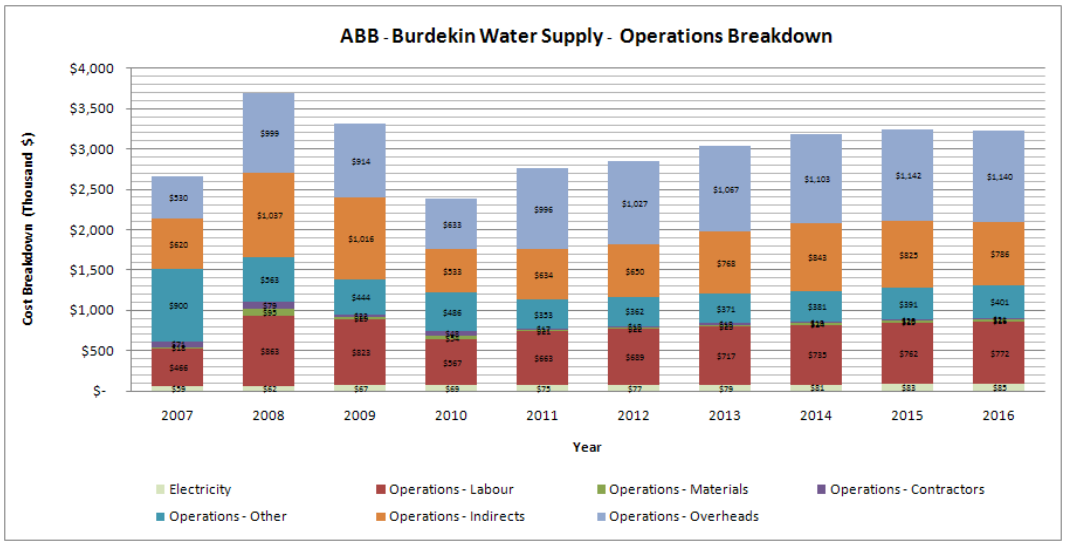
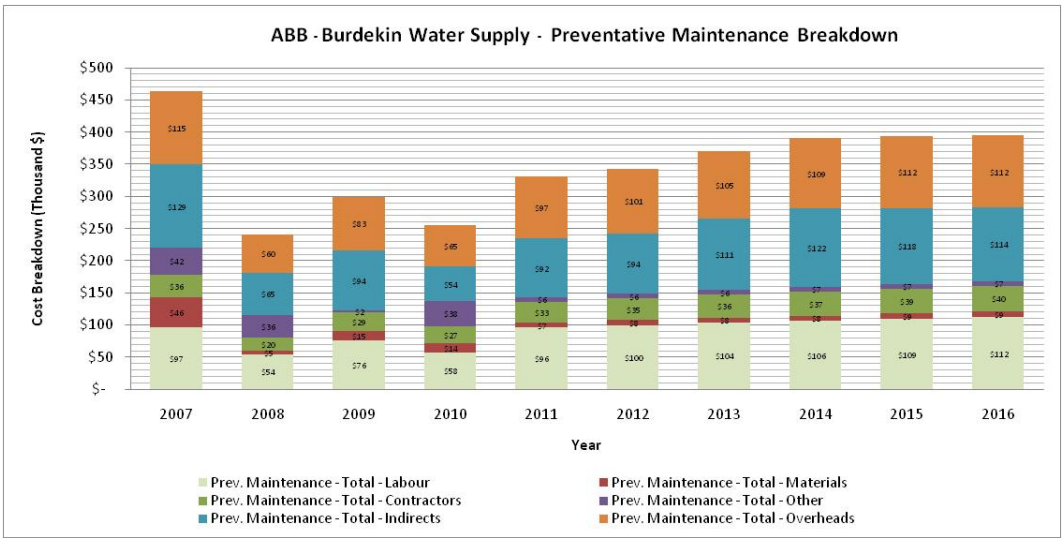


Figure 8: Burdekin Water Supply - Breakdown of Operational Costs (Historic and Forecast)

To better understand the variation in operational costs and the general decline in costs a further breakdown of the components is provided in Figure 8. There is likely to be some difficulty in comparing 2011 and onwards with earlier years given that the SunWater was structured differently. However we make the following general observations:

- Water use between 2007 and 2010 shows a general decrease from 2007 to 2009 and then an increase in 2010 and this trend seems to be the opposite of what is observed for general operations cost though seems to better reflect the trends in PM and CM
- We also note that the costs associated with Scheduling and delivery of water match the water use trend
- In looking at further disaggregated operational cost data (refer Appendix A) we note that the biggest component of general operations costs are to do with water management and scheme management.

- Greater than 50% of operational costs are indirects and overheads which are beyond the scope of this assessment
- The introduction of outcomes from the SLIFI review is shown to result in reduced labour costs for 2010 and 2011 from 2009 and 2008.
- Labour costs have plateaued and some reduction in contractor costs has shifted to labour and this is due to increased weed prevention.
- We also note that the work to be undertaken by SunWater has increased over time and largely relates to increased compliance though the introduction of ROPs and increased time in meeting health and safety obligations (eg development of work method statements etc)



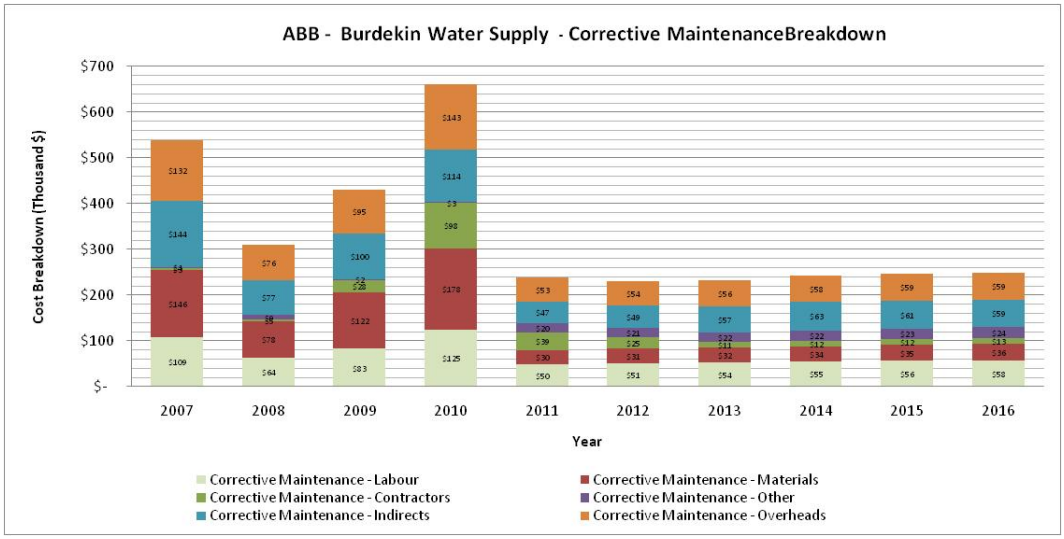


Figure 9: Burdekin Water Supply - Preventative Maintenance Breakdown (Historic and Forecast)

Figure 10: Burdekin Water Supply - Corrective Maintenance Breakdown (Historic and Forecast)

Figure 9 and Figure 10 provide the breakdown of preventative and corrective maintenance. These figures reveal:

- Indirects and overheads are greater than 50% of costs

- Corrective maintenance overall is forecast as reducing by 50 %
- SunWater indicated that corrective maintenance was under predicted and that future preventative maintenance is likely to increase to compensate for reduction in corrective maintenance.
- A full breakdown of historic preventative and corrective maintenance is provided in Appendix A

Being a Bulk Water Supply scheme, the majority of costs relate to scheme assets, which create and maintain a customer's Water Access Entitlement (WAE). Specifically scheme management and water management costs make up the largest components of operations costs. This in part includes the cost of discharging their obligations under the Resource Operations Plan which was introduced in 2009.

With respect to electricity SunWater have undertaken extensive cost benefit analyses into when and where they should adopt contestable or franchise tariffs. Specialist consultants in this field have been employed to advise SunWater on such strategies, and for this particular scheme the current advice is to run a franchise tariff.

Recreational costs appear to be wrapped up with centralised costs and another consultant is dealing with corporate overheads. Arup have seen recreational costs (past & present) and can comment that wherever possible SunWater is trying to offload these assets. For the Burdekin Bulk Water Supply scheme, refer to section 4.2.5 for graphs and further cost details

Insurances are another centralised allocation cost and as such are being assessed by others. The allocation for the Burdekin Haughton WSS is $272,000 annually for the 5 year price path. Two key parameters used by Insurance brokers to help determine annual premiums, is asset value and risk mitigation strategies. A move to the optimised replacement cost may increase the net value of assets to be insured and as such increase premiums. SunWater's risk mitigation strategies are robust and accreditations like ISO 9001, AS/NZS ISO4801 & AS/NZS ISO 14001 will be reviewed favourably by insurance brokers.

The information which has been analysed shows the general trends in operational costs but does not associate costs directly with work orders. Therefore the assessment of prudency and efficiency of costs cannot be assessed. However Arup's assessment of Opex for this scheme suggests that forecast Opex can be justified given historic trends. SunWater has demonstrated prudency and efficiency in its policies and procedures in maintaining its desired level of service. On this basis we would conclude that forecasts are in line with historic actual costs but cannot state whether the costs are prudent and efficient.

5.3.1 Operation and Water Use

Given the nature of the activities, some operational costs related to 'water management' and 'schedule and delivery' could be expected to be approximately proportional to the amount of water used. The charts in Figure 11 and Figure 12 below show the operational costs attributed to each of these activities, as well as the total amount of water used in the respective years. The charts show a slight

correlation between water usage and operational costs for the Burdekin Water Supply in the case of schedule and delivery, but not water management activities.

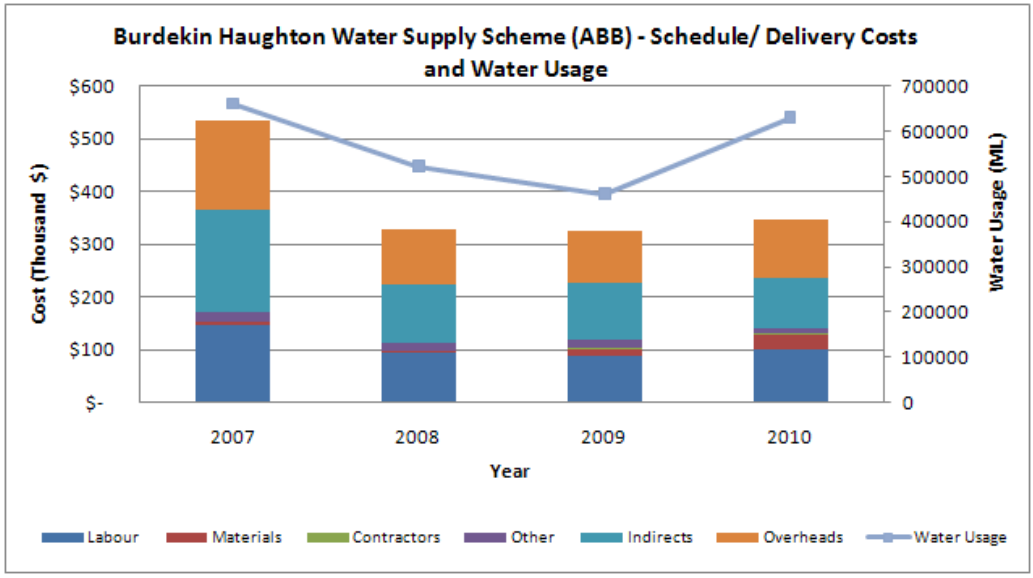


Figure 11 Burdekin Water Supply – Schedule and Delivery Operational Costs and Water Usage

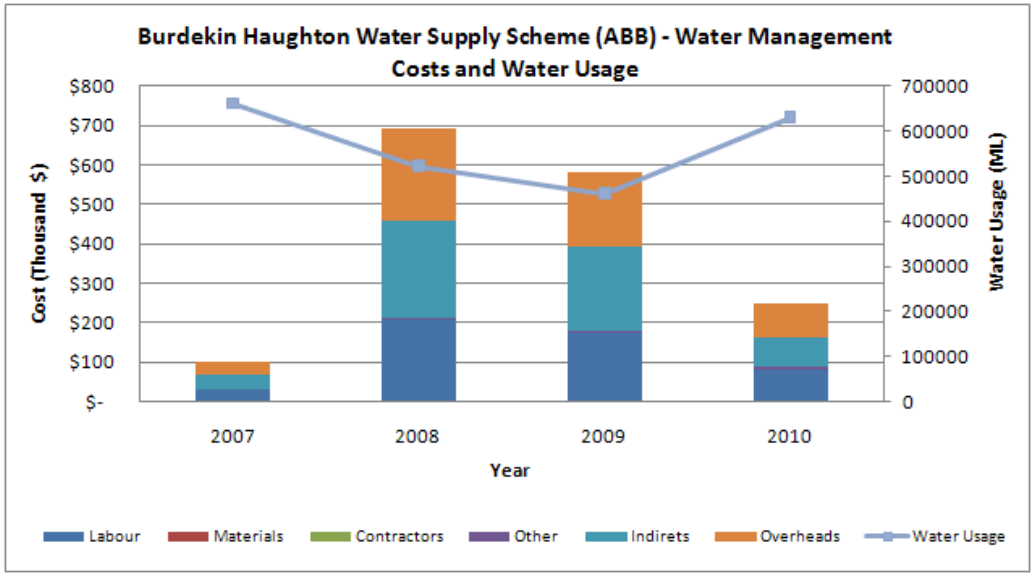


Figure 12 Burdekin Water Supply – Water Management Operational Costs and Water Usage

5.4 Assessment of Renewals

5.4.1 Renewals Accounting

The renewals annuity is part of SunWater's strategy to manage and refurbish the assets in perpetuity. It is a condition based depreciation, based on asset management plan, for those assets which are essentially renewed rather than replaced. An assessment on what assets should be replaced when, has been established and a histogram of these costs is provided in the NSP. Annually, an assessment is made on which projects in the annuity schedule should be pushed back or brought forward, and the projects for the upcoming year are chosen. The

selected projects then move through SunWater's project scoping process which includes updated cost estimation and an options analysis if over $50k in value.

An understanding of the renewals accounting process and a determination of the of the closing balance at 30 June 2011, requires detailed knowledge and data of several key aspects, these include;

BURDEKIN HAUGHTON WSS ($000's)		
(a)	Renewals balance 1 July 2006	(302)
(b)	Inflows to the annuity account (income from irrigation sector 2007 -2011)	2345
(c)	Renewals expenditure apportioned to irrigators 2007 - 2011	1742
(d)	Calculating interest on account balances	9.689%
(e)	Irrigator sector balance	268
(f)	Uplift factor whole of scheme	2.71
(g)	Scheme opening balance	727

a) The renewals balance has been taken from SunWater's paper, Renewals Annuity Calculation - Internal Working Paper.

b) Available in SunWater's annual report and same internal paper reference in (a)

c) This data is detailed in SunWater's paper, Renewals Annuity Calculation - Internal Working Paper. Arup has also checked these numbers with Annuity data for 2007-2011 provided by SunWater for all projects. Though we cannot get the numbers to precisely match, the variance is negligible.

d) There are some discrepancies in the interest rate to be used on balances. The SunWater paper, Renewals Annuity Calculation - Internal Working Paper, talks about using a 9.689%, but then renewal annual financial model – version 610.03 uses 6% for 2012 balances and then 5% for balances from 2012 and beyond. QCA need to determine the actual % rate.

e) The irrigation sector balance is the result of (a) x interest on balances + (b) – (c).

f) Uplift factor used to multiple (e)

g) Scheme opening balance

A review of the projects undertaken in the annuities scheme over of the 2007 – 2011 period show that,

- Assets being refurbished are strictly irrigation assets, required to be maintained to meet the required service regimes of irrigators, regulators and good corporate practice
- Assets are Treasury approved for assessment
- Project costs are only updated in the year they are scheduled to be undertaken. This is reasonable to ensure price estimations are current, alternative options are meaningful and allow for variance in asset life conditioning.

- Only unscheduled work, not in previous pricing path, relates to flood damage repairs in 2009 for Burdekin Headworks and GBA.

5.4.2 Renewals Forecasting

A full breakdown of the A review of the projects undertaken in the annuities scheme over of the 2011 – 2016 period show that,

- The Burdekin Scheme opening balance 1st July 2011 is positive and is banking money for big spends in 2023 – 2025. These works are to do with;
    - Replace main high voltage cable system at Burdekin Falls Dam
    - Replace electrical cable at Burdekin Falls dam
    - Replace hydraulic system at Clare Weir.
- Assets being refurbished are strictly irrigation assets, required to be maintained to meet the required service regimes of irrigators, regulators and good corporate practice
- Assets are Treasury approved for assessment
- SunWater incorporate option analyses for all projects greater than $50k, refer to attachment for their process flow control chart.

Arup have reviewed in greater detail the following projects within the 2011 – 2016 period. These include:

- Clare Weir Fishlock – Design and Implementation of hydraulic upgrades
- Clare Weir Fishlock – Completion of refurbishment of Clare Weir Fishlock
- Clare Weir – Replace Valve Control Equipment
- Val Bird weir outlet works

Clare Weir Fishlock – Design and Implement Hydraulic Upgrades - $162K – 2011 & Completion of refurbishment of Clare Weir Fishlock - $274K - 2012

The construction of the Clare Weir fishway commenced in 2004 and was commissioned in early 2005. Since commissioned, the fishway has suffered a significantly high level of unreliability resulting with upwards of $300,000 having been spent on maintenance.

Arup has seen that SunWater's environmental engineer carried out a detailed assessment of the functionality and effectiveness of the weir and reported a detailed list of faults requiring significant works which was documented and entered into the SunWater Hummingbird system. Jamming of gates and valve actuators from debris;

- Repeated failure of the valve actuator cylinders;
- Failure of the gate hydraulic cylinders;
- Contamination of the hydraulic fluid;
- Breakage of the gate seals;
- The downstream gate not fully closing;

- Accelerated corrosion of the gates after damage to the protective coating;
- Lack of crane access to the lock and holding chambers;
- Filling of the various lock chambers with debris;
- Poor performance of the hydraulic system pumps;
- High hydraulic operating pressures;
- Corrosion of one level sensor;
- Blocking of level sensor stilling tubes;
- Loss of handrails and access ladders;

Arup have reviewed the document and found it to appropriately cover all the issues associated with the fishlock. Specifically we note that for this relatively new structure, the design has underestimated the level of debris during normal operation therefore leading to many of the issues noted above. In support of this operation and maintenance staff have advised of significant levels of coarse sand and stones being introduced under normal operation.

Following on from this assessment we note that Sunwater developed a program over 2 years to design and replace hydraulic components. We note that in the May 2010 SunWater's senior mechanical engineer inspected the weir to look at the hydraulic issues and to develop a detailed report of the problems associated with the fishlock including preparation of detailed costs.

The 2009/2010 ROP for the Burdekin Basin states the ROL holder, where practicable must use the fishway to release water from Clare Weir followed by the outlet valve and then over the crest of the weir. This requires that the fishlock be kept functional and as such we consider this expenditure item to be prudent.

With regards to costing Arup have reviewed the Senior Mechanical Engineer's report produced in 2010 which looks at options for refurbishment taking into account the long term operational issues which are likely to occur at the site. Specifically we note the following measures:

- The use of a more robust actuator and replacing the cover over the valve put with a more solid cover to prevent major debris from jamming the actuator mechanism
- Modification of gate design to reduce the size of debris entering the lock
- Applying some of the design principles used at the Bowen Weir Fishlock (build 2009) to eliminate some of the operational issue at the Clare Weir Fishlock

We note the works proposed as part of refurbishment seek to reduce long term operational costs at the weir. We also note that the costings are based on the costs incurred during the construction of the Bowen Weir fishlock which is a similar mechanism to that at Clare. We note that this is an appropriate assessment of costs for the production of the NSP and believe it to be a prudent expenditure and efficient cost using the most recent available costs from a similar project.

Clare Weir – Replace Valve Control Equipment - $104K - 2016

SunWater have stated that they have historically aimed to replace electronic systems every 10 years apart from reasons due to condition, obsolescence and availability of spare parts. An options study has been proposed for 2015 valued at $5K which is for the commissioning of a specialist to check if the best strategy has been adopted in light of risk and condition. This will seek to determine if the control unit can operate for a further period of time which may seek to re-life the asset and therefore defer investment. This is considered a prudent methodology for justifying the investment in replacement of the control valve. The cost of the replacement has been based on the cost from close out of construction in 2005 and has subsequently been revalued. Arup were not able to determine the source of the revaluation for this specific piece of equipment. We also note that SunWater have provided us with output from the SAP system which shows the replacement cost as being $82,736 and not $104K as shown in the annuity spreadsheet which forms the basis of the NSP. We have sought clarity around the difference proposed but have not yet received a response from SunWater. We consider the basis of the replacement cost as appropriate though clarification is necessary on why the SAP system is showing a different value to that in the annuity spreadsheet.

Val Bird Weir Outlet Works – Stg 1 and Stg 2 - $279K – 2012/2013

In this instance, Arup were provided output from the SAP system and we consider this inadequate for the assessment of prudency and efficiency. We note that this piece of equipment has been in operation from 1982 and SunWater show that this work is necessary as part of the Resource Operation Plan. Arup have briefly reviewed the plan and note the mention of the weir in the plan. It is however unclear how the outlet works proposed are necessary to meet the requirements of the ROP. Without this information Arup are not able to assess prudency and efficiency.

General Observations

Each scheme has a large number of items identified under the R&R program. The timeframe for this study did not allow investigation of a large number of items. We have therefore undertaken a broad sense check of works proposed based on the spreadsheet which SunWater states is the basis for the NSP. Arup believe the following aspects need to be justified:

1. Clare Weir - We note that at Clare weir there is an annual cost of approximately 75K for the refurbishment of hydraulic rams from 2013 to 2036. We also note that in 2017 SunWater have costed an options analysis to review hydraulic system requirements and refurbishment strategy. We are unclear as to why refurbishment is being undertaken prior to the development of the options study and we have not received any information from SunWater regarding the basis of the annual 75K which makes a large contribution to the annuity balance.

2. Between 2017 and 2021 we note that SunWater are undertaking a full replacement of cylinders at various gates at Clare Weir. The total for this replacement is $3.75M which is an extensive sum. This is based on applying a unit cost of $25K per cylinder. We note that the methodology

used in preparing the breakdown, ie itemising costs on a per asset basis, generates a large number of items many of which should be packaged up into single items that would probably be more economic in delivery and in this instance even a 10-20% saving would have an obvious benefit to the balance. Arup are unable up comment on the amount of benefit until we have more detail on what work this actually captures, something not clear from the information thus provided.

3. We note from the information provided to Arup that SunWater have proposed spending $1.2M in 2026 for what they have termed as "Refurbish Hydraulics – three year program balance of replacement budget". This does not refer to a specific asset but rather a program of works. It is unclear how the system would have identified this piece of work and it also may double up on the annual hydraulic modifications proposed for prior years. This will have a notable impact on the scheme and SunWater should provide clear justification for this item before it is considered either prudent or efficient.

5.5 Summary of Observations

In summary Arup note the following observations:

- We note that the procedures adopted are prudent and that SunWater are undertaking work to make their operations more efficient.
- As outlined in the NSP and validated above, total operating costs for the new pricing path versus the previous pricing path is reducing some 15%, which seems achievable with the caveats around electricity and regulatory mandated activities though we would expect a much larger increase in the cost of electricity.
- Opex forecasts are reasonable considering historic trends and we note that increases in forecast PM has been negated by decreases in forecast CM
- Arup have insufficient information to conclude whether Opex are prudent and efficient as we have no method for linking costs with work orders
- The annuity program appears robust and is congruent, with the asset management strategy adopted by SunWater.
- The scheme is currently positive and banking money for future years.
- Arup would like to highlight, the higher than industry average WACC and whether irrigators have sufficient input in deciding future expenditure and in particular unbudgeted expenditure, like the 2009 flood damage repairs.
- Arup would like to see greater detail around works envisaged for the current financial year to understand if costs proposed are prudent and efficient
- The methodology used in applying the annuities program appears prudent but Arup are not able to make an assessment around the efficiency of costs given we have not been given sufficient detail of the actual works proposed.
- We also note that irrigators raised the issue of supplying water to North Queensland Water who have access to the distribution network but are thought to only pay the bulk charge component. Sunwater has stated that NQ water has a capacity of 10,000 ML in the channel systems while there is approximately 110,000 ML of allocations in reserve in the Burdekin River.

SunWater state the NQ water are apportioned a share of the channel distribution cost bases on a water delivery entitlement of 10,000 ML and any additional need for water will require them to fund the channel upgrade to increase capacity.

6 Burdekin Distribution Scheme

6.1 Scheme Summary

The Burdekin Haughton distribution system is located near the town of Clare and includes the following major sub-systems:

- Dalbeg System
- Millaroo System
- Haughton System
- Barratta System
- Giru Benefited Area
- Clare System
- Elliot System

These systems include 391 km of channels and pipelines and 372 km of drains. SunWater has contractual obligations to customers in relation to the management and operation of these systems.

A description of the major distribution assets that comprise each of the sub-systems is presented in Table 3

Table 5. Bulk Water Assets

Sub-System	Assets	Optimised Replacement Costs
Dalbeg System	• Three pump stations: • Dalbeg A – 74ML/day capacity • Dalbeg B – 74ML/ day capacity • Dalbeg Relift – 18ML/ day capacity • Dalbeg main channel is concrete lined and lateral channels are unlined.	Not Available
Millaroo System	• Three pump stations: • Millaroo A – 180ML/day capacity • Millaroo B – 111ML/ day capacity • Millaroo Relift – 34ML/ day capacity • Most Millaroo channels are concrete lined.	Not Available
Haughton System	• Haughton Main Channel is mostly unlined and can carry 2,600ML/ day • Tom Fenwick Pump stations – 3,023ML/ day • Haughton Balancing Storage	Not Available
Barratta System	• Barratta main channel, laterals and sub-laterals are mostly unlined and open – full gravity system	Not Available
Clare System	• Two pump stations: • Clare A – 166ML/day capacity • Clare B – 122ML/ day capacity	Not Available
Elliot System	• Elliot pump station – 180ML/ day capacity • Elliot Main Channel – 3,800ML/ day capacity	Not Available

The Burdekin Haughton distribution system has 258 customers. The scheme comprises 280,801 ML of customer held medium priority WAE and 10,000ML of

customer held high priority WAE. SunWater holds 190,477ML of medium priority WAE and 16,260 ML of high priority WAE for distribution losses. These distribution losses will attract bulk water charges.

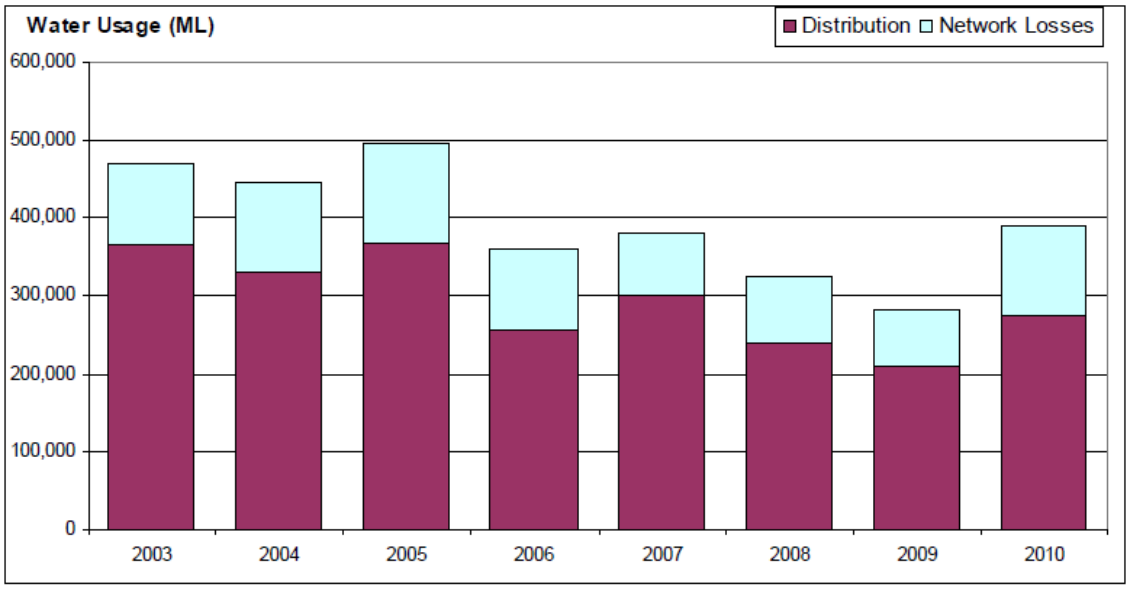


Figure 13 Burdekin Distribution Scheme – Water Usage

6.2 Irrigator Comments & Key Concerns

Refer Section 5 for comments.

6.3 Operations

Arup have reviewed the information provided by SunWater in conjunction with the site visits to assess the prudency of operational costs. To assess prudency the first step is to understand the trend changes in costs from historic to forecast. The following charts present the disaggregated cost information provided by SunWater which help to further break down the information provided in the NSPs. In this particular scheme overall operational costs (excluding electricity) are increasing annually about 1.65% when comparing the current pricing path annual average with the proposed price path.

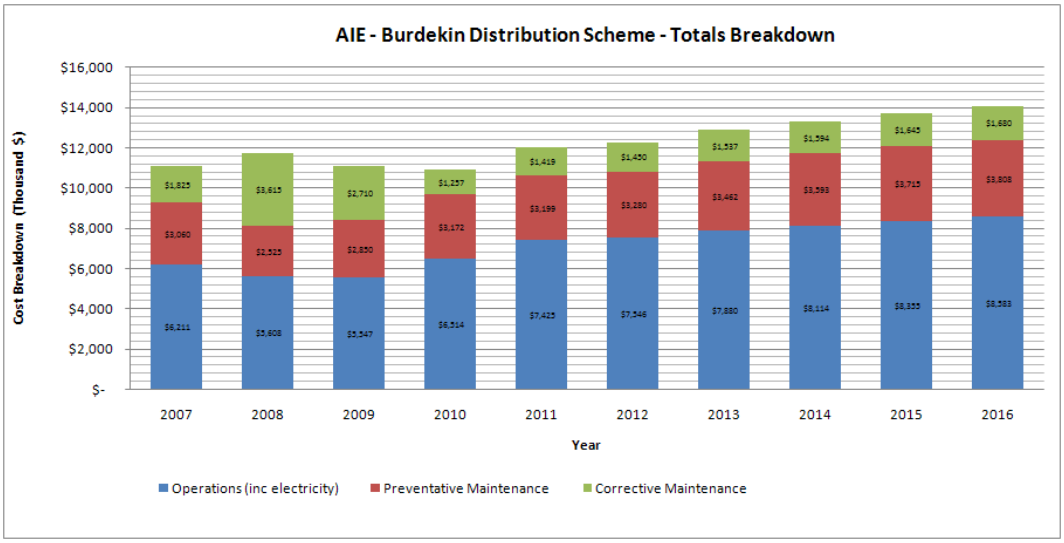


Figure 14 Burdekin Distribution Scheme - Breakdown of Overall Operational Expenditure (Historic and Forecast)

In 2011 costs for operations, preventative & corrective maintenance and allowing for deductions in revenue offsets amount to $8,057,000. The proposed increases on this number for the 2012 – 2016 pricing path are less than CPI. A review of the breakout costs, graphically show Service delivery strategies have achieved efficiencies in better utilisation of their labour force and as a result there is a change in the distribution of costs and duties between preventative maintenance and corrective maintenance (refer to tables).

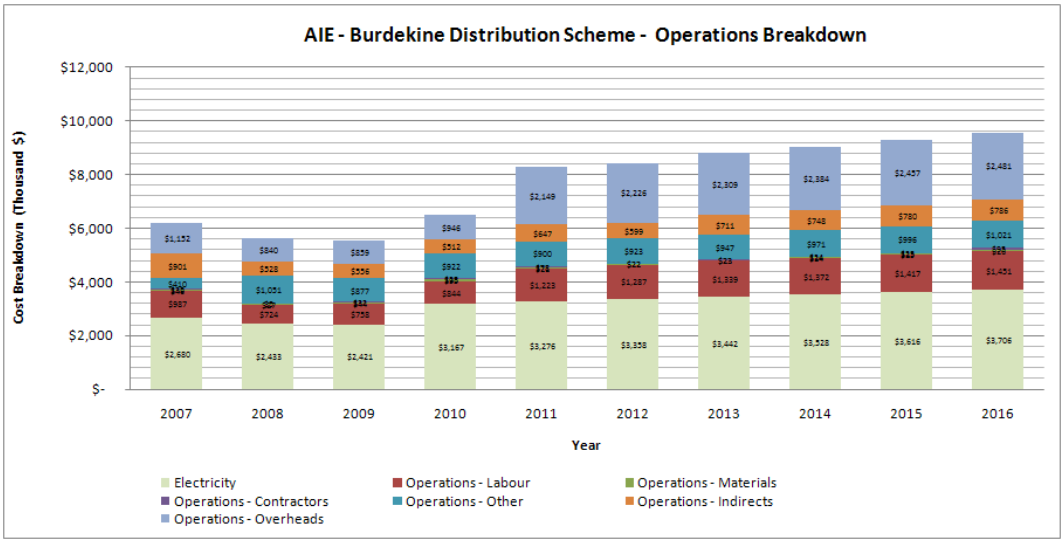


Figure 15 Burdekin Distribution Scheme - Breakdown of Operational Expenditure (Historic and Forecast)

A review of historic data operations data indicates that scheduling and delivery of water is by far the largest component with labour and overheads being the largest components within this. We note that labour costs generally increase across the Opex budget and have received no explanation why this may be the case. Some reapportioning may be evident between the bulk and distribution scheme but this would not explain the overall rise in operational labour costs for the distribution scheme.

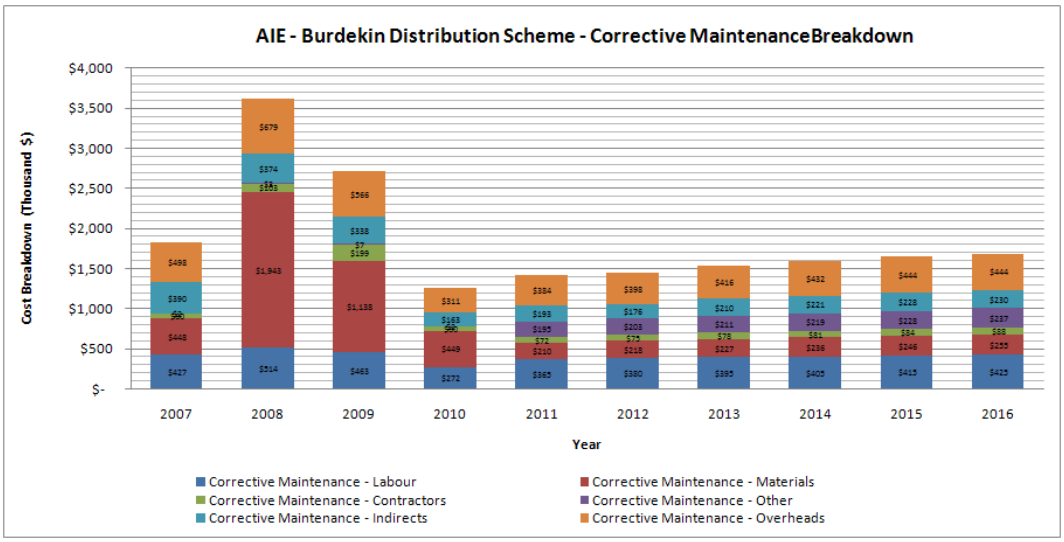


Figure 16 Burdekin Distribution Scheme - Breakdown of Corrective Maintenance Expenditure (Historic and Forecast)

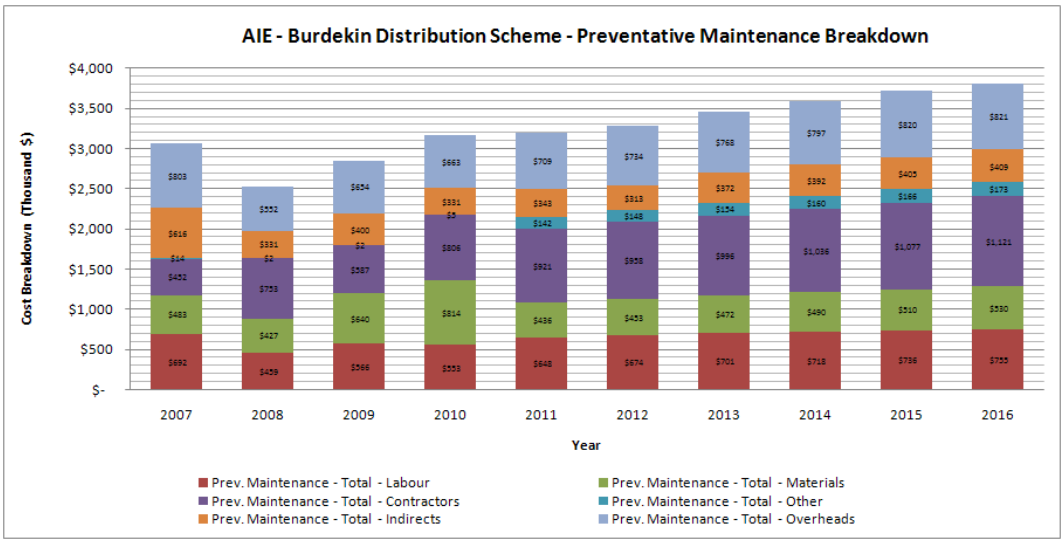


Figure 17 Burdekin Distribution Scheme - Breakdown of Preventative Maintenance Expenditure (Historic and Forecast)

Delving further into operational costs (Figure 15) shows electricity as being a large component. The issue of utilising contestable tariffs was raised by irrigators to reduce electricity costs. SunWater indicated that due to the remote nature of the scheme that contestable tariffs were not applicable.

Figure 17 shows the breakdown of preventative maintenance. Materials and specifically chemicals are a large cost component. After field visits and discussions with irrigation users and SunWater operational personnel, one of the biggest issues threatening the standard of operations in this scheme is weed control, due to a noxious weed problem with Hymenachne. Arup have reviewed SunWater's internal paper and estimate approximate cost increases to be as follows. Additionally we point to the data provided in Appendix A which shows the increase in cost of materials around weed control as part of PM. The figures also indicate that weed control as being the largest part of the distribution scheme

PM program. However Arup queries why both labour and contractor costs have increased within the PM weed control budget.

Acrolein Paper	2012	2013	2014	2015	2016	TOTAL
Acrolein (2011 numbers $6k/drum @38 drums) (old numbers $4k/drum@ 32 drums) Annual delta	$100k	$102k	$105k	$108	$110	$525k
NewTech man ($80k includes on costs)	$82k	$84k	$86k	$88k	$90k	$430k
TOTAL	$182k	$186k	$191k	$196k	$200k	$955k

2012 starts with 2.5% CPI increase

After taking into consideration proposed increases in Acrolein to combat a growing weed control problem in the channels, and applying a simple CPI increase (2.5%) to operational costs, it becomes apparent that cost savings are being achieved on their projected 5 year opex spend of $58,187k.

One noteworthy saving initiative observed in this scheme was the new policy of slashing the grass and vegetation only 1-2 meters alongside the channels and not the entire nature strip. This has delivered savings in contractor labour who are normally engaged to undertake this work.

Other observed savings initiatives are to do with the SLIFI program.

- Local administrative staff have been reduced.
- A vehicle strategy that reduces the number of vehicles leased and a change to favour 2WD's over 4WD's where possible, has reduced costs
- Disposed of houses in Clare and Ayr, reduces costs and any associated preventative & corrective maintenance.
- Disposed of Depot & land
- Adoption of IT Thin client technology
- Operation and Water Use

6.3.1 Operation and Water Usage

Given the nature of the activities, some operational costs related to 'water management' and 'schedule and delivery' could be expected to be approximately proportional to the amount of water used. The chart in Figure 21 below shows the operational costs attributed to schedule and delivery, as well as the total amount of water used in the respective years (no operational costs were attributed to water management activities in the period 2007 – 2010). The chart shows a slight correlation between water usage and schedule and delivery operational costs for the Burdekin Distribution Scheme.

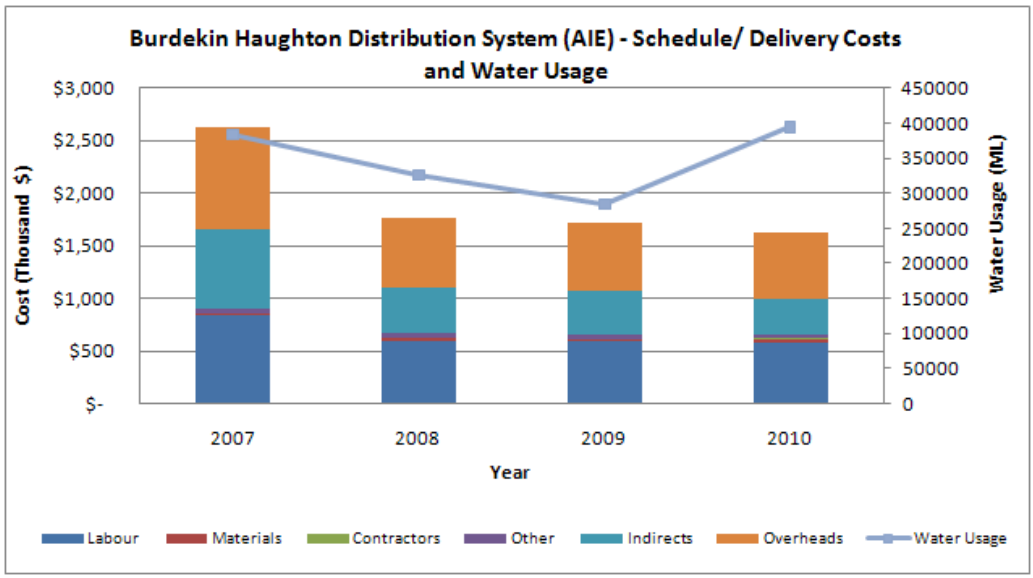


Figure 18 Burdekin Distribution Scheme – Schedule and Delivery Operational Costs and Water UsageAssessment of Renewals

6.3.2 Renewals Accounting

The renewals annuity is part of SunWater's strategy to manage and refurbish the assets in perpetuity. Its condition based depreciation, based on asset management plan, for those assets which are essentially renewed rather than replaced. An assessment on what assets should be replaced when, has been established and a histogram of these costs is provided in the NSP. Annually, an assessment is made on which projects in the annuity schedule should be pushed back or brought forward, and the projects for the upcoming year are chosen. The selected projects then move through SunWater's project scoping process which includes updated cost estimation and an options analysis if over $50k in value.

An understanding of the renewals accounting process and a determination of the closing balance at 30 June 2011, requires detailed knowledge and data of several key aspects, these include:

BURDEKIN HAUGHTON DISTRIBUTION ($000's)		
(a)	Renewals balance 1 July 2006	(883)
(b)	Inflows to the annuity account (income from irrigation sector 2007 -2011)	8007
(c)	Renewals expenditure apportioned to irrigators 2007 - 2011	9972
(d)	Calculating interest on account balances	9.689%
(e)	Irrigator sector balance	(3201)
(f)	Uplift factor whole of scheme	0
(g)	Scheme opening balance	(3201)

The renewals balance has be taken from SunWater's paper, Renewals Annuity Calculation - Internal Working Paper. It is not in Arup's scope to critique this paper.

a) Available in SunWater's annual report and same internal paper reference in (a)

b) This data is detailed in SunWater's paper, Renewals Annuity Calculation - Internal Working Paper. Arup has also checked these numbers with Annuity data for 2007-2011 provided by SunWater for all projects. Other than 2007, we have difficulty in aligning up project expenditure in the excel spreadsheets with those on Table 8 of the Renewals Annuity Calculation - Internal Working Paper. The difference is larger than net present value adjustments at 2011 values. It could do with project closure times and when, the project gets allocated to which fiscal year.

c) There are some discrepancies in the interest rate to be used on balances. The SunWater paper, Renewals Annuity Calculation - Internal Working Paper, talks about using a 9.689%, but then renewal annual financial model – version 610.03 uses 6% for 2012 balances and then 5% for balances from 2012 and beyond. QCA need to determine the actual % rate.

d) The irrigation sector balance is the result of (a) x interest on balances +(b) –(c).

e) Uplift factor used to multiple (e), not applicable for Distribution schemes.

f) Scheme opening balance

6.3.3 Historical Renewals

Table 6 provides a list of the largest historical renewals items undertaken between 2006 to 2011. While the scheme started on a negative balance in 2006, the value of the balance has decreased significantly over the last 5 year period. Arup have therefore undertaken a brief review to understand what items may have contributed to these increased negative balance. From the list in Table 6 it is evident that a large proportion of expenditure was related to flood damage repair which would not have been part of the program at the start of 2006. We identified $2.265M worth of flood damage repair costs in the schedule provided. Other new items found in the list provided to Arup which would not have been identified at the start of 2006 include:

- Fencing installations ($49K)
- Intersafe projects ($501K)

Table 6: Top 10 Historical Renewals Expenditure Items - Burdekin Distribution System 2007 - 2010

Historical Renewal Item	Money Spent
Flood Damage Repair - HMC & P/Stns (2008)	$636,025
Intersafe Gated - Clare (2010)	$464,483
Millaroo Channel 3 - Refurbish Earth Channel with HDPE Pip (2007)	$322,493
Dalbeg Channel A - Replace Pipeline Lateral with HDPE (Stage II) (2007)	$282,192

Refurbish Pump Station - Clare PSTNA 3/4 - Design (Stage 1) 2008 - Construct 2009 (2008)	$206,534
Flood Damage Repair - Haughton System (2008)	$189,637
Flood Damage Repair - HMC & P/Stns (2008)	$176,508
Flood Damage Repair - Barratta System (2008)	$168,508
Flood Damage Repair - Haughton Drainage (2008)	$155,818
Refurbish Pump Station - Clare PSTNA 3/4 - Design (Stage 1) 2008 - Construct 2009 (2010)	$153,711
Reinstate Flow Metering - Haughton Diversion Channel (2010)	$148,585
Flood Damage Repair - Clare System (2009)	$138,255
Replace Control System inc PLC & Install Remote Vibration Monitoring Equipment - Tom Fenwick Pstn1 (2010)	$110,110
Flood Damage Repair - Millaroo System (2009)	$110,062

A summary of the top 10 projects by cost between 2007 and 2011 is shown in Table 6.

6.3.4 Forecast Renewals

A review of the projects undertaken in the annuities scheme over of the 2011 – 2016 period show that:

- Assets being refurbished are strictly irrigation assets, required to be maintained to meet the required service regimes of irrigators, regulators and good corporate practice
- Assets are Treasury approved for assessment
- Project costs are only updated in the year they are scheduled to be undertaken. This is reasonable to ensure price estimations are current, alternative options are meaningful and allow for variance in asset life conditioning.
- The Burdekin Distribution Scheme opening balance 1st July 2011 is negative $3.2M and is forecasting significant customer funding spends in 2012, lower commitments in 2013 – 2016 with sharp escalations in 2017 and beyond.
- Arup have reviewed a few key items under the forecast budget including
    - Intersafe Gated project for Millaroo
    - Millaroo Irrigation System – Fencing Policy Implementation
    - Replacement of discharge valves – Millaroo B Pump Station – Pump Units 1, 2 & 3
    - Barratta Irrigation Distribution – Replace Rotating Weed Screen

Intersafe Gated Project

The Intersafe gated project is being rolled out by SunWater in maintaining appropriate WHS standards for its employees. We have seen that SunWater has undertaken a risk assessment of all relevant Millaroo assets and identified high or

extreme risk assets for modification. The need to apply this across the state at various schemes has meant that efficiencies could be adopted in terms of assessment and procurement. Arup is satisfied that the procedures around implementation of this project represent prudent and efficient practices and therefore are likely to result in prudent and efficient costs.

Millaroo Irrigation System – Fencing Policy Implementation

The Millaroo fencing policy is part of SunWater's fencing policy in exercising its duty of care with respect to public safety. We acknowledge that as a state-wide policy that SunWater have adopted prudent and efficient practices in its implementation. Activities include a risk assessment approach to identify high risk areas which warrant fencing and regional procurement strategies in implementation of the policy. Arup however not that while cost recovery from adjacent land owners has been identified that significant additional negotiation needs to be undertaken in conjunction with local councils to ensure that this actually takes place. We note that cost recovery has not always occurred though non-action on this may result in far greater costs to SunWater and therefore irrigators.

Replacement of discharge valves – Millaroo B Pump Station – Pump Units 1, 2 & 3

Arup have reviewed the SAP output relating to the replacement of the discharge valves. We are not able to ascertain from this output whether this is a prudent and efficient expenditure. We however note that original replacement date as being 2010 with the revised scheduled replacement date now moved to 2012 with an options analysis being proposed for 2011. This would imply that some degree of prioritisation takes place as suggested by SunWater. We note that the Bill of Materials produced in 1997 indicated a replacement cost of $29,710 for one such valve. The estimated cost for 2010 is $67,739 for each valve though we are not shown the basis by which the 1997 cost has been escalated. We however believe that the replacement of the three valves is unlikely to be a direct multiplier of 3 from the value of one. While this may be sufficient for the purposes of estimating into the future we would expect that the real cost of the replacement of the three will be less than estimated. An options study is proposed which will provide a more realistic estimate of the replacement cost.

Barratta Irrigation Distribution – Replace Rotating Weed Screen – 2012 - $175K

Based on information from SunWater, the rotating weed screen failed in service due to corrosion and mechanical wear and on this basis for assigned a condition score of 6 (failed) with a replacement item raised for 2012. We understand that the budget for this item was obtained from a quote obtained from Batescrew Pumps and Valves (Quote LC102123) in Dec 2009 of $174k for two screens to be fitted side by side. Given that this value was in excess of 50K it has triggered further investigation in 2010/2011 which revealed a cheaper alternative of $43K. Without a detailed review of the actual works proposed, Arup are not able to comment if this is the most efficient cost but note that the procedures adopted are considered to generate a prudent outcome. We also believe that SunWater has endeavoured to obtain a more efficient costing which was identified through the

investigation undertaken. This demonstrates that initial costings may not always represent the best solution, which is likely to only be identified upon more detailed investigation. SunWater have indicated that this 2011/2012 replacement planning item will be retained until the boom arrangement is proven in the short term and if no evidence of failure will be modified within the program.

General Observations

Each scheme has a large number of items identified under the R&R program. The timeframe for this study did not allow investigation of a large number of items. We have therefore undertaken a broad sense check of works proposed based on the spreadsheet which SunWater states is the basis for the NSP.

We note that there are a large number of items for replacement within the same year within close geographical proximity:

- Replacement of 900Mhz radio with 450Mhz model at R016 – Barratta Irrigation System (48K)
- Replacement of submersible pump at Clare B pump station (196K)

Items such as the above are identified purely based on replacement date for that specific component and SunWater have indicated that the costing are based on replacement cost for the single item. The risk of applying such a methodology means that economies of scale of doing similar works within a similar area are not captured in the budgets. These are the key items identified in the 2012 to 2016 period however we note that there are many more such items identified for the 2016 to 2036 period. Certainly we would expect that the impact of costing these items separately could result in an overprediction of 30 – 40 % depending on volume. Where this is the case and where the cost impact can be significant, we would recommend that SunWater reassess a more appropriate rate to reduce the impact of overprediction on its customers.

6.4 Summary of Observations

In summary Arup note the following observations:

- We note that the procedures adopted are prudent and that SunWater are undertaking work to make their operations more efficient.
- As outlined in the NSP and validated above, total operating costs for the new pricing path versus the previous pricing path is increasing 8.3% over the 5 year period, which is approximately a 1.65% annual increase (less than CPI).Opex forecasts are reasonable considering historic trends and we note that increases in forecast PM has been negated by decreases in forecast CM
- Arup have insufficient information to conclude whether Opex are prudent and efficient as we have no method for linking costs with work orders
- Arup have undertaken a brief review of items which contributed to the negative opening balance and forecast items
- The scheme currently has a significant negative opening balance but this can be explained and has been discussed above in section 5.2.3. One of the contributors to the negative balance has been flood damage and Arup has made enquiries as to how these monies are paid back into the scheme.

SunWater have confirmed that any Insurance claim revenue received is prorated to each service contract against the entire related spend and then included as a revenue in the annuity calculation. This means that any amounts not able to be claimed and the deductable are spread against the service contracts that are affected by the event. This has been reviewed by Indec and they have raised no issues with its treatment. Arup would like to highlight, the higher than industry average WACC and whether irrigators have sufficient input in deciding future expenditure and in particular unbudgeted expenditure, like the 2009 flood damage repairs.

- For forecast items we found that SunWater were implementing practices which would result in a prudent and efficient outcome with regards to justifying work, undertaking investigations and updating costings.
- We however note that there is a lower level of accuracy of projects post the current financial year given that they have been identified largely based on replacement date and replacement cost.
- For large numbers of multiple items at the same site we note that SunWater are using the individual replacement cost for a single item and multiplying it by the numbers of items which we believe will lead to an overprediction of costs. Arup would therefore recommend that SunWater review such items and ensure that the costs captured take account of likely discounts from working in close geographical proximity and economies of scales for materials purchased.
- The methodology used in preparing the breakdown, ie itemising costs on a per asset basis, generates a large number of items many of which should be packaged up into single items that would probably be more economic in delivery. While we consider that asset life is an appropriate method for identifying works post the current financial year we believe that SunWater should do a sense check of the program out to 2036 and certainly for large numbers of the same item in any one year should be modified to include the likely level of economy that could be generated.
- Outside of the issue raised above, the methodology used in applying the annuities program appears prudent but Arup are not able to make an assessment around the efficiency of costs given we have not been given sufficient detail of the actual works proposed.

7 Mareeba Water Supply Scheme

7.1 Scheme Summary

The Mareeba Dimbulah Water Supply Scheme is centred on the town of Mareeba in Far North Queensland. The scheme's bulk water components are:

- Tinaroo Falls Dam on the Barron River
- Collins Weir on Walsh River
- Bruce Weir on Walsh River
- Leafgold Weir on Walsh River
- Solanum Weir on Eureka Creek
- Dulbil Weir on Tinaroo Creek
- Granite Creek Weir on Granite Creek

The storages above are listed in the Barron ROP and as such, SunWater has obligations in relation to their management and operation. SunWater uses a network of hydrographical gauging stations for scheduling water deliveries and to generate stream flow data for ROL compliance reporting.

The capacity of the bulk water assets and their replacement cost as at 1 July 2011 are presented in Table 7.

Table 7. Bulk Water Assets

Asset	Capacity when Full	Optimised Replacement Cost
Dams		
Tinaroo Falls Dam	438,920ML	$228,386,866
Weirs		
Dulbil Weir	271 ML	$442,597
Granite Creek Weir	244 ML	$1,721
Collins Weir	600 ML	$3,642,876
Bruce Weir	970 ML	$3,051,984
Leafgold Weir	260 ML	$2,863,503
Solanum Weir	345 ML	$1,926,182
Other Bulk Water Assets		
Land		$15,278,906
Stream gauges		$0
Meters		$0
Share of the West Barron MC		$0
Working capital		$101,197
Third party assets including relocated road, railway lines and bridges		-
Total		$255,695,834
Capital contributions received from irrigators		$6,263,473

The scheme's WAEs are listed in the Barron ROP. The scheme has 1,136 customers of whom 1,008 customers take water from within the distribution network or from steams supplemented by the distribution network. The scheme comprises of 190,398 ML of medium priority WAE and 14,026 ML of high priority WAE.

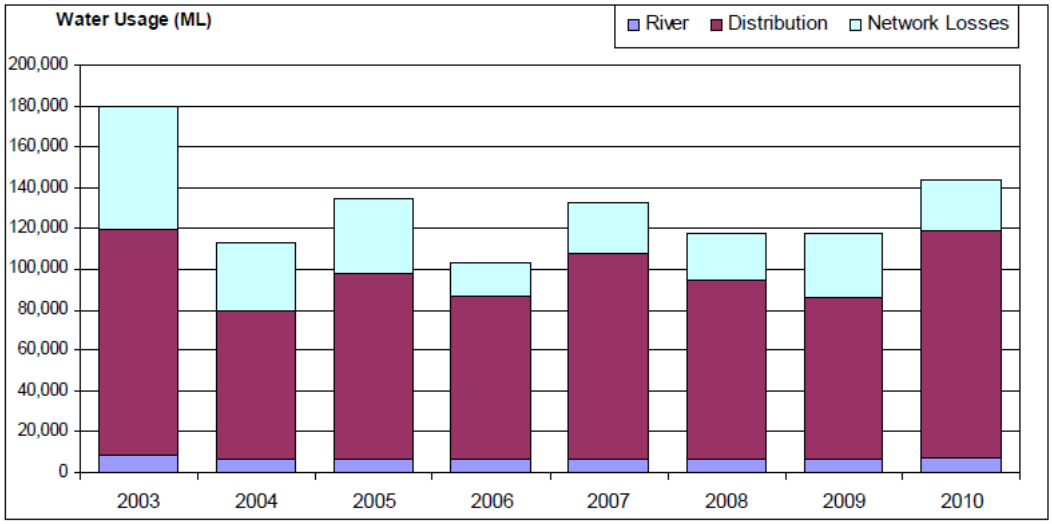


Figure 19 Mareeba Water Supply Scheme – Water Usage

7.2 Irrigator comments & key concerns

The comments provided in Table 8 are a summary of those comments raised by Mareeba Irrigators.

Table 8: Comments from Mareeba Irrigators

Ref	Comments
1	It was claimed that the three part tariff system was working well and that they did not want to change and were particularly reluctant to change to a solely Part A system
2	Claims were made that the service from SunWater was not up to standard and particular example give was that temporary transfers are now taking much longer and that they are talking to staff at head office who are not familiar with the scheme.
3	Irrigators see that local SunWater staff are very busy, and the question is whether centralisation of some duties has gone too far.
4	Measures used to restrict the movement of the fish Talapia have not worked and therefore they believe that the costs incurred are not efficient and are not addressing the problem
5	The irrigation advisory committee resigned because they were not consulted over various matters and felt that their needs were not being addressed.
6	Numerous comments about lack of consultation and irrigators seeking more stakeholder engagement.
7	Numerous questions on the appropriateness of the annuities program and specifically expenditure items which are vague in their description in the NSP.
8	SunWater have a lack of incentive to reduce costs.

7.3 Operations

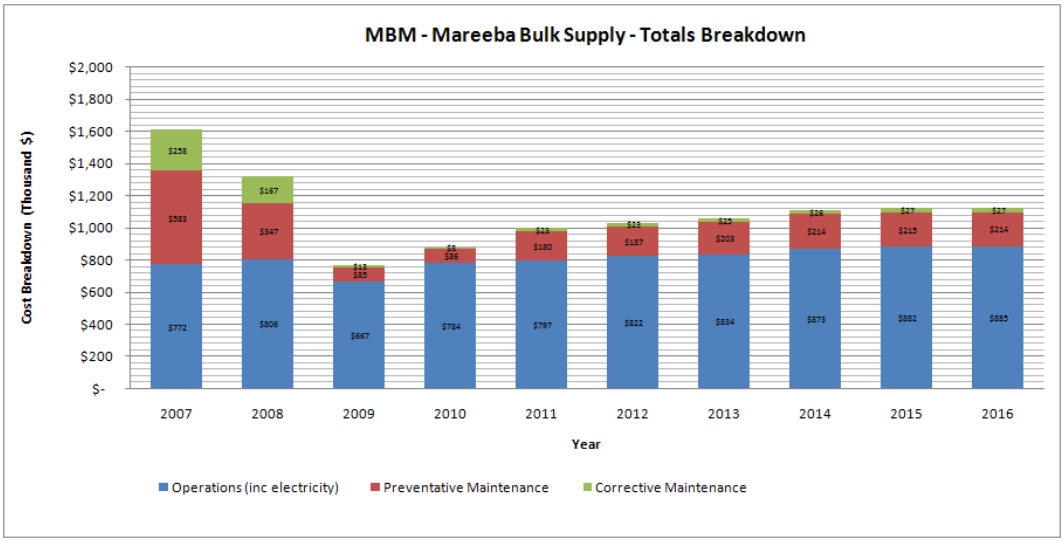


Figure 20 Mareeba Water Supply Scheme- Breakdown of Total Operational Expenditure (Historic and Forecast)

Figure 20 shows the change in operational costs from historic to future years. This shows:

- Operational Costs as being steady
- Preventative maintenance is significantly reduced from years 2007/2008 to 2009 and 2010 and has then plateaued.
- Corrective maintenance as being a very small component of the costs
- There does not seem to be any direct correlation between water use and the Opex budget

Further scrutiny of the operational costs show the labour component to be fairly steady (refer Figure 21). Discussions with local staff indicated that the labour components could largely be broken down into:

- Management of the scheme
- Environmental management including water quality testing etc.
- Scheduling and delivery of water
- Lesser components included workplace health and safety, customer management, meter reading and facility management

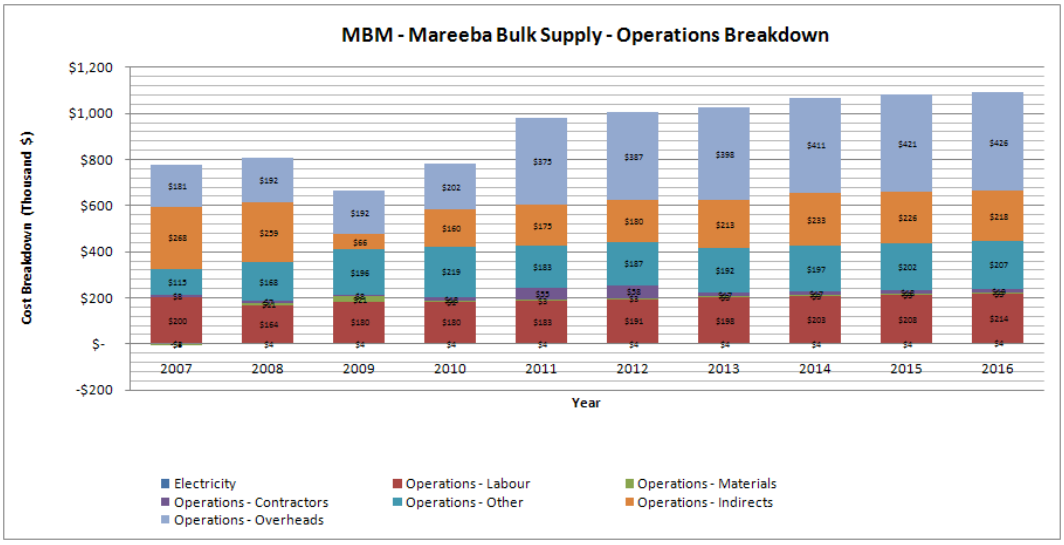


Figure 21 Mareeba Water Supply Scheme- Breakdown of Overall Operational Expenditure (Historic and Forecast)

Further scrutiny of the operational costs show the labour component to be fairly steady. Discussions with local staff indicated that the labour components could largely be broken down into:

- Management of the scheme
- Environmental management including water quality testing etc.
- Scheduling and delivery of water
- Lesser components included workplace health and safety, customer management, meter reading and facility management

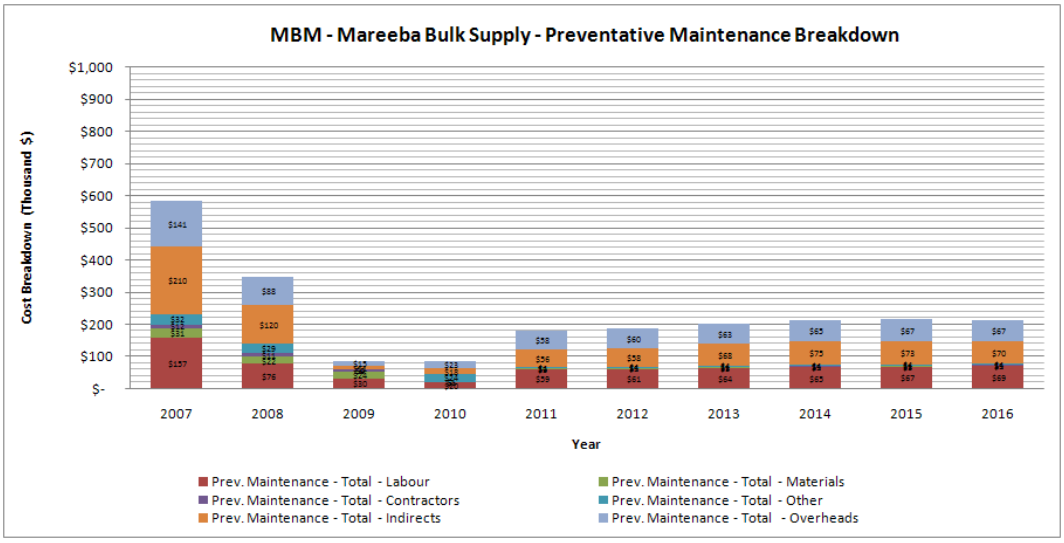


Figure 22 Mareeba Water Supply Scheme- Breakdown of Preventative Maintenance Expenditure (Historic and Forecast)

The reason for the drop in PM and CM costs from 2007 and 2008 to 2009 and 2010 are largely to do with the splitting of bulk and distribution assets. This can be observed in looking at the plots for the distribution system where initial 2007/2008 years are less than subsequent years. The breakdown for historic years

has been undertaken to fit into the Business Operating Model (BOM) and therefore may not accurately reflect the actual work undertaken and the actual breakdown between bulk and distribution.

From 2011 onwards costs in labour can be seen to increase. One reason for this is the fact that Tinaroo Falls dam is a referable dam under the Water Supply (Safety and Reliability) Act 2008 and Water Act (2000) and these regulations impose further onus on the operator with regards to dam surveillance. In the case of Tinaroo which is currently spilling, more frequent inspections are necessary to monitor aspects including embankment stresses, seepage and pore pressure measurements etc. This is likely to increase operational costs and perhaps above those forecast for the future years.

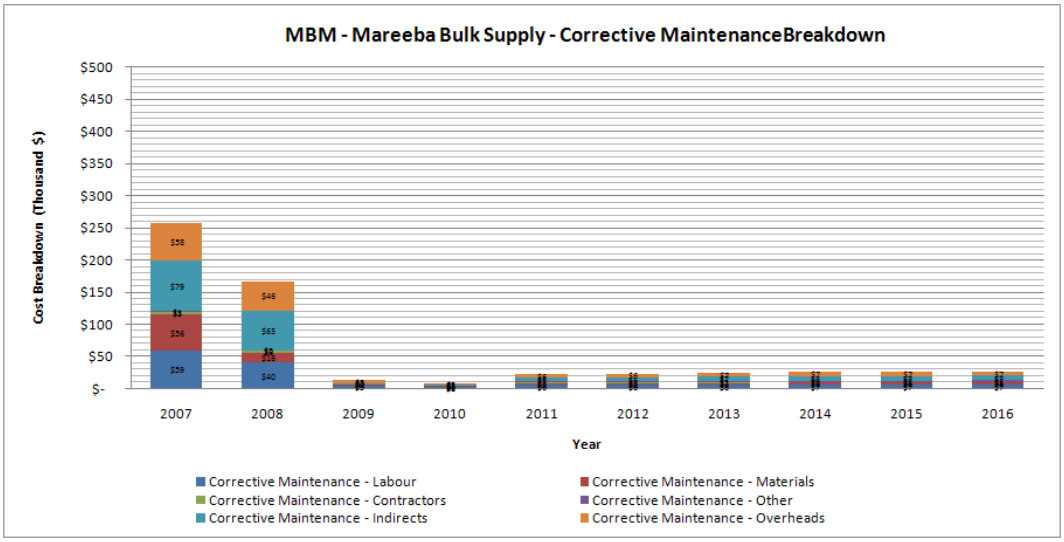


Figure 23 Mareeba Water Supply Scheme- Breakdown of Corrective Maintenance Expenditure (Historic and Forecast)

7.3.1 Operation and Water Usage

Given the nature of the activities, some operational costs related to ‘water management’ and ‘schedule and delivery’ could be expected to be approximately proportional to the amount of water used. The charts in Figure 24 and Figure 25 below show the operational costs attributed to each of these activities, as well as the total amount of water used in the respective years. In the case of the Mareeba Water Supply Scheme, neither of these operational costs show a strong correlation with water usage.

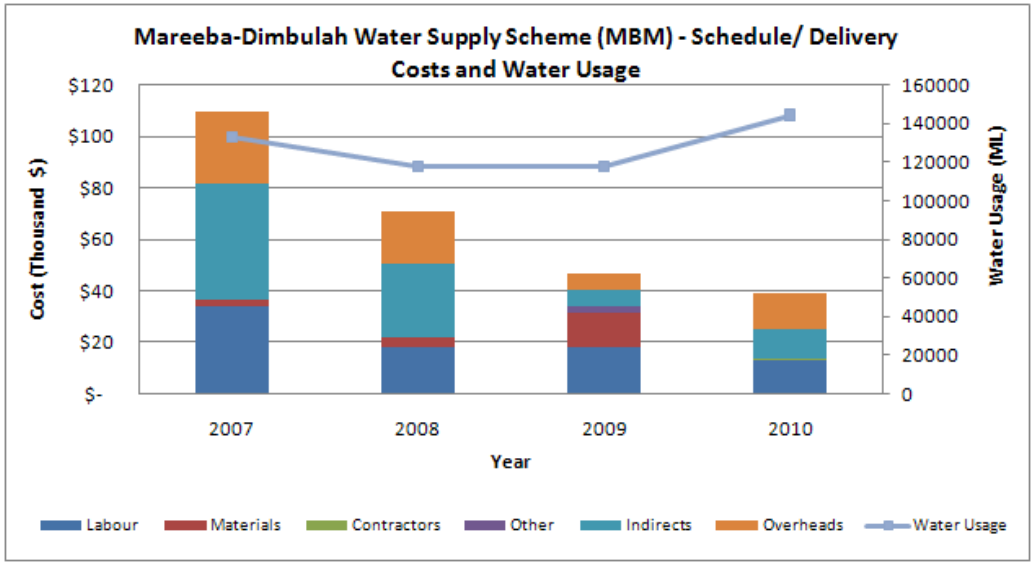


Figure 24 Mareeba Water Supply Scheme – Schedule and Delivery Operational Costs and Water Usage

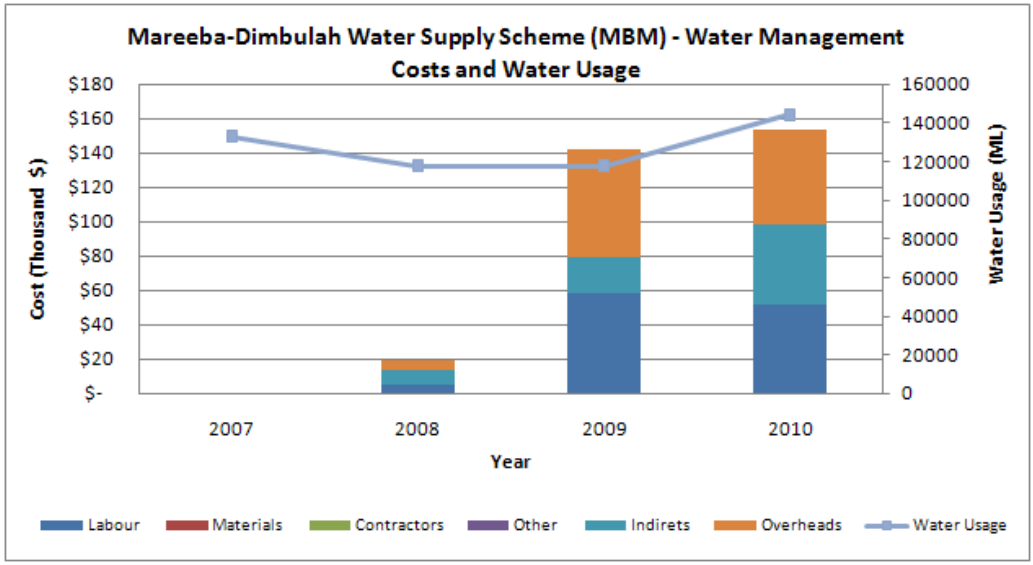


Figure 25 Mareeba Water Supply Scheme – Water Management Operational Costs and Water Usage

7.4 Assessment of Renewals

7.4.1 Renewals Accounting

The Mareeba Bulk Scheme has a positive opening balance of $1,506,000 indicating that the forecast expenditure at the start of the current price path was not fully expended or forecast budgets exceeded actual spent. A large component of the works under the renewal budget for this scheme is the upgrade of the spillway for Tinaroo Falls Dam which started in 2009. Figures provided to Arup indicate that the cost of the upgrade of the spillway came in under budget for 2009 and 2010 and 2011 up until the point at which the figures were released.

An understanding of the renewals accounting process and a determination of the closing balance at 30 June 2011, requires detailed knowledge and data of several key aspects, these include:

MAREEBA DIMBULAH BULK ($000's)		
(a)	Renewals balance 1 July 2006	214
(b)	Inflows to the annuity account (income from irrigation sector 2007 -2011)	1133
(c)	Renewals expenditure apportioned to irrigators 2007 - 2011	447
(d)	Calculating interest on account balances	9.689%
(e)	Irrigator sector balance	1143
(f)	Uplift factor whole of scheme	0
(g)	Scheme opening balance at 1st July 2011	1506

a) The renewals balance has been taken from SunWater's paper, Renewals Annuity Calculation - Internal Working Paper. It is not in Arup's scope to critique this paper.

b) Available in SunWater's annual report and same internal paper reference in (a)

c) This data is detailed in SunWater's paper, Renewals Annuity Calculation - Internal Working Paper. Arup has also checked these numbers with Annuity data for 2007-2011 provided by SunWater for all projects. Other than 2007, we have difficulty in aligning up project expenditure in the excel spreadsheets with those on Table 8 of the Renewals Annuity Calculation - Internal Working Paper. The difference is larger than net present value adjustments at 2011 values. It could do with project closure times and when, the project gets allocated to which fiscal year.

d) There are some discrepancies in the interest rate to be used on balances. The SunWater paper, Renewals Annuity Calculation - Internal Working Paper, talks about using a 9.689%, but then renewal annual financial model – version 610.03 uses 6% for 2012 balances and then 5% for balances from 2012 and beyond. QCA needs to determine the actual % rate.

e) Uplift factor used to multiple (e), not applicable for Distribution schemes.

f) Scheme opening balance

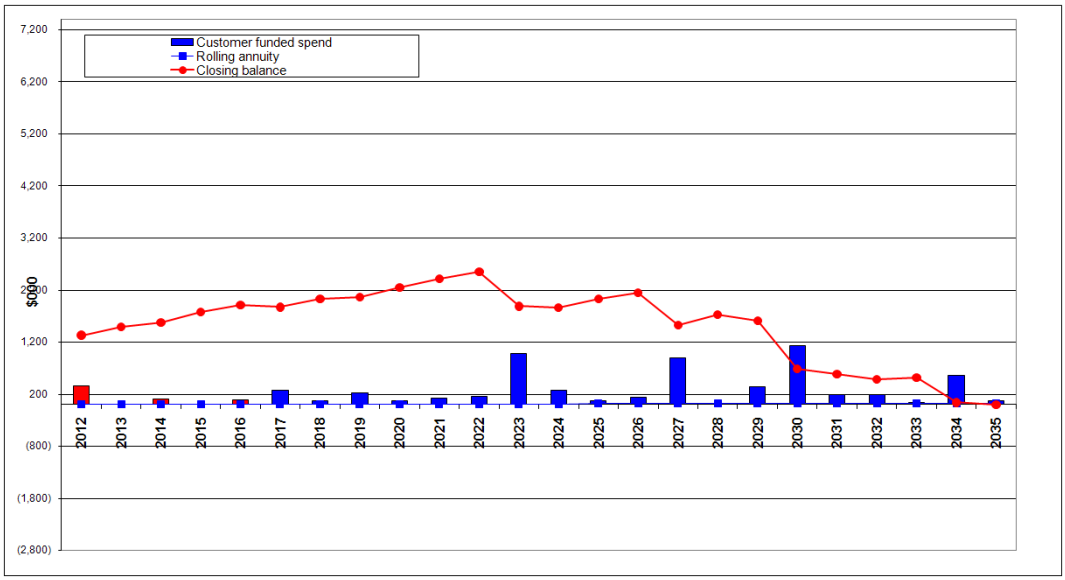


Figure 26: Renewals Annuity Chart- Mareeba Bulk

7.4.2 Renewals Forecast

A small number of works are proposed for the next price path. Arup have reviewed the systems and processes for the following sample items from the list:

- Refurbish bellmouth and conduit lining – Tinaroo Falls Dam Irrigation Outlet Works Pipe ($110000) to be undertaken in 2011
- Tinaroo Falls Dam – River Outlet Works Dispersion Valve ($297000) - 2012
- Conduct post tensioning of the Dam Wall Rock Bolts to be conducted by Specialist Contractor ($87,000) – 2016

Refurbish bellmouth and conduit lining – Tinaroo Falls Dam Irrigation Outlet Works Pipe ($110000) to be undertaken in 2011

With regards to item 1, the refurbishment of bellmouth and conduit lining, Arup has been provided outputs from the SAP system which detail the processes which have led to this work being proposed for 2011. The systems shows that regular condition assessments have been undertaken and that corrosion pits have formed under coating leading to its poor condition. The work was originally proposed for 2010 and the system shows that it is considered as having a moderate level of risk and was deferred to 2011 due to the upgrade of Tinaroo Falls Dam.

Tinaroo Falls Dam – River Outlet Works Dispersion Valve ($297000) - 2012

With regards to item 2, refurbishment of the dispersion valve, SunWater has shown that this has emerged from the risk assessment and 2009 dam safety inspection. The existing DN1350 Tinaroo Dam Cone Valve is nearing the end of its expected design life having been installed in 1957 with a rough expected life of between 50 to 60 years. A site inspection undertaken by HVES revealed a number of issues including unreliable opening/closing and excessive wear of the drive train. SunWater undertook a review of the refurbishment strategy for this piece of equipment investigation both a temporary restoration and a full replacement. From an discounted cash flow analysis, and depending on the number of years

that the existing valve could last, it has been recommended that a replacement is the best option at a total budget cost of $250,000. The analysis and costing are sound and are based on valve manufacture's budget costs provided by Hydro Valve Engineering Solutions Pty Ltd.

Conduct post tensioning of the Dam Wall Rock Bolts to be conducted by Specialist Contractor ($87,000) – 2016

SunWater indicated that this has been triggered through a physical hydraulic flood model study of SunWater's Dams, where modifications were required to Tinaroo Dam to ensure safety of the structure when passing an extreme flood event. While the government funded spillway upgrade of the project is due to complete in 2011, SunWater have proposed to undertake post tensioning every five years as required by ANCOLD (Australian National Committee on Large Dams) guidelines. The value of $87K has been proposed as an initial estimate though discussions with SunWater have now revealed that actually estimates have been provided by contractors in 2009 for testing the anchor system and are coming in at $115K. SunWater have indicated that upon including SunWater's costs this will escalate to $160K. We are unclear on why a value of $87K was incorporated into the development of the NSP figures when SunWater already had a value of $115K in 2009. This would indicate that updating the system with more recent costs may take longer than required affecting the accuracy of some of the figures reported in the NSP.

7.5 Summary of Observations

In summary Arup note the following observations:

- We note that the procedures adopted are prudency and that SunWater are undertaking work to make their operations more efficient.
- Arup believe that forecast Opex is consistent with historic actual. During the site visit we observed that locally the scheme was being managed in a prudent manner and did not witness any activities which we believed was being undertaken in an inefficient manner. As previously stated this assessment does not consider electricity expenses and their projected increases.
- As outlined in the NSP and validated above, total operating costs for the new pricing path versus the previous pricing path is decreasing by some $521k, and this is due to the method of unbundling used to break down bulk and distribution components. Arup have insufficient information to conclude whether Opex are prudent and efficient as we have no method for linking costs with work orders
- The annuity program appears robust and is congruent, with the asset management strategy adopted by SunWater.
- Arup would like to see greater detail around works envisaged for the current financial year to understand if costs proposed are prudent and efficient
- The annuity program appears robust and is congruent, with the asset management strategy adopted by SunWater. The scheme is currently positive and is planned to stay so up till 2033.

- Arup would like to highlight, the higher than industry average WACC and repeat its comments as to whether irrigators have sufficient input in deciding future expenditure. Other than these two issues, in general the annuities program appears prudent and efficient in its operations.
- The methodology used in applying the annuities program appears prudent but Arup are not able to make an assessment around the efficiency of costs given we have not been given sufficient detail of the actual works proposed.

For this specific scheme we note the breakdown of talks between the irrigator groups and SunWater. Based on our observations this is due to:

- Lack of communication on the part of SunWater with regards to the changes which were to take place in the region
- Lack of clarity around the role of the Irrigation Advisory Committee and expectations of both the irrigators and SunWater
- Lack of understanding within the irrigation community on what issues are outside of the hands of SunWater (i.e. recreational costs, ROP costs, etc)

8 Mareeba Distribution Scheme

8.1 Scheme Summary

The Mareeba Dimbulah distribution system is located near the town of Mareeba in Far North Queensland and includes the following major sub-systems:

- Tinaroo
- Walkamin
- Dimbulah
- Mareeba
- Paddy's Green

These systems include 375 km of channels and pipelines and 61 km of drains. SunWater has contractual obligations to customers in relation to the management and operation of these systems.

A description of the major distribution assets that comprise each of the sub-systems is presented in Table 9.

Table 9. Bulk Water Assets

Sub-System	Assets	Optimised Replacement Costs
Walkamin / Tinaroo	West Barron main channel Mareeba Main Channel Nardello's Lagoon Atherton Main Channel B-Section Ariga Main Channel	Not Available
Dimbulah	Walsh Bluff Control Structure Walsh Bluff Main Channel South Walsh Main Channel Mutchilba Balancing Storage – 16ML capacity Price Creek Pump Stations Price Creek Balancing Storage	Not Available
Mareeba	Mareeba Main Channel East Barron Main Channel East Barron Balancing Storage – 273ML capacity	Not Available
Paddy's Green	West Barron Balancing Storage Paddy's Green Relift Pump Station	Not Available

The distribution system has 1008 customers and services 146,883 ML of customer held medium priority WAE and 266 ML of customer held high priority WAE. Customers who take water from the Walsh River and other supplemented streams are included in these statistics. SunWater holds 37,000 ML of medium priority

WAE and 8,000 ML of high priority WAE for distribution losses. These distribution losses will attract bulk water charges.

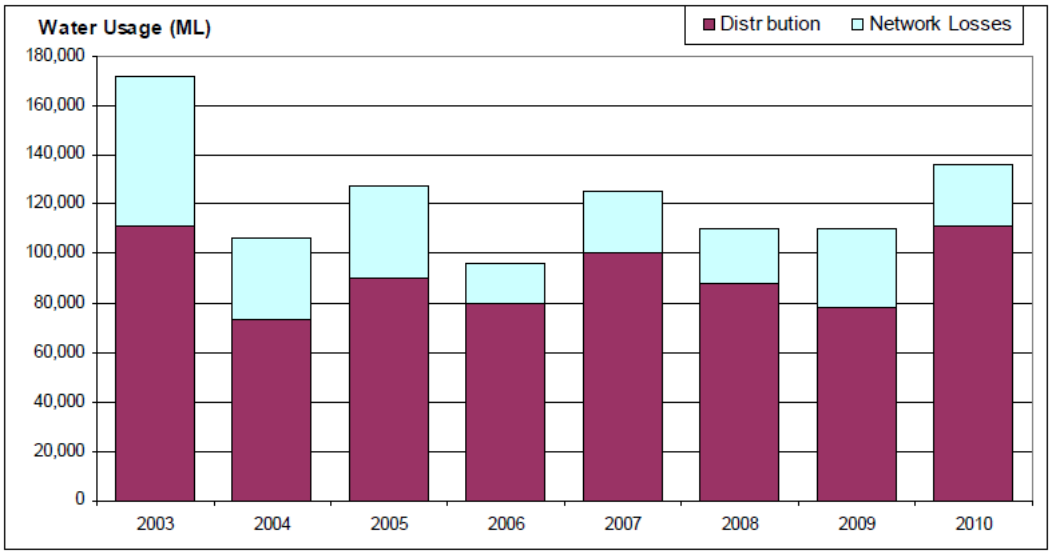


Figure 27 Mareeba Irrigation Scheme – Water Usage

8.2 Irrigator comments & key concerns

The comments provided in section 7.2 remain valid for this section.

8.3 Operations

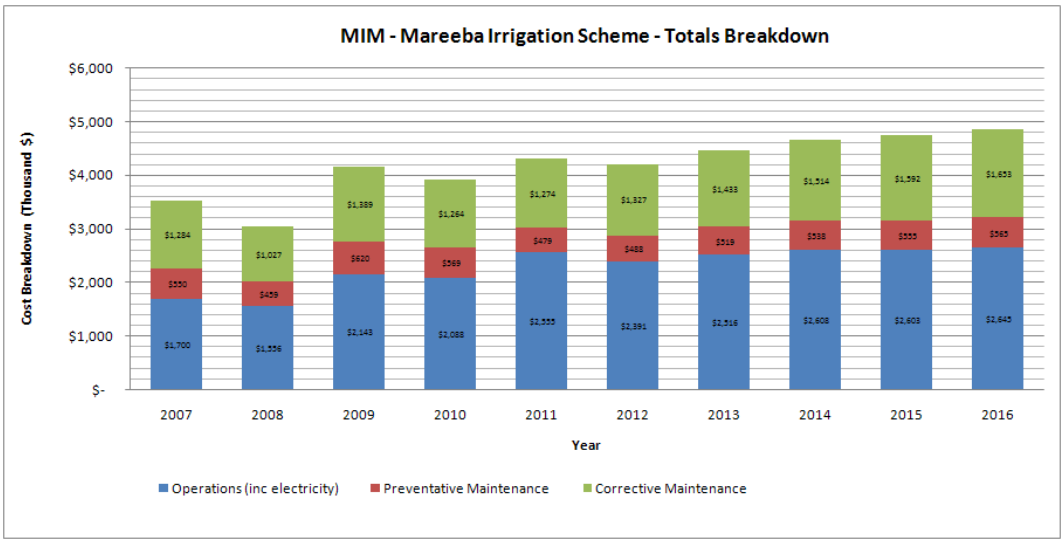


Figure 28 Mareeba Distribution Scheme- Breakdown of Total Expenditure (Historic and Forecast)

Figure 28 provides a breakdown of the operational costs for the Mareeba distribution scheme. Operations cost makes up the largest proportion followed by corrective maintenance. Over the forecast period cost rise based on indexation and are not excessive in comparison to actual costs incurred between 2007 and 2011.

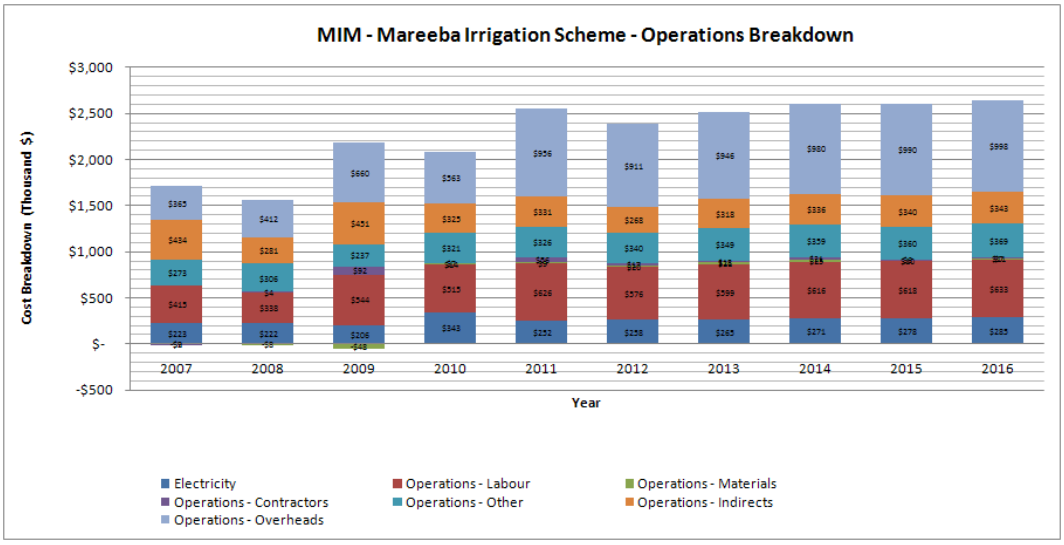


Figure 29 Mareeba Distribution Scheme- Breakdown of Operations Expenditure (Historic and Forecast)

Further scrutiny of the operations component show that labour and electricity and insurance costs as making up a large proportion with indirect and overheads comprising about 40% of the costs.

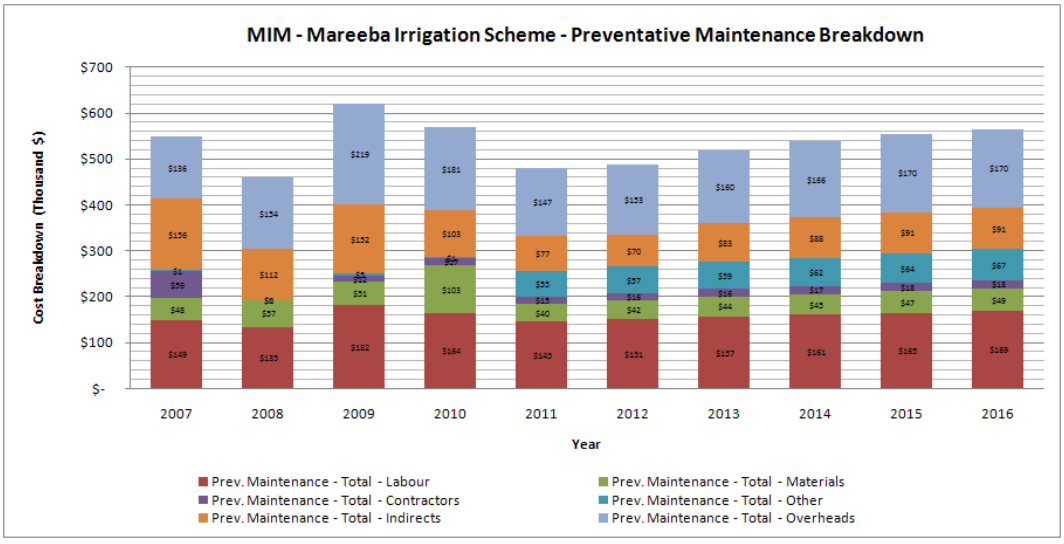


Figure 30 Mareeba Distribution Scheme- Breakdown of Preventative Maintenance Expenditure (Historic and Forecast)

In the case of preventative maintenance, labour is relatively steady and Figure 30 shows no marked increase in PM costs over time. Based on historic values chemicals and labour may vary along with contractors depending on the conditions on the ground. Specifically in this tropical climate, water quality is an issue and depending on the temperature could generate various algal blooms along with aquatic weeds. Historically increased materials costs are due to the use of Copper Sulphate for mitigation of algal blooms.

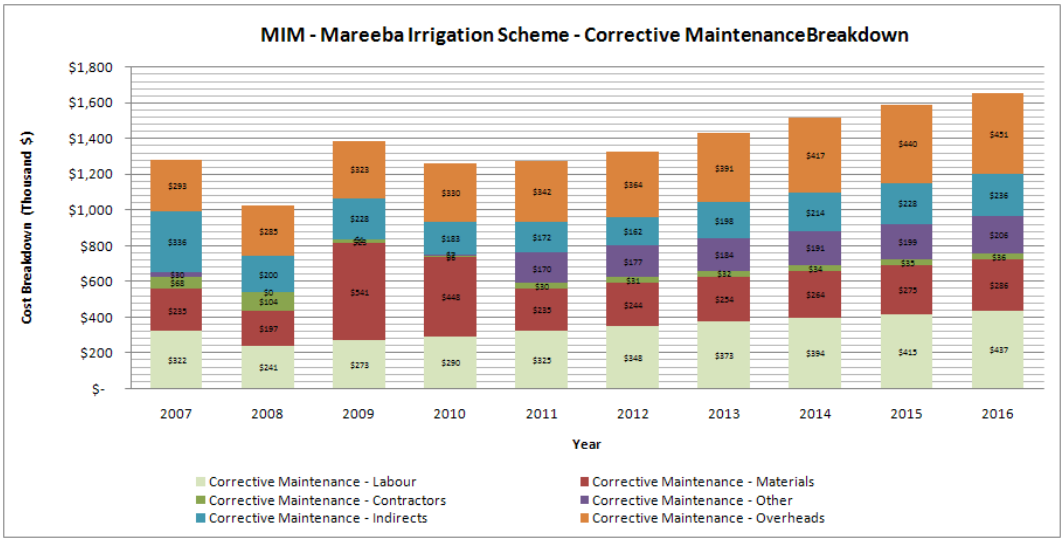


Figure 31 Mareeba Distribution Scheme- Breakdown of Corrective Maintenance Expenditure (Historic and Forecast)

8.3.1 Operation and Water Usage

Given the nature of the activities, some operational costs related to 'water management' and 'schedule and delivery' could be expected to be approximately proportional to the amount of water used. The charts in Figure 32 and Figure 33 below show the operational costs attributed to each of these activities, as well as the total amount of water used in the respective years. The charts show a slight correlation between water usage and operational costs for the Mareeba Distribution Scheme, particularly in the case of schedule and delivery activities.

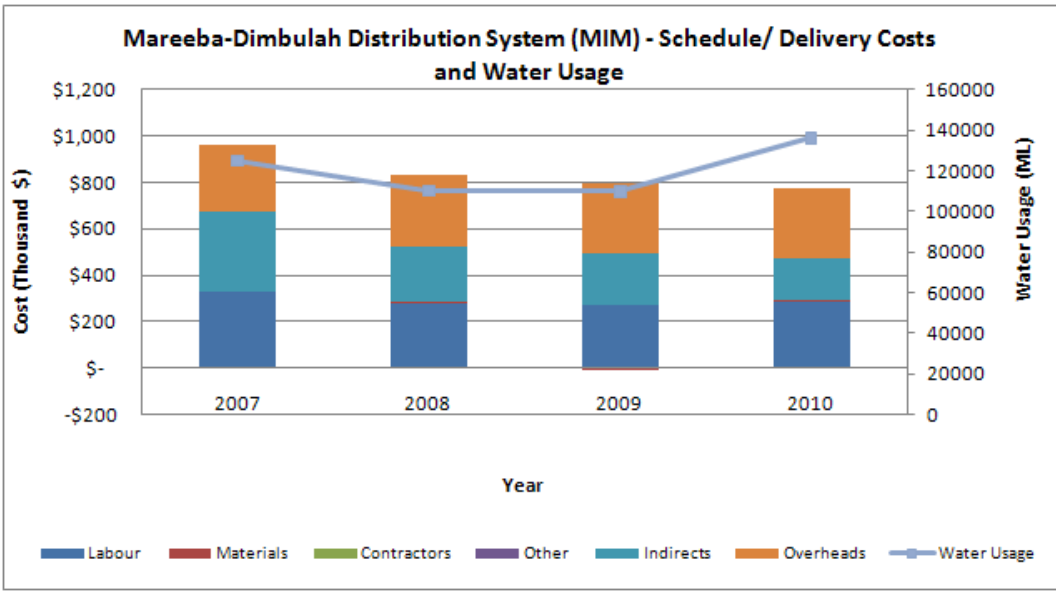


Figure 32 Mareeba Distribution Scheme – Schedule and Delivery Operational Costs and Water Usage

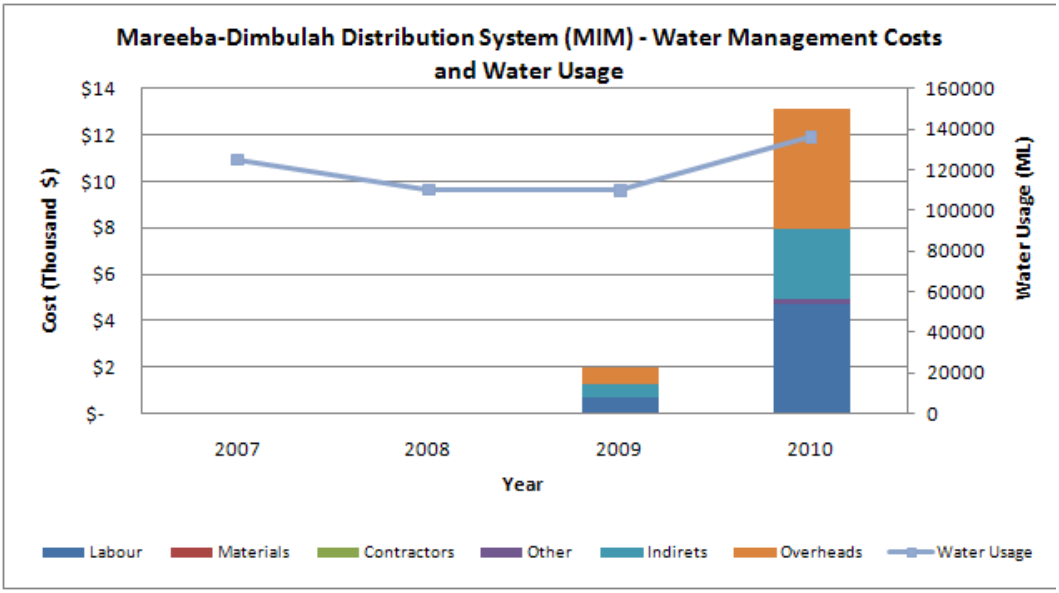


Figure 33 Mareeba Distribution Scheme – Water Management Operational Costs and Water Usage

8.4 Assessment of Renewals

8.4.1 Renewals Accounting

The Mareeba Bulk Scheme has a positive opening balance of $250,000 indicating that the forecast expenditure at the start of the current price path was not fully expended.

An understanding of the renewals accounting process and a determination of the of the closing balance at 30 June 2011, requires detailed knowledge and data of several key aspects, these include:

MAREEBA DIMBULAH DISTRIBUTION ($000's)		
(a)	Renewals balance 1 July 2006	(1,903)
(b)	Inflows to the annuity account (income from irrigation sector 2007 -2011)	4,404
(c)	Renewals expenditure apportioned to irrigators 2007 - 2011	8,137
(d)	Calculating interest on account balances	9.689%
(e)	Irrigator sector balance	150
(f)	Uplift factor whole of scheme	1.67
(g)	Scheme opening balance at 1st July 2011	250

a) The renewals balance has been taken from SunWater's paper, Renewals Annuity Calculation - Internal Working Paper. It is not in Arup's scope to critique this paper.

b) Available in SunWater's annual report and same internal paper reference in (a)

c) This data is detailed in SunWater's paper, Renewals Annuity Calculation - Internal Working Paper. Arup has also checked these numbers with Annuity data for 2007-2011 provided by SunWater for all projects. Other than 2007, we have difficulty in aligning up project expenditure in the excel spreadsheets with those on Table 8 of the Renewals Annuity Calculation - Internal Working Paper. The difference is larger than net present value adjustments at 2011 values. It could do with project closure times and when, the project gets allocated to which fiscal year.

d) There are some discrepancies in the interest rate to be used on balances. The SunWater paper, Renewals Annuity Calculation - Internal Working Paper, talks about using a 9.689%, but then renewal annual financial model – version 610.03 uses 6% for 2012 balances and then 5% for balances from 2012 and beyond. QCA need to determine the actual % rate.

e) The irrigation sector balance is the result of (a) x interest on balances +(b) –(c).

f) Uplift factor used to multiple (e), not applicable for Distribution schemes.

g) Scheme opening balance

8.4.2 Historical Renewals

For this scheme we note that the opening balance is positive and that this is a notable change from the negative balance from 2006. Arup are not able to comment on whether this is due to a failure to implement the program, actual expenditure significantly lower than forecast or works identified were not actually necessary upon detailed investigation due to longer replacement lives. We however note that large renewals expenditure for 2007 to 2011 includes:

- South Walsh SW12, SW12-2 & Sw13 pipeline replacement
- Replacement of timber bridges with concrete bridges at Cherry Creek and Springs Creek
- Intersafe projects to replace gates

Arup have reviewed both the Intersafe strategy and the Pipeline replacement strategy. The development of these strategies demonstrate that SunWater have looked at these projects more holistically to explore the risk to SunWater and based on this information develop a strategy of implementation.

The pipeline replacement strategy assessed the impact of leakage from the system and through a cost benefit analysis revealed that long term maintenance costs were going to increase and would be financially unviable. Additionally the risk to standards of service was discussed revealing that the increased frequency of maintenance would pose a serious risk to service standard.

The Intersafe strategy started in Mareeba where Intersafe Group Pty Ltd identified 43 operational health and safety issues including:

- Pulling channel drop boards
- Operating slide gates
- Operating valves and
- Lifting scour pit lids

Due to the risk posed the SunWater board resolved in 2007 to rectify high risk assets in Mareeba within 3 years followed by the development of a strategy for the remainder of the state. SunWater have also demonstrated the implementation of their procurement policy to ensure a more cost efficient outcome for its customers as part of the Intersafe strategy.

8.4.3 Renewals Forecast

Reviews of the projects undertaken in the annuities scheme over of the 2007 – 2011 period show that:

- Assets being refurbished are strictly irrigation assets, required to be maintained to meet the required service regimes of irrigators, regulators and good corporate practice
- Assets are Treasury approved for assessment
- Project costs are only updated in the year they are scheduled to be undertaken. This is reasonable to ensure price estimations are current, alternative options are meaningful and allow for variance in asset life conditioning.
- There appears to be some significant forecast expenditure (specifically 2026 and 2033) which will significantly influence the annuity balances. These projects have been identified based on the asset planning methodology and largely include replacement of pipelines within the South Walsh distribution area. Arup have reviewed the options analysis around pipeline replacement for this scheme and believe the work is justified based on the risk to SunWater's customers and failure to meet level of supply.
- We have reviewed the SAP output and can confirm that these have been identified based on their estimated asset life and estimated replacement cost.
- The scheme opened with a large negative balance in 2006 which has been turned into a positive balance for the start of 2011. A review of historic annuity expenditure indicates:
    - There has been an underspend on the implementation of the Intersafe non gated project.
    - The installation of fencing on the West Barron costed 65% less than budgeted
    - Across 2009-2011 there has been an overall underspend from what was originally forecast to what was actually spent
- Arup has read SunWater's position papers on the Fencing Policy and the investment to upgrade the WHS structures to reduce risks to SunWater's field personal. Arup believe both papers are appropriate responses to these matters and they represent prudent and cost effective expenditures.

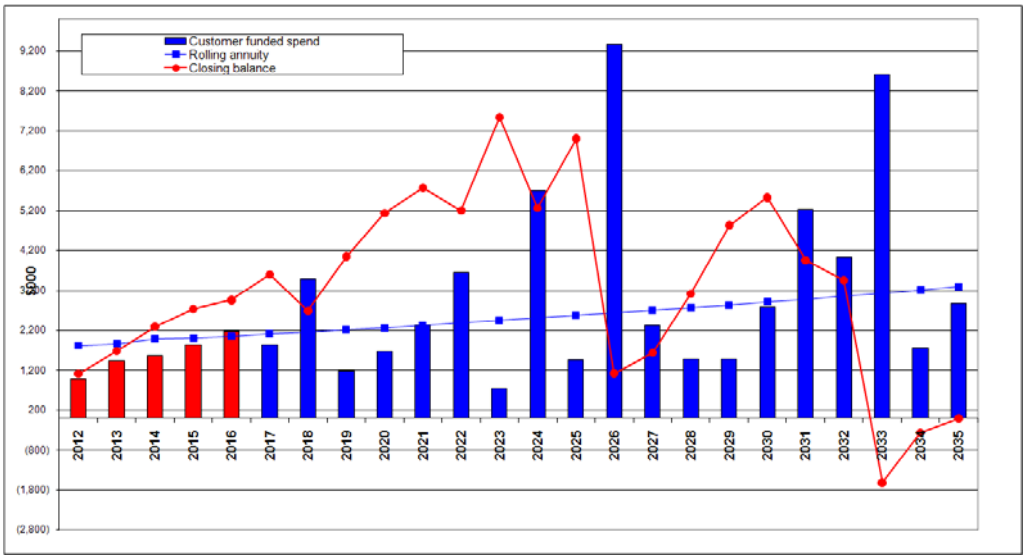


Figure 34: Renewals Annuity Chart - Mareeba Distribution Scheme

A small number of works are proposed for the next price path. Arup have reviewed the systems and processes for the following sample items from the list:

- (2013) Refurbish: Bracing beams based on condition and risk.
- (2012) Upgrade Scada: Radios and PLC
- (2014) Pipeline replacement – Southedge Irrigation – Lateral WB14 Pipeline 1

Refurbish Bracing Beams – West Barron Distribution - $213K - 2013

With regards to item 1, which is the refurbishment of the West Barron main channel C-section bench flume, Arup has been provided outputs from the SAP system which detail the processes which have led to this work being proposed for 2013. Condition assessment has indicated that there is some corrosion on beams and that the consequence of failure is moderate. It is expected that further examination of the options would be undertaken in the 2013 financial year if the project is approved to proceed.

Upgrade Scada: Radios and PLC - $65K – 2012

This is part of an ongoing program of upgrade and SCADA replacement. From information provided by Sunwater we understand that this specific item involves the upgrade/replacement at 8 sites. SunWater has indicated that costing is based on replacement cost, previous projects and in conjunction with local staff. The information provided to date for this item is not sufficient to assess prudency and efficiency.

Pipeline replacement – Southedge Irrigation – Lateral WB14 Pipeline 1

SunWater has provided Arup outputs from SAP in relation to the replacement of the pipeline for the Southedge Irrigation. Additionally Arup have been provided a range of documentation with regards to the proposed pipeline replacement program which makes up a large component of the annuity program for the Mareeba Dimbulah distribution scheme. We note that in 2005 SunWater started

investigating a pipeline replacement strategy noting that significant work was requirement due to a historical pipeline failures. Specifically we note that detailed investigation of a part of an exhumed pipeline revealed that there was degradation to the internal face of the concrete where in some cases there was only 2mm of protection remaining before reinforcement is exposed to corrosive attack. Specifically we note that this investigation by GHD[22] found that the residual life of most pipelines in the area as being significantly reduced with a recommendation stating that a replacement strategy be put in place within 10 years to maintain the desired levels of service.

The main aspect of this which supports the projects is the refurbishment and maintenance planning register which shows that significant works are being undertaken on a regular basis to repair leaks in this pipeline. The risk register shows that there are moderate risks to production and operation. Specifically we note that this section is subject to 5 leaks per year with leak frequency increasing. Specifically we note that SunWater notes that as the number of leaks the risk to SunWater increases that the Service Targets cannot be met and that the cost associated with each leak will increase.[23] Arup agree with the review that the cost of maintenance would be excessive with replacement being a more efficient option for dealing with pipes which originally had been designed to non standard specification.

The methodology used for arriving at this cost appears to be logical and well founded. The investigation itself is quite thorough considering the level of information available. It is worth mentioning that replacement costs are based on one pipe material only (PE) and this made have a distorted effect when considering other more expensive materials such as DICL or MSCL or site specific construction requirements.

General Observations

Each scheme has a large number of items identified under the R&R program. The timeframe for this study did not allow investigation of a large number of items. We have therefore undertaken a broad sense check of works proposed based on the spreadsheet which SunWater states is the basis for the NSP. Specifically we note that the methodology used in preparing the breakdown, ie itemising costs on a per asset basis, generates a large number of items many of which should be packaged up into single items that would probably be more economic in delivery. Specifically we note that items such as:

- Replacement of drop and check structures
- Replacing scour valves
- Replacing air valves

[22] GHD (for SunWater) – Asset Renewals Review Report – Section M9 Pipeline - Mareeba
[23] SunWater, *Mareeba Dimbulah Water Supply Scheme – Pipeline Options Analysis* , 2005, Page 50

8.5 Summary of Observations

In summary Arup note the following observations:

- We note that the procedures adopted are prudency and that SunWater are undertaking work to make their operations more efficient.
- Arup believe that forecast Opex is consistent with historic actual. During the site visit we observed that locally the scheme was being managed in a prudent manner and did not witness any activities which we believed was being undertaken in an inefficient manner. As previously stated this assessment does not consider electricity expenses and their projected increases.
- As outlined in the NSP and validated above, total operating costs for the new pricing path versus the previous pricing path is increasing by some $895k, but the reasons are valid and the expenses are on maintaining key assets.
- Arup have insufficient information to conclude whether Opex are prudent and efficient as we have no method for linking costs with work orders
- The annuity program appears robust and is congruent, with the asset management strategy adopted by SunWater.
- Arup would like to see greater detail around works envisaged for the current financial year to understand if costs proposed are prudent and efficient
- The annuity program appears robust and is congruent, with the asset management strategy adopted by SunWater. The scheme is currently positive and is planned to stay so up till 2033.
- Arup would like to highlight, the higher than industry average WACC and repeat its comments as to whether irrigators have sufficient input in deciding future expenditure. Other than these two issues, in general the annuities program appears prudent and efficient in its operations.
- The methodology used in preparing the breakdown, ie itemising costs on a per asset basis, generates a large number of items many of which should be packaged up into single items that would probably be more economic in delivery. While we consider that asset life is an appropriate method for identifying works post the current financial year we believe that SunWater should do a sense check of the program out to 2036 and certainly for large numbers of the same item in any one year should be modified to include the likely level of economy that could be generated.
- Barring the issue raised above the methodology used in applying the annuities program appears prudent but Arup are not able to make an assessment around the efficiency of costs given we have not been given sufficient detail of the actual works proposed.

For this specific scheme we note the breakdown of talks between the irrigator groups and SunWater. Based on our observations this is due to:

- Lack of communication on the part of SunWater with regards to the changes which were to take place in the region
- Lack of clarity around the role of the Irrigation Advisory Committee and expectations of both the irrigators and SunWater
- Lack of understanding within the irrigation community on what issues are outside of the hands of SunWater (i.e. recreational costs, ROP costs etc)

9 Eton Water Supply Scheme

9.1 Scheme Summary

The Eton Water Supply Scheme is located southwest of Mackay near the town of Eton. The scheme's bulk water components include:

- Kinchant Dam
- Mirani Pump Station and Diversion Channel.

Kinchant Dam is listed in the Pioneer Valley ROP and as such SunWater has obligations in relation to the dam's management and operation.

The capacity of the bulk water assets and their replacement cost as at 1 July 2011 are presented in Table 10.

Table 10. Bulk Water Assets

Asset	Capacity when Full	Optimised Replacement Cost
Dams		
Kinchant Dam	62,800 ML	$165,002,107
Other Bulk Water Assets		
Land		$165,002,107
Stream gauges		
Meters		$5,957,813
Working capital		$0
Mirani Pump Stations and diversion channel	910 ML/ day	$0
Third party assets - access roads to dam		$43,237
Total		$192,443,424
Capital contributions received from irrigators		$47,379

The scheme's WAEs are listed in the Pioneer Valley ROP. The scheme has 307 customers, all of which take water in the distribution network, except for the holders of Risk WAE. Risk WAE relates to a small volume water harvesting WAE taken directly from Mirani Diversion Channel.

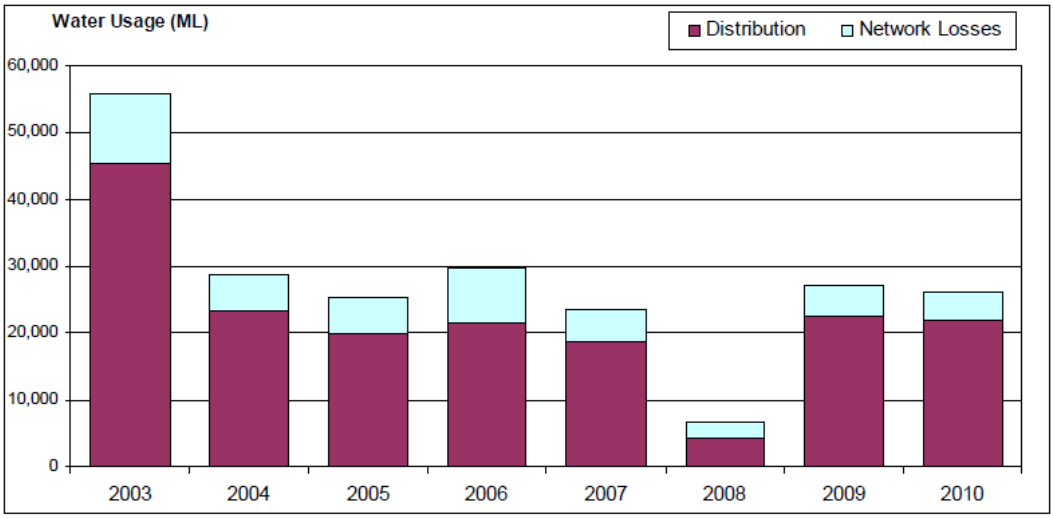


Figure 35 Eton Water Supply Scheme – Water Usage

9.2 Irrigator comments & key concerns

Ref	Comments
1	Pioneer Water Board deliver some of the irrigator services in the area, but no credit or recognition is given by SunWater.
2	NSP's are lacking detailed information, and stakeholders lack the data to make meaningful comments.
4	SCADA systems have not worked well
5	High Risk A customers get 500ML from Pioneer Water Board, irrigators want reassurance that any associated distribution costs are being applied to these allocations
6	Numerous questions on the appropriateness of the annuities program to manage capital refurbishment.
7	SunWater have a lack of incentive to reduce costs.
8	Drop in dam wall height, due to problems with fabric bags, unfavourably impacts irrigators' allocation and level of reliability.
9	Are Industrial & Mining users paying their fare share of adjunct costs like Recreational charges, DERM charges

9.3 Operations

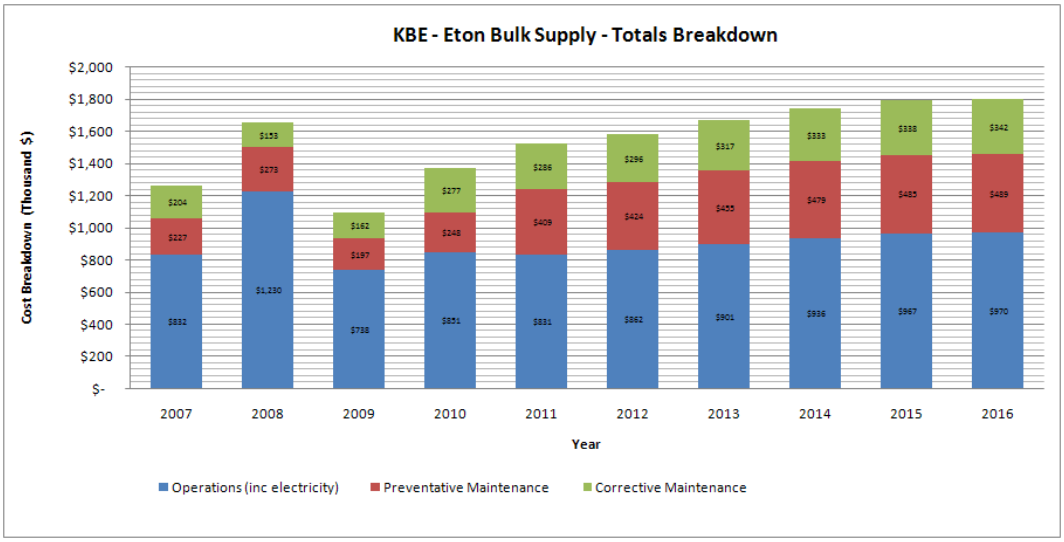


Figure 36 Eton Water Supply Scheme - Breakdown of Total Expenditure (Historic and Forecast)

In this particular scheme overall operational costs are forecasted to increase annually at about 1.47% on top of 2011 real dollars, when using an average of the 2006-2011 operating costs. SunWater have indicated that the expense fluctuations are due too;

a) Service delivery strategies have achieved efficiencies in better utilisation of their labour force and as a result there is a change in the distribution of costs and duties between maintenance (both corrective & preventative) and general scheme operations. (Refer above table).

b) For the overall net increase (some $552k), the major contributor is a rise in the electrical and mechanical maintenance activity to keep the Mirani pump station operational. We note that significant work is proposed at the pump stations within the renewals program(s).

c) The SLIFI review has also reduced costs at the regional level and may have contributed to some drop in cost from 2008 to 2009.

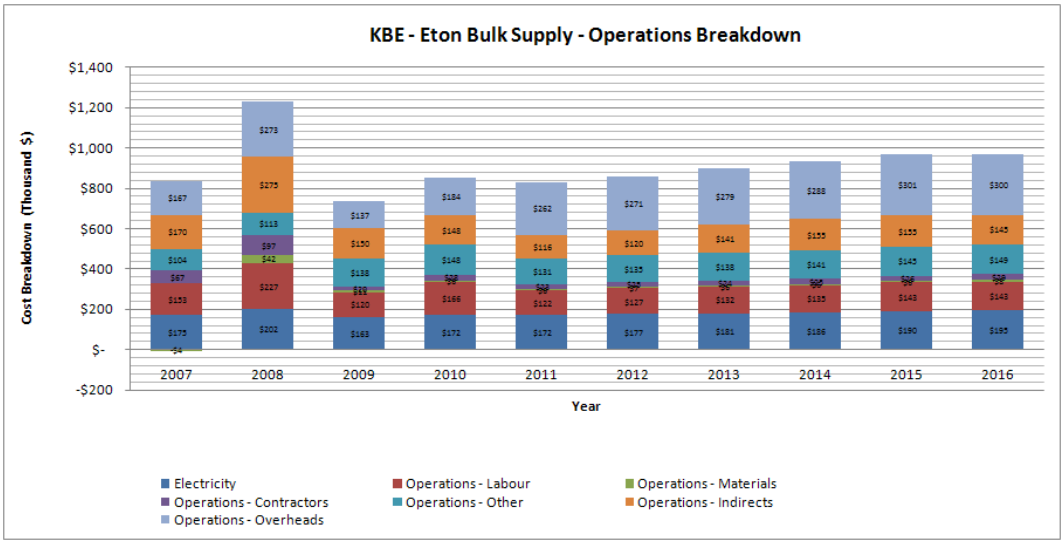


Figure 37: Eton Bulk Supply - Operational Breakdown (Historical and Forecast)

Figure 37 helps further understand the reason behind the changes to operations costs. Again the figure reveals that up to 50% of costs are indirect and overhead costs which is being evaluated by an alternate consultancy. The remaining components; electricity and labour do not change significantly from historic to forecast years.

We note that the spike in 2008 is due to dam safety obligations at Kinchant Dam which may be occur again in years of high rainfall. Specifically monitoring activities include seepage monitoring. 2007 was the year where ROP requirements were put onto SunWater which requires SunWater to measure water quality, monitor blue green algae, inspect the integrity of river banks on the Pioneer River and report any fish strandings.

Insurances are another centralised allocation cost and as such are being assessed by others. The allocation for the Eton Bulk Water Scheme is $113,000 annually for the 5 year price path. Two key parameters used by Insurance brokers to help determine annual premiums, is asset value and risk mitigation strategies. A move to the optimised replacement cost will most probably increase the net value of assets to be insured and as such increase premiums. SunWater's risk mitigation strategies are robust and accreditations like ISO 9001, AS/NZS ISO4801 & AS/NZS ISO 14001 will be reviewed favourably by insurance brokers.

Based on field observations, discussions with SunWater regional staff and further interrogation of NSP data, Arup believe the incurrence and assignment of opex costs and service standards are appropriate and are being carried out to a high service level.

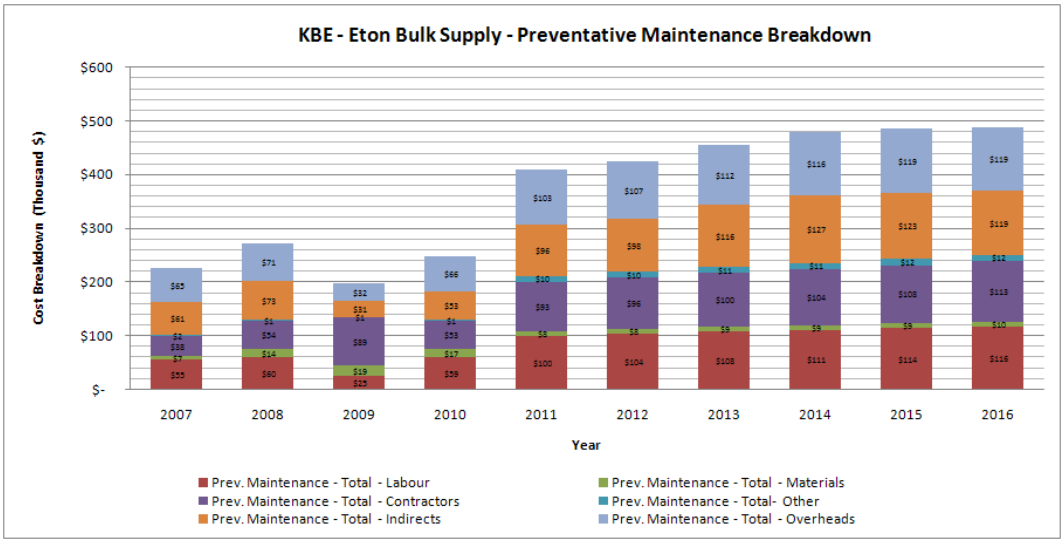


Figure 38 Eton Water Supply Scheme - Breakdown of Preventative Maintenance Expenditure (Historic and Forecast)

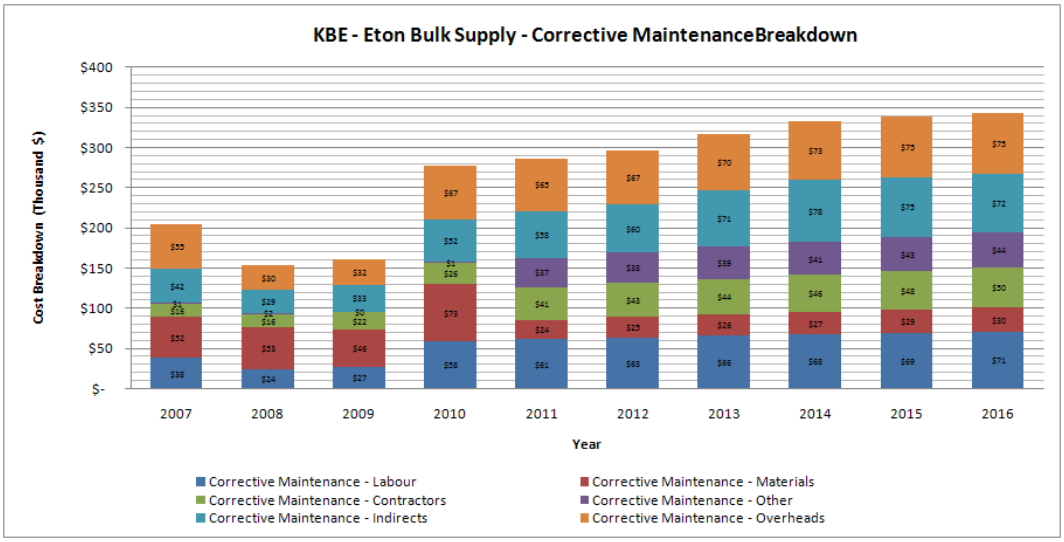


Figure 39 Eton Water Supply Scheme - Breakdown of Corrective Maintenance Expenditure (Historic and Forecast)

We note that there is an increase in PM and CM for the forecast period. The Eton bulk supply scheme has significant areas requiring slashing of grass and as such incur a large contractor component to maintain grounds particularly around Kinchant Dam. Given the working area and the monitoring required around the dam the use of contractors to maintain vegetation growth was considered appropriate.

9.3.1 Operation and Water Usage

Given the nature of the activities, some operational costs related to ‘water management’ and ‘schedule and delivery’ could be expected to be approximately proportional to the amount of water used. The charts in Figure 40 and Figure 41 below show the operational costs attributed to each of these activities, as well as the total amount of water used in the respective years. In the case of the Eton Water Supply Scheme, neither of these operational costs show a strong correlation with water usage.

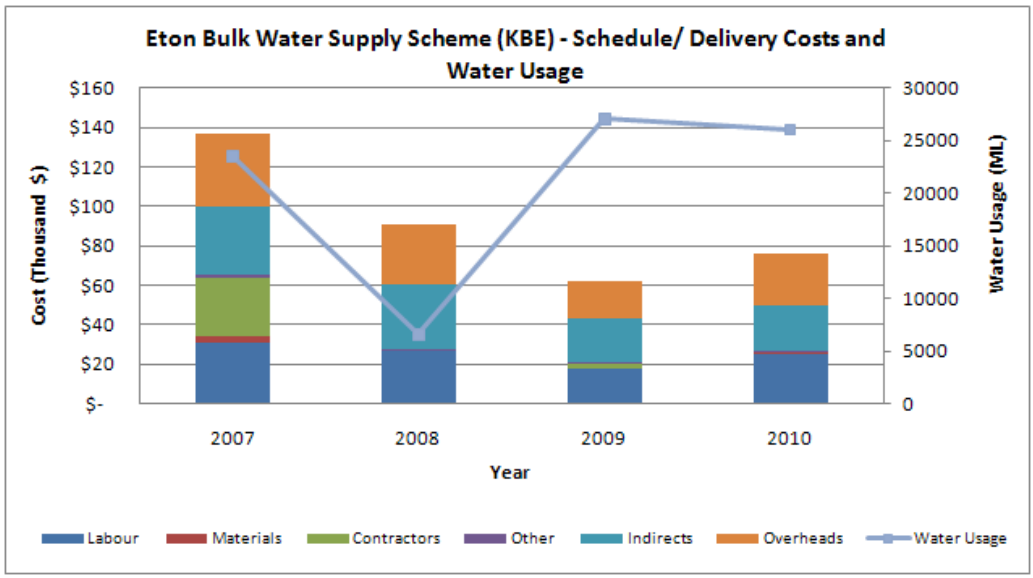


Figure 40 Eton Water Supply Scheme – Schedule and Delivery Operational Costs and Water Usage

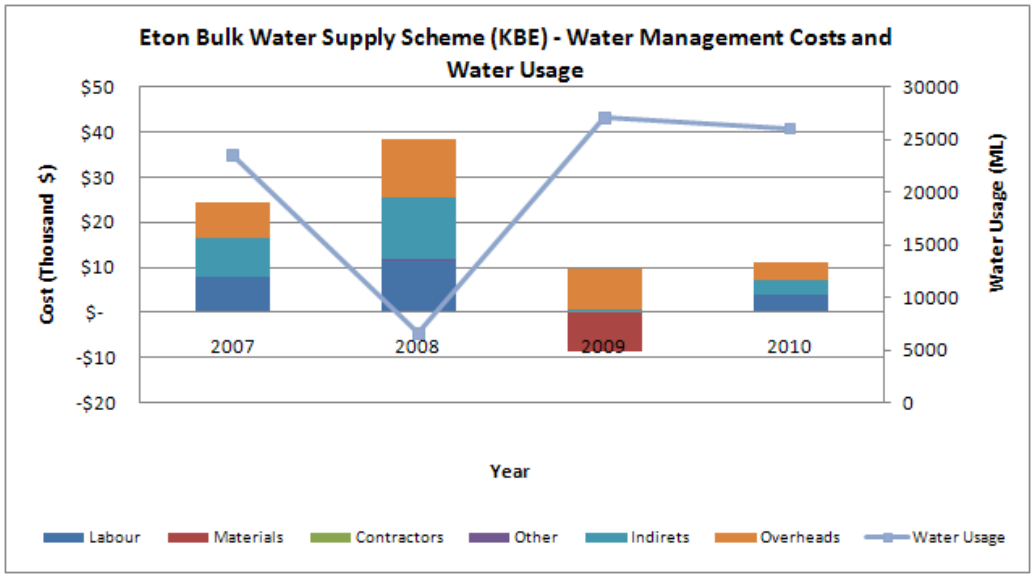


Figure 41 Eton Water Supply Scheme – Water Management Operational Costs and Water Usage

9.4 Assessment of Renewals

9.4.1 Renewals Accounting

Eton Bulk Scheme has an opening balance of negative $1,314,000. An understanding of the renewals accounting process and a determination of the closing balance at 30 June 2011, requires detailed knowledge and data of several key aspects, these include:

ETON BULK WATER SCHEME ($000's)		
(a)	Renewals balance 1 July 2006	(85)
(b)	Inflows to the annuity account (income from irrigation sector 2007 -2011)	741
(c)	Renewals expenditure apportioned to irrigators 2007 - 2011	1492
(d)	Calculating interest on account balances	9.689%
(e)	Irrigator sector balance	(1492)
(f)	Uplift factor whole of scheme	1.26
(g)	Scheme opening balance	(1314)

a) The renewals balance has be taken from SunWater's paper, Renewals Annuity Calculation - Internal Working Paper. It is not in Arup's scope to critique this paper.

b) Available in SunWater's annual report and same internal paper reference in (a)

c) This data is detailed in SunWater's paper, Renewals Annuity Calculation - Internal Working Paper. Arup has also checked these numbers with Annuity data for 2007-2011 provided by SunWater for all projects. Though we cannot get the numbers to precisely match on an annual basis, the 5 year price path variance is negligible.

d) There are some discrepancies in the interest rate to be used on balances. The SunWater paper, Renewals Annuity Calculation - Internal Working Paper, talks about using a 9.689%, but then renewal annual financial model – version 610.03 uses 6% for 2012 balances and then 5% for balances from 2012 and beyond. QCA need to determine the actual % rate.

e) The irrigator sector balance is the result of (a) x interest on balances +(b) – (c).

f) Uplift factor used to multiple (e). Not in Arup's scope to review HUF factors.

g) Scheme opening balance

9.4.2 Historical Renewals

A review of the historic data indicates that this is due to undertaking projects not originally budgeted for rather than overspends on projects. Table 11gives a summary of the largest 10 projects between 2007 and 2011.

Table 11: Top 10 historical expenditure items - Eton Bulk Scheme

Historical Renewal Item	Money Spent
Mirani PSTN1, 2, 3 - Install New Metering ROP Compliance (2007)	$153,058
Intersafe Gated - Mirani - NDP (2010)	$146,409
Comprehensive Risk Assessment including Geotech - Kinchant Dam (Compressed Program) (2010)	$127,141
Replace Kinchant Dam Outlet Works Switchboards (SB-1 & SB-3)	$66,750

(2010)	
Overhaul/Replace/Certification - Inlet Tower Hoist - Kinchant Dam (2009)	$59,339
Eton WSS - Policy Compliance Investigations (R&B, Signs, Fencing) (2008)	$54,013
Kinchant Dam - 5 Yearly Dam Safety Inspection (2008)	$46,227

Arup have not been able to see the list of works which constituted the R&R program proposed in 2006 and therefore cannot identify the projects that contributed to the increase in renewals expenditure. Additionally we have been provided with a list of projects in excess of $10K. However a review of the above projects would suggest that all Intersafe projects were not accounted for in 2006 in addition to risk assessments of Kinchant dam which most likely would have emerged out of the 2008 dam safety inspection. Additionally we note that there are some smaller expenditures around the $10K mark which relate to flood damage repairs in 2008 which would also not have been accounted for previously. The following provides a commentary on the Intersafe project.

Intersafe project which is being extended across Queensland is considered necessary to ensure that all workers are able to undertake their duties in a safe environment. SunWater have applied due process in evaluating sites where there is a medium to high risk and prioritising works at these sites. This work follows on from an initial pilot study and is now being rolled out across the state. We believe that the financial risk to the SunWater business is greater in the long term than the short term cost of assessing and rectifying high risk assets. SunWater have demonstrated a great deal of rigour in undertaking this work including:

- Development of standardised solutions and risk assessment templates
- Training regional staff in risk assessments
- Establishment of procurement contracts for standardised solutions

Given the procedures adopted we consider this to be a prudent and efficient expenditure.

9.4.3 Renewals Forecast

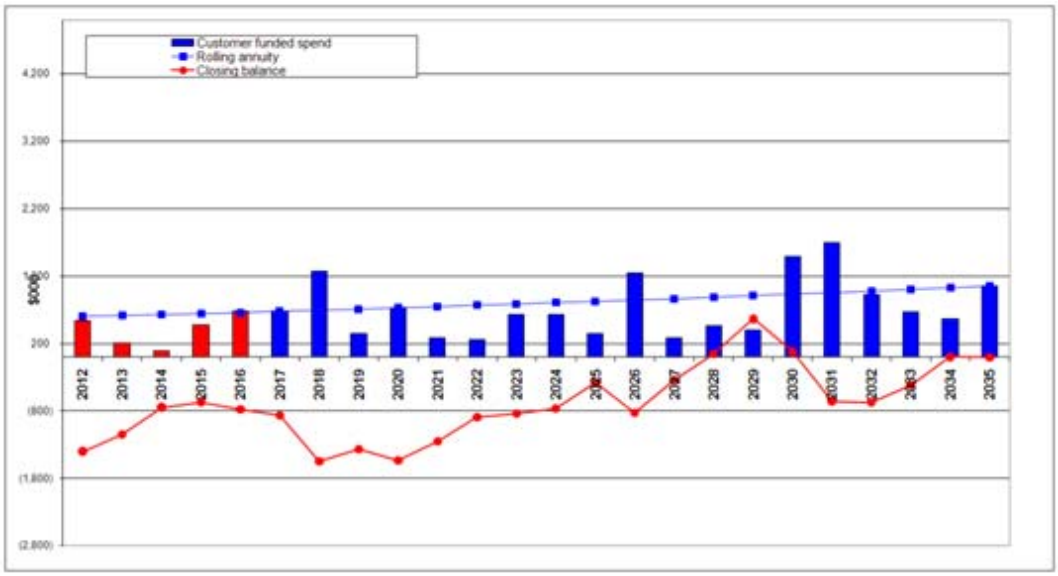


Figure 42: Renewals Annuity Chart - Eton Bulk Scheme

A review of the projects undertaken in the annuities scheme over of the 2011 – 2016 period show that,

- The Eton BW Scheme opening balance 1st July 2011 is $1,314K negative and is scheduled to track negative for most of its 25 year annuity.
- Arup have reviewed the following projects:
  - Replacement of switchboard – Mirani Pump Station 1 – $226K – 2012
  - Refurbishment pump unit 1 – Mirani Pump Station 3 - $75L – 2013

Replacement of switchboard – Mirani Pump Station 1 – $226K – 2012

We note that this switchboard has been in operation from 1980 and had a nominated asset life of 35 years though it has been identified as having a replacement frequency of 30 years. Various condition assessments have shown it to have an overall condition rating of 3 though a score of 5 is assigned for age and availability of parts. Arup have requested from SunWater the reason behind the earlier replacement of this switchboard. Additional refer to the general observation section on further comments around this expenditure item.

Refurbishment pump unit 1 – Mirani Pump Station 3 - $75L – 2013

This pump unit has been in operation from 1994 and was last overhauled in 2003. SunWater has scheduled this next overhaul for 2013 which is 10 years since the last overhaul. From a condition perspective the latest assigned an overall condition score of 3 and showed there signs of insulation resistance. We understand that the cost has been derived from previous projects though we were not able to source these projects and therefore need further explanation on the costing to classify as efficient.

General Observations

Each scheme has a large number of items identified under the R&R program. The timeframe for this study did not allow investigation of a large number of items. We have therefore undertaken a broad sense check of works proposed based on the spreadsheet which SunWater states is the basis for the NSP. We however make the following comments which we believe require greater investigation before approving inclusion into the NSP calculations:

- At Mirani pump station 3 we note that in 2015 SunWater have proposed 5 scoping, design and drafting studies for the replacement of the pump units starters with each costing $50K. This equates to a total of $250K which we believe is excessive for a scoping, design and drafting study. A scoping study for these pump units would be in the order of $100K and not $250K.
- At Mirani pump station 3 we note that in 2016 SunWater have proposed 5 replacement of pump unit starters each at $50K. The total value of the proposed works is $250K which we believe does not take into account the reduced cost associated with undertaking work at the same site and the same time. Arup have not been able to see a detailed breakdown of this costing but believe that this could be discounted by between $50K - $100K.
- The replacement of the pump unit starters has been costed at $50K each. The application of a single cost to each starter unit does not seem to take account of reduced costs obtained from economies of scale. While we note that it is difficult to cost each item in detail when there are many items within the renewals program we suggest that the similar individual items in the same year should be discounted to account for the economies obtained from undertaking work at the same site and of similar nature.
- Mirani pump station 1 has a proposed replacement of a switchboard in 2012 at the cost of $226K and we also note a further replacement of control equipment in 2019 at a cost of $97K. We are unclear on the reason why these have been scheduled separately as we would anticipate that both pieces of work are interrelated and should be undertaken at the same time. Again we would seek further explanation from SunWater about the works proposed and the order suggested before determining an efficient cost.
- Mirani pump station 3 has scheduled an PLC/SCADA system replacement options analysis for 2012 with a full replacement scheduled in 2026 at a cost of $303K. We would expect that a replacement would be done in the year of the options study or at the latest the subsequent year. The full replacement in 2026 has been identified based on asset life and we would suggest that the options study be deferred to 2026 or 2025 to ensure that outcomes are take account of the technology and requirements of that time.
- We note the replacement of valves 1 and 2 (1350mm butterfly valves) scheduled for 2026 at the cost of $197K in 2011 dollars for each valve (therefore $394K). Arup have reviewed the Cardno 2008[24] asset revaluation report which states that a 2008 rate for the supply and install of a butterfly valve as being $98K. Even factoring up to 2011 dollars and taking into account SunWater overheads we consider a value of $394K to be excessive. While their inclusion in the program based on asset life is considered prudent,

[24] Cardno for SunWater, *SunWater Asset Revaluation*, June 2008, - Page 49

Arup believe that SunWater need to justify the value attributed to these works before they are classified as efficient.

- Mirani pump station 2 is at the moment not in operation and we understand will be redesigned and procured in 2017. The schedule of works proposed for this infrastructure then shows that the control equipment will be replaced in 2020 ($19K) and a switchboard replacement will take place in 2023 ($108K). Additionally there are works proposed for the replacement of the pump unit 1 and 2 starter to be replaced in 2018 in addition to the replacement of the main circuit breaker and incoming supply panel (combined value of $265K). If the pump station will be redesigned and constructed in 2017 it is not likely that these other works would be undertaken at the times proposed. Without further explanation from SunWater regarding the inclusion of these works we recommend that they be removed from the R&R program.

9.5 Summary of Observations

In summary Arup note the following observations:

- We note that the procedures adopted are prudency and that SunWater are undertaking work to make their operations more efficient.
- Arup believe that forecast Opex is consistent with historic actual. During the site visit we observed that locally the scheme was being managed in a prudent manner and did not witness any activities which we believed was being undertaken in an inefficient manner. As previously stated this assessment does not consider electricity expenses and their projected increases.
- Arup have insufficient information to conclude whether Opex are prudent and efficient as we have no method for linking costs with work orders
- Arup would like to see greater detail around works envisaged for the current financial year to understand if costs proposed are prudent and efficient
- The scheme is currently negative and is planned to stay so (albeit a smaller negative number) for most of the next 25 years.
- Arup would like to highlight, the higher than industry average WACC and repeat its comments as to whether irrigators have sufficient input in deciding future expenditure. Other than these two issues, in general the annuities program appears prudent and efficient in its operations.
- The methodology used in preparing the breakdown, ie itemising costs on a per asset basis, generates a large number of items many of which should be packaged up into single items that would probably be more economic in delivery. While we consider that asset life is an appropriate method for identifying works post the current financial year we believe that SunWater should do a sense check of the program out to 2036 and certainly for large numbers of the same item in any one year should be modified to include the likely level of economy that could be generated. Arup have raised some specific observations regarding some costings within the annuities program and specifically we note the application of unit costs for the replacement of multiple items (eg pump unit starters) at the same site.
- Arup have made numerous observations regarding the annuities program which need further explanation from SunWater around the basis of the costing before the can be classified as efficient costing.

- The methodology used in applying the annuities program appears prudent and it is likely that when automatically generated using the SAP system there will be a level of overprediction of costs due to works being identified on a functional unit basis. A balance needs to be achieved, where we acknowledge that assessing items individually may prove counterproductive and excessive. Taking this into account we believe that a greater level of sense checking needs to take place to ensure that works identified are consistent with SunWater's asset planning strategy.
- Arup are not able to classify the Eton Water Supply Scheme R&R program as prudent or efficient and believe that further investigation of the factors raised above is necessary before this can be done.

10 Eton Distribution Scheme

10.1 Scheme Summary

The Eton distribution system is located southwest of Mackay near the town of Eton. It is supplied from Kinchant Dam located on Sandy Creek. The distribution system consists of the following major assets:

- Oakenden Main Channel
- Abingdon System and Abingdon Pump Station
- Brightley System and Brightley Pump Station 1 and 2
- Victoria Plains System and Victoria Plains Pump Station
- Oakenden System and Oakenden Pump Station
- Marwood System
- Munburra System
- Mt Alice System and Mt Alice Pump Station.

These assets are essential parts of the distribution system and as such SunWater has contractual obligations to customers in relation their management and operation.

A description of the major distribution assets is presented in Table 12.

Table 12. Bulk Water Assets

Asset	Components	Optimised Replacement Costs
Oakenden Main Channel	Oakenden Main Channel –553ML/ day capacity in first section to 173ML/ day capacity in last section	Not Available
Oakenden operational system	Oakenden Pump Station – 38ML/ day capacity Oakenden Balancing Storage – 3ML capacity Buried pipelines	Not Available
Brightley operational system	2 pump stations: Brightley Pump Station 1- 62ML/ day capacity Brightley Pump Station 2 – 19ML/ day 3 balancing storages: Brightley balancing storage 1 – 0.8ML capacity Brightley balancing storage 2 – 8ML capacity Brightley balancing storage 3 – 50ML	Not Available
Victoria Plains operational system	Victoria Plains Pump Station – 82ML/ day capacity Victoria Plains Balancing Storage – 25ML capacity Pipelines	Not Available
Marwood operational system	Munburra gravity system	Not Available
Mt Alice operational system	Mount Alice Pump Station – 120ML/ day capacity Mount Alice Balancing Storage – 3ML capacity Distribution pipelines	Not Available
Abingdon operational system	Abingdon Pump Station – 32ML/ day capacity Abingdon balancing storage tank (excavated earth tank) – 1ML/ day capacity	Not Available

The distribution system has 307 customers and services 52,675 ML of customer held High B WAE, 504 ML of Risk WAE and 700 ML of High A WAE. SunWater holds 6,295 ML of High B WAE and 3,089 ML of High A WAE for distribution losses. These distribution losses will attract bulk water charges.

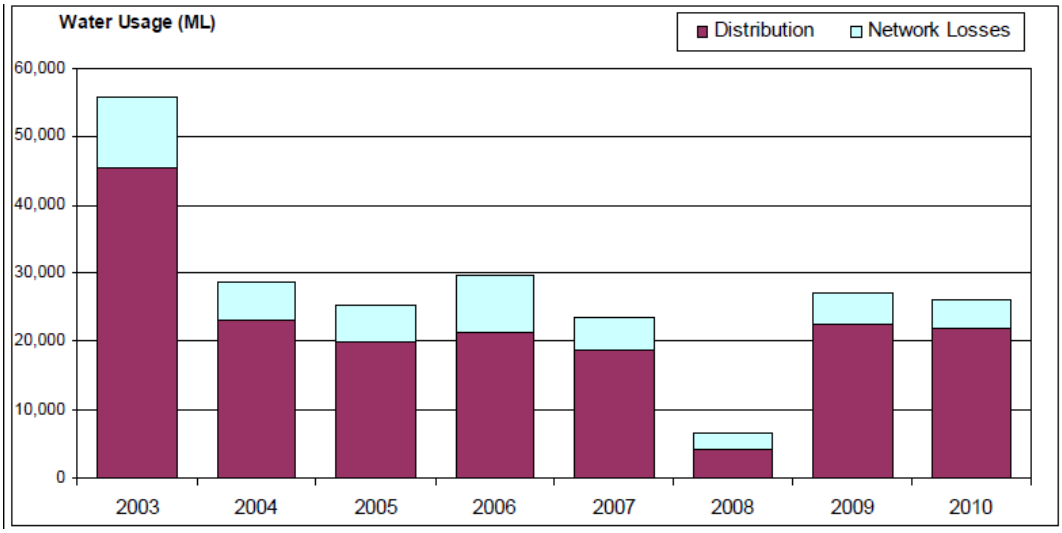


Figure 43 Eton Irrigation Scheme – Water Usage

10.2 Irrigator comments & key concerns

Comments on Section 9 remain valid here.

10.3 Operations

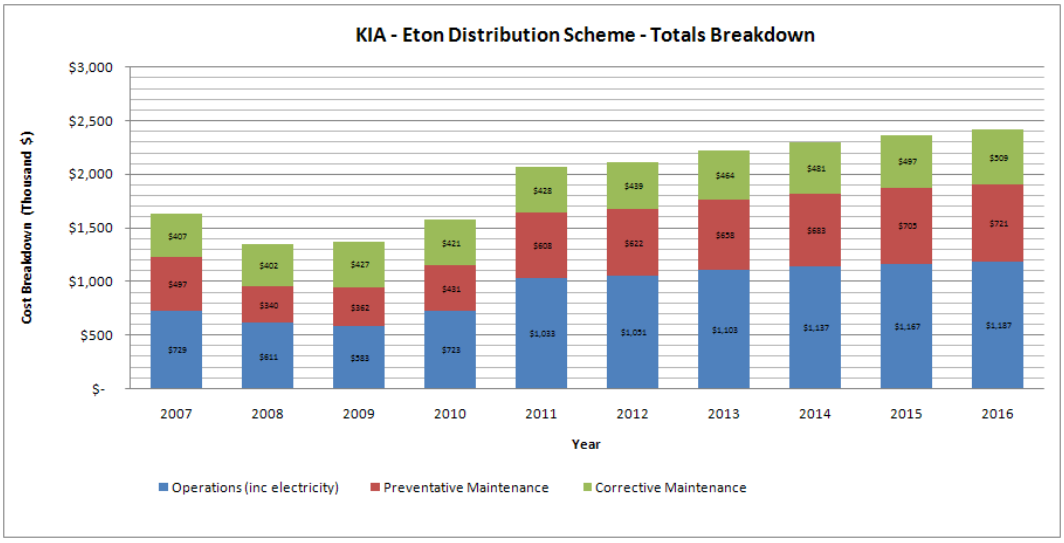


Figure 44 Eton Irrigation Scheme - Breakdown of Total Expenditure (Historic and Forecast)

Arup have reviewed the information provided by SunWater in conjunction with the site visits to assess the prudency of operational costs. To assess prudency the first step is to understand the trend changes in costs from historic to forecast. The following charts present the disaggregated cost information provided by SunWater which help to further break down the information provided in the NSPs.

In this particular scheme overall operational costs (excluding electricity) are increasing annually about 8%, when you use the average annual operating cost of each price path, using 2011 dollars. In dollar terms this is a $2.163M increase

when comparing price paths. From the graph above, increases in preventative maintenance and operations are clearly visible.

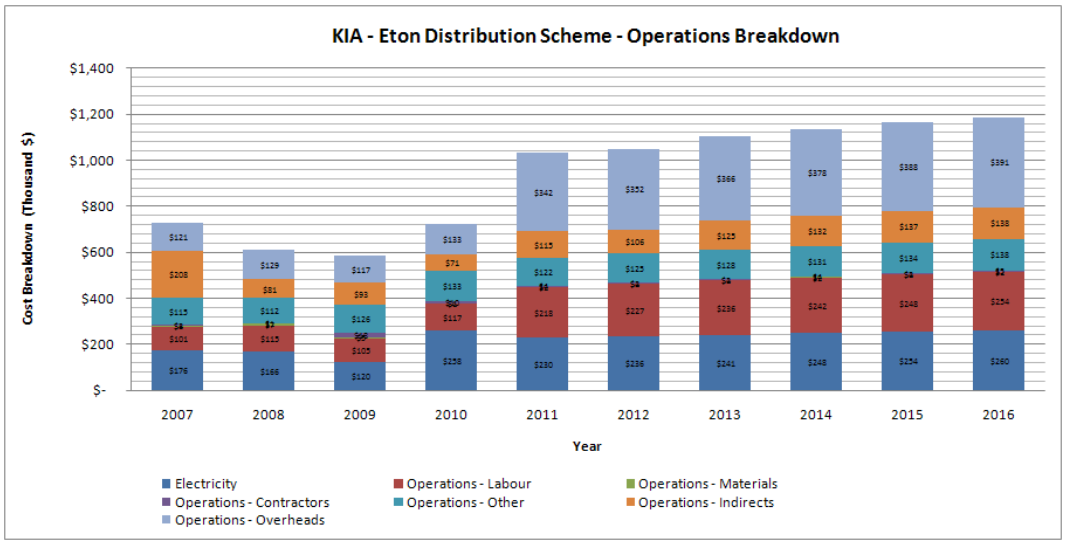


Figure 45 Eton Irrigation Scheme - Breakdown of Operational Expenditure (Historic and Forecast)

Figure 45 shows a break-out of the operational costs into its various sub elements. The largest increases in cost for this scheme are labour and overheads. Electricity although a large cost component remains relatively neutral across the board. We have asked for an explanation from SunWater on the reason behind the increase in labour costs and are still awaiting a formal response. Initial review of the information thus provided indicates that the increase could be associated with the allocating labour costs between the bulk and distribution schemes for Eton. Labour operational costs are seen to decrease for the Eton Bulk Scheme and therefore may explain the increases for the distribution scheme.

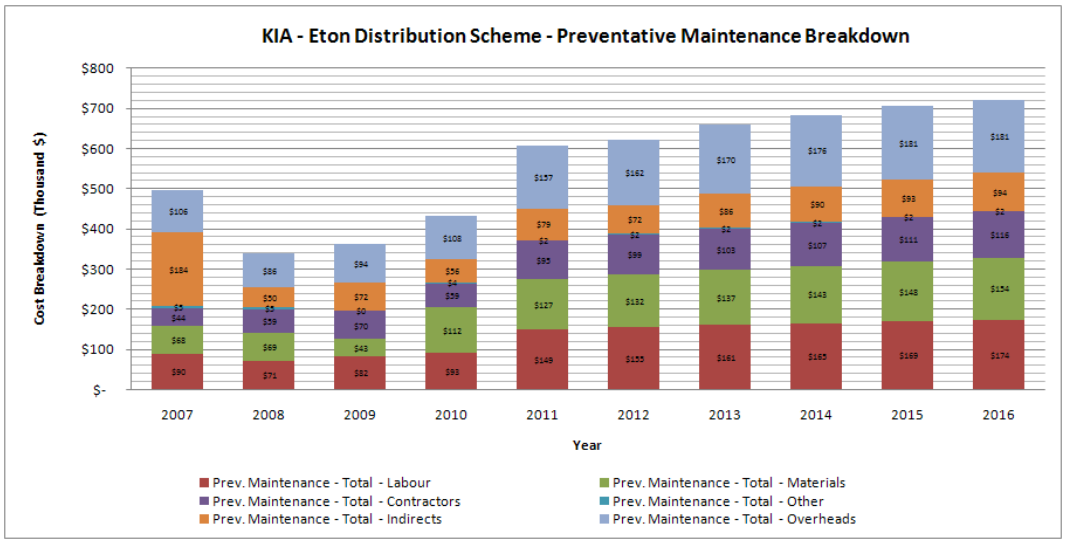


Figure 46 Eton Irrigation Scheme - Breakdown of Preventative Maintenance Expenditure (Historic and Forecast)

Preventative maintenance is also a large component of the Opex budget and therefore is investigated further here. The graph highlights that labour, contractors

and materials are the biggest components. A review of the financial numbers indicates that the spike in materials cost in 2010 is due to increases in the price of Acrolein and also the need for increased treatment due to the proliferation of Hymenachne, a semi aquatic grass which was seen to be invading water bodies at a rapid pace.

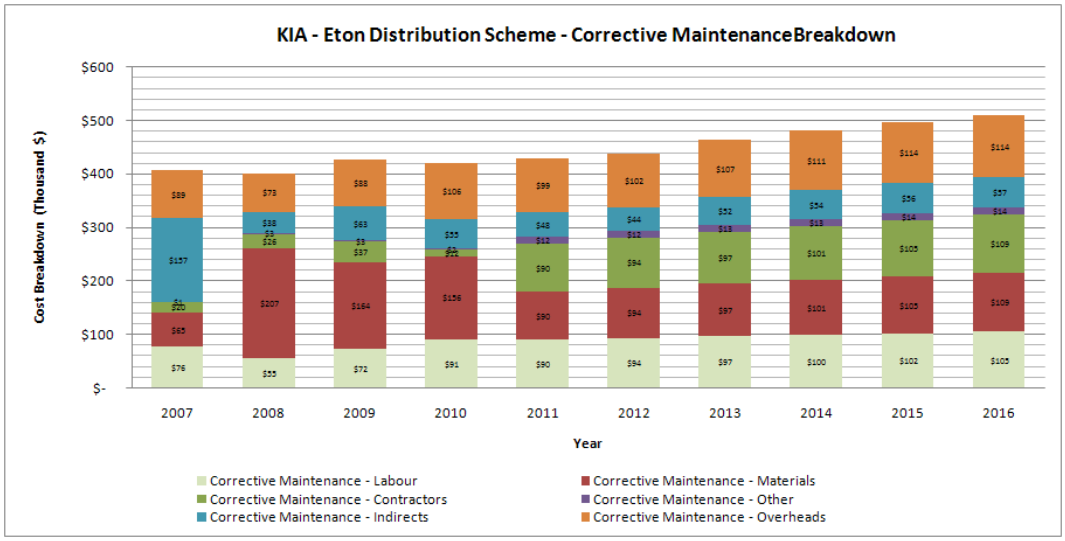


Figure 47 Eton Irrigation Scheme - Breakdown of Corrective Maintenance Expenditure (Historic and Forecast)

Table 13 uses data from SunWater's internal Paper on the projected demand for Acrolein. The following scenario uses the anticipated chemical usage and additional labour to approximately estimate the associated increase in costs. We note that large increase in materials under CM in the current price path which has translated into an increase in materials under the PM budget. We presume that unscheduled weed eradication activities were previous billed to CM and hence the transfer of this forecast to PM. Without further clarity from SunWater this is still a presumption. Additionally we are unclear as why there is a large increase in the use of contractors under the CM budget for the 2011 to 2016 price path.

Table 13: Projections in cost of Acrolein

Acrolein Paper	2012	2013	2014	2015	2016	TOTAL
Acrolein (2011 numbers $6k/drum @18 drums) (old numbers $4k/drum@ 14.5 drums) Annual delta	$51k	$52k	$54k	$55	$56	$268k
NewTech man ($80k includes on costs)	$82k	$84k	$86k	$88k	$90k	$430k
TOTAL	$133k	$136k	$140	$143k	$146k	$698k

2012 starts with 2.5% CPI increase

From our field visits, discussions with SunWater personnel and access to internal papers, Arup acknowledges and can validate that the expenditure is for assets and operations necessary to fulfil SunWater's service and regulatory commitments. Nevertheless it's a substantial increase which has attracted the concerns of irrigators.

Being a Distribution scheme the majority of costs for distribution/channel systems relate to the supply of water to the customer rather than compliance. These supply services include, significant operating costs in scheduling and delivering water, maintaining the distribution system to supply water at the required flow rates & times, and maintaining the assets to ensure continuous supply availability.

Review of electricity prices is not part of the Arup scope, however in our investigations into SunWater's expenses we can comment that, SunWater have undertaken extensive cost benefit analyses into when and where they should adopt contestable or franchise tariffs. Specialist consultants in this field have been employed to advise SunWater on such strategies, and for this particular scheme the current advice is to run a franchise tariff.

Insurances are another centralised allocation cost and as such are being assessed by others. The allocation for the Eton Distribution Scheme is $119,000 annually for the 5 year price path. Two key parameters used by Insurance brokers to help determine annual premiums, is asset value and risk mitigation strategies. A move to the optimised replacement cost will most probably increase the net value of assets to be insured and as such increase premiums. SunWater's risk mitigation strategies are robust and accreditations like ISO 9001, AS/NZS ISO4801 & AS/NZS ISO 14001 will be reviewed favourably by insurance brokers.

Overall Opex for this scheme markedly increases and upon broader investigation this has not been offset by a similar decrease for the bulk scheme. SunWater have to date provided no further explanation regarding the basis for these increases.

10.3.1 Operation and Water Usage

Given the nature of the activities, some operational costs related to 'water management' and 'schedule and delivery' could be expected to be approximately proportional to the amount of water used. The chart in Figure 48 below shows the operational costs attributed to schedule and delivery, as well as the total amount of water used in the respective years (no operational costs were attributed to water management activities in the period 2007 – 2010). No strong correlation between water usage and schedule and delivery operational costs is evident for the Eton Irrigation Scheme.

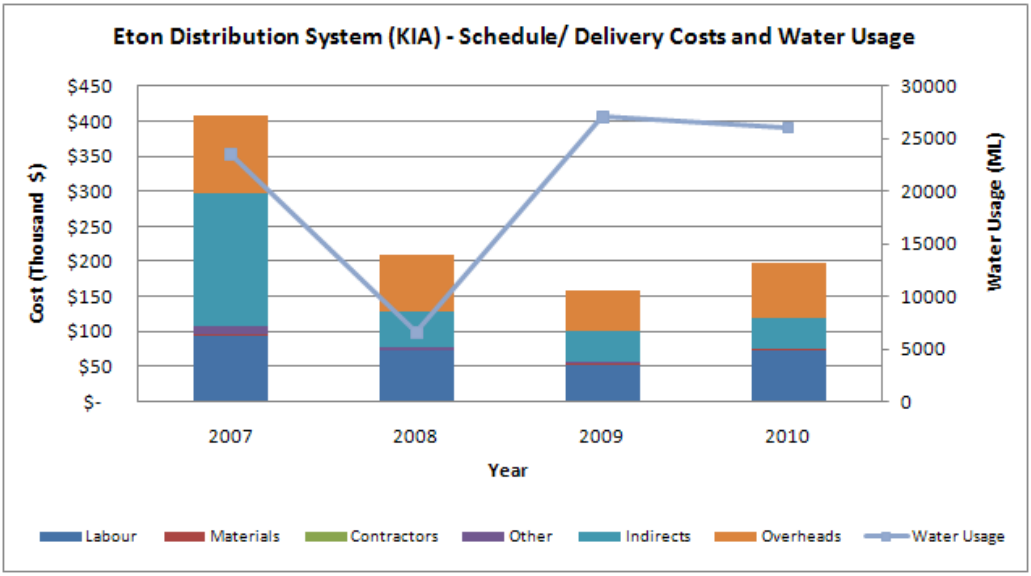


Figure 48 Eton Irrigation Scheme – Schedule and Delivery Operational Costs and Water UsageAssessment of Renewals

10.4 Assessment of Renewals

10.4.1 Renewals Accounting

The Eton distribution scheme has an opening balance of negative $414,000. A review of the historic data indicates that this would be due to expenditure resulting from flood damage and is seen to occur in 2008. The largest of these is for $62,316 which seems to have taken place at the Oakenden Main Channel. The question has been put forward to SunWater on whether these expenses incurred with respect to flood damage can be recovered through insurance or this is within the insurance excess. Other notable entries include the installation of fencing at property boundaries which we understand are necessary to reduce risk of accidents within SunWater's boundary.

An understanding of the renewals accounting process and a determination of the closing balance at 30 June 2011, requires detailed knowledge and data of several key aspects, these include:

ETON DISTRIBUTION ($000's)		
(a)	Renewals balance 1 July 2006	(103)
(b)	Inflows to the annuity account (income from irrigation sector 2007 -2011)	1296
(c)	Renewals expenditure apportioned to irrigators 2007 - 2011	1647
(d)	Calculating interest on account balances	9.689%
(e)	Irrigator sector balance	(414)
(f)	Uplift factor whole of scheme	0
(g)	Scheme opening balance	(414)

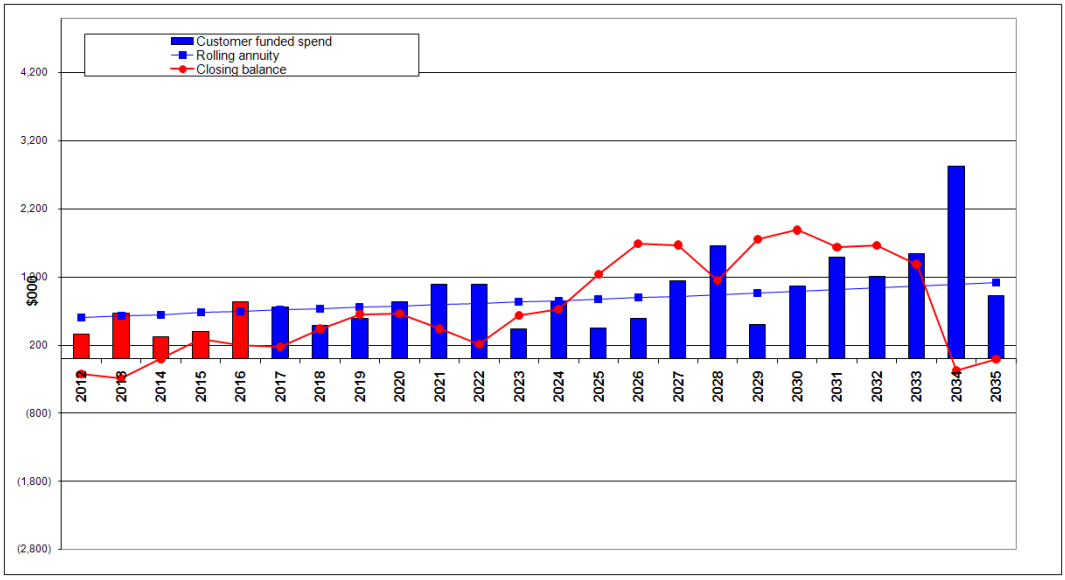


Figure 49: Renewals Annuity Chart - Eton Distribution Scheme

a) The renewals balance has be taken from SunWater's paper, Renewals Annuity Calculation - Internal Working Paper. It is not in Arup's scope to critique this paper.

b) Available in SunWater's annual report and same internal paper reference in (a)

c) This data is detailed in SunWater's paper, Renewals Annuity Calculation - Internal Working Paper. Arup has also checked these numbers with Annuity data for 2007-2011 provided by SunWater for all projects. Though we cannot get the numbers to precisely match on an annual basis, the 5 year price path variance is negligible, and most likely due to the NSP data being in 2011 real dollars.

d) There are some discrepancies in the interest rate to be used on balances. The SunWater paper, Renewals Annuity Calculation - Internal Working Paper, talks about using a 9.689%, but then renewal annual financial model – version 610.03 uses 6% for 2012 balances and then 5% for balances from 2012 and beyond. QCA need to determine the actual % rate.

e) The irrigation sector balance is the result of (a) x interest on balances +(b) –(c).

f) Uplift factor used to multiple (e), not applicable for Distribution schemes.

g) Scheme opening balance

A review of the projects undertaken in the annuities scheme over of the 2007 – 2011 period reveal:

a) Assets being refurbished are strictly irrigation assets, required to be maintained to meet the required service regimes of irrigators, regulators and good corporate practice

b) Assets are Treasury approved for assessment

c) Project costs are only updated in the year they are scheduled to be undertaken. This is reasonable to ensure price estimations are current, alternative options are meaningful and allow for variance in asset life conditioning.

d) There is project expenditure, which would not have been projected at the start of the 2007 – 2011 pricing path. Such projects include $100k for flood damage repairs, $320k for WHS structures and some $138k to install fencing as part of the fencing policy.

e) Arup has read SunWater's position papers on the Fencing Policy and the investment to upgrade the WHS structures to reduce risks to SunWater's field personal. Arup believe both papers are appropriate responses to these matters and they represent prudent and cost effective expenditures.

f) The $414k negative balance is largely related to an opening negative balance from 1/7/06 and the unbudgeted renewals expenditure outline in item (d).

10.4.2 Renewals Forecasting

A review of the projects undertaken in the annuities scheme over of the 2011 – 2016 period show that:

- The Eton Distribution Scheme opening balance 1st July 2011 is negative $414k and is forecasting renewals expenditure mainly to do with pumps and pumps station refurbishments. The forward position is that this scheme will have a positive annuity in 2014 and will remain positive for most of the 30 year forecast. The scheme has a much smaller expenditure profile than the Burdekin, with far fewer projects.
    - 8 projects in 2012
    - 4 projects in 2013
    - 56 projects in 2014
    - 20 projects in 2015
    - 12 projects in 2016
- Arup have reviewed a couple of the large expenditure items including:
    - Replacement of 2 starter pump units at Victoria Plains Pump Station (2013) – 2 by $67.34K
    - Replacement of switchboard at Brightly Pump Station (2013) - $236K
    - Repair fencing at Oakenden distribution (2012) - $6K

Replacement of starter pump units at Victoria Plains Pump Station (2012)

These pump units have a nominated asset life of 20 years and have been in operation from 1989. The replacement of the starter pump units was originally scheduled for 2009 when a condition assessment at the time indicated that the time for replacement could be shifted to 2012. The methodology of reviewing renewals items in the year of replacement or year prior (as was historically done) does ensure that priority is shifted to assets which have a higher risk rating. With regards to costing SunWater have stated that "*costing is based on replacement*

cost, previous projects and in conjunction with local staff."[25] While we acknowledge that the methodology around identification of this asset for replacement is prudent we are not able to conclude whether the costing is efficient unless we have the basis for costing. We do however note that the cost of replacement of is based on the cost for a single pump unit (ie $67.34K). It would seem that SunWater have simple applied the cost to the two pump units not accounting for any economies of scale for installation at the same site.

Replacement of switchboard at Brightly Pump Station (2013) - $236K

This switchboard has been in operation from 1980 and although SunWater has indicated an asset life of 35 years it has been included in the program for 2013, 2 years ahead of schedule. The condition assessment has given it a scoring of 5 indicating that there has been evidence of overheating. The replacement of the switchboard was reviewed as part of the audit of electrical sites undertaken by Parsons Brinkerhoff[26] where the switchboard at Brightly pump station was identified as being of concern due to age and the availability of spare parts. This specific switchboard was shown to pose an extreme risk and specifically was identified as failing to meet the requirements of section 7.4.2 of AS/NZS 3439.1:2002 – Protection against direct contact. Based on this Arup agree that this is a prudent expenditure item. With regards to costing SunWater have stated that "*costing is based on replacement cost, previous projects and in conjunction with local staff.*" Again we would seek more indepth explanation around this costing and in the absence of this we are not able to conclude whether this is an efficient costing.

Repair fencing at Oakenden distribution (2012) - $6K

This project was raised as a side issue during a condition assessment undertaken in September 2010 and note specifically this is for the repair of a gate. SunWater note that although it was given a condition of 2 it was identified as posing a security risk by enabling access to unwanted parties. This highlights the need to restrict access to various parts of the system to minimise liability to SunWater and its customers. Arup consider this a prudent expenditure. SunWater have said the cost is based on fencing contractor engagement though we have not been provided further evidence showing if this was obtained through a formal quotation. We would seek further details on the basis of this costing before classifying it as efficient.

General Observations

Each scheme has a large number of items identified under the R&R program. The timeframe for this study did not allow investigation of a large number of items. We have therefore undertaken a broad sense check of works proposed based on the spreadsheet which SunWater states is the basis for the NSP.

- Brightly pump station 2 has a scheduled switchboard replacement in 2012 ($100K) and a control equipment replacement in 2017 at a cost of $144K. Normal practice would be to replace them concurrently for purposes of

[25] Email Carolyn Hurst to Ragini Prasad: 19th July 2007
[26] Produced by Parsons Brinckerhoff for SunWater, Audit of Electrical Sites, 2009, Page 53

efficiency and an explanation is required form SunWater regarding the timing delay.

- At Abingdon Pump station we note that the replacement of the control consol is proposed for 2014 with the replacement of the control equipment scheduled for 2017. Again we would think that this should be done at the same time for purposes of efficiency.
- We note that there is a program of air valve replacement scheduled for 2023 for Brightly No. 1 distribution and again this has been costed on an individual functional unit basis. We would expect that some level of economy could be gained from doing this work concurrently which does not seem to be reflected in the costing. This is similar for the 2027 program of air valve replacement scheduled for Marwood distribution.

10.5 Summary of Observations

In summary Arup note the following observations:

- We note that the procedures adopted are prudency and that SunWater are undertaking work to make their operations more efficient.
- Arup believe that forecast Opex is consistent with historic actual. During the site visit we observed that locally the scheme was being managed in a prudent manner and did not witness any activities which we believed was being undertaken in an inefficient manner. As previously stated this assessment does not consider electricity expenses and their projected increases.
- As outlined in the NSP and validated above, total operating costs for the new pricing path versus the previous pricing path is increasing 27.7% over the 5 year period, which is approximately 8% annual increase
- Both CM and PM are increasing markedly and SunWater have not provided full justification around these though we note the increase in cost of materials associated with weed eradication
- Arup have insufficient information to conclude whether Opex are prudent and efficient as we have no method for linking costs with work orders
- The annuity program is automatically generated in the SAP system
- The scheme is currently negative, but forecasted to turn positive in 2014 and remain positive for the next 25 years. One of the contributors to the negative balance has been flood damage
- Arup would like to see greater detail around works envisaged for the current financial year to understand if costs proposed are prudent and efficient
- Arup would like to highlight, the higher than industry average WACC and repeat its comments as to whether irrigators have sufficient input in deciding future expenditure. Other than these two issues, in general the annuities program appears prudent and efficient in its operations.
- The methodology used in applying the annuities program appears prudent based on replacement date, however a further sense check of the program shows that the scheduling of works are not conducive to an economically efficient outcome (specifically the replacement of control equipment and switchboards taking place a few years apart). Arup are not able to make an

assessment around the efficiency of costs given we have not been given sufficient detail of the actual works proposed.

11 Pioneer Water Supply Scheme

11.1 Scheme Summary

The Pioneer River Water Supply Scheme is located near the city of Mackay. The scheme's bulk water components are:

- Teemburra Dam
- Mirani Weir
- Marian Weir
- Dumbleton Weir

The storages above are listed in the Pioneer Valley ROP and as such, SunWater has obligations in relation to their management and operation. SunWater uses a network of hydrographical gauging stations for scheduling water deliveries and to generate stream flow data for ROL compliance reporting.

The capacity of the bulk water assets and their replacement cost as at 1 July 2011 are presented in Table 14.

Table 14. Bulk Water Assets

Asset	Capacity when Full	Optimised Replacement Cost
Dams		
Teemburra Dam	147,500 ML	$142,124,562
Weirs		
Mirani Weir	4,660 ML	$54,019,826
Marian Weir	3, 980 ML	$10,067,899
Dumbleton Rocks Weir	8, 840 ML	$24,740,368
Other Bulk Water Assets		
Land		$5,157,031
Stream gauges		$0
Meters		$0
Working capital		$40,366
Palm Tree Creek Pipeline		$0
Third party assets - access roads to dam		
Total		$236,150,051
Capital contributions received from irrigators		$413,500

The scheme's WAEs are listed in the Pioneer Valley ROP. The scheme has 7 customers. One of these customers, the Pioneer Valley Water Board (PVWB), supplies approximately 250 customers. The scheme comprises 47,357 ML High B WAE and 30,753 ML of High A WAE. All the High B customers are supplied by the PVWB, the DOL holder within the scheme. Although SunWater has supply

contracts with each high priority B WAE holder, it also has an agency agreement with PVWB to supply these customers.

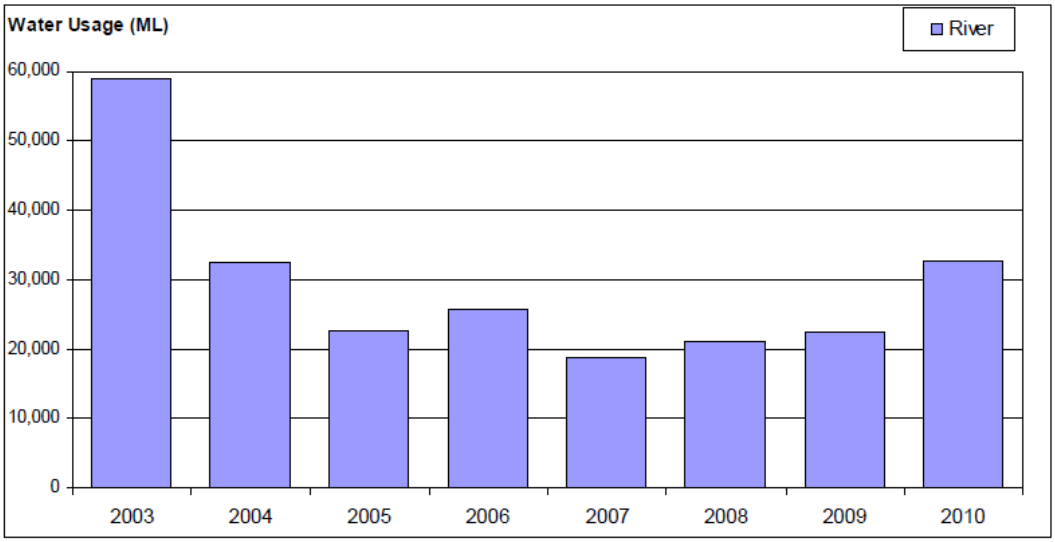


Figure 50 Pioneer Water Supply – Water Usage

11.2 Irrigator comments & key concerns

Ref	Comments
1	Pioneer Water Board deliver some of the irrigator services in the area, but no credit or recognition is given by SunWater. The NSP is misleading and the working infers that SunWater does the distribution component when this is being undertaken by PVWB
2	NSP's are lacking detailed information, and stakeholders lack the data to make meaningful comments. Operational and Renewals data should be broken down further
3	There is a need for greater levels of communication by SunWater, particularly in relation to operation of the scheme.
4	The deflation of fabri dams is a concern and the associated loss in yield and they feel that the decision to deflate was reactive. Drop in weir wall height, due to problems with fabric bags, unfavourably impacts irrigators allocation and level of reliability.
5	High Risk A customers get 500ML from Pioneer Water Board, irrigators want reassurance that any associated distribution costs are being applied to these allocations
6	Numerous questions on the appropriateness of the annuities program to manage capital refurbishment.
7	Mirani Weir on the Pioneer River has a dual function and also benefits the Eton scheme as it provides a pumping pool to Kinchant Dam and there was concern that all the costs associated with the weir were attached to the Pioneer Scheme rather than being shared between Pioneer and Eton
8	SunWater have a lack of incentive to reduce costs and PVWB felt that they were doing some things a lot cheaper than SunWater.
9	Concerns were expressed about customers having to pay for what were considered 'legacy' issues with parts of the system where the original design was potentially flawed and now requiring the need for regular refurbishment and maintenance. Specifically the valve on Palm Tree Creek outlet was discussed where significant renewals expenditure has been undertaken and has still failed to produce the desired results
10	Are Industrial & Mining users paying their fare share of adjunct costs like DERM charges etc

Additional comments were raised in a formal correspondence to the Queensland Competition Authority on the 15th February 2011.

11.3 Operations

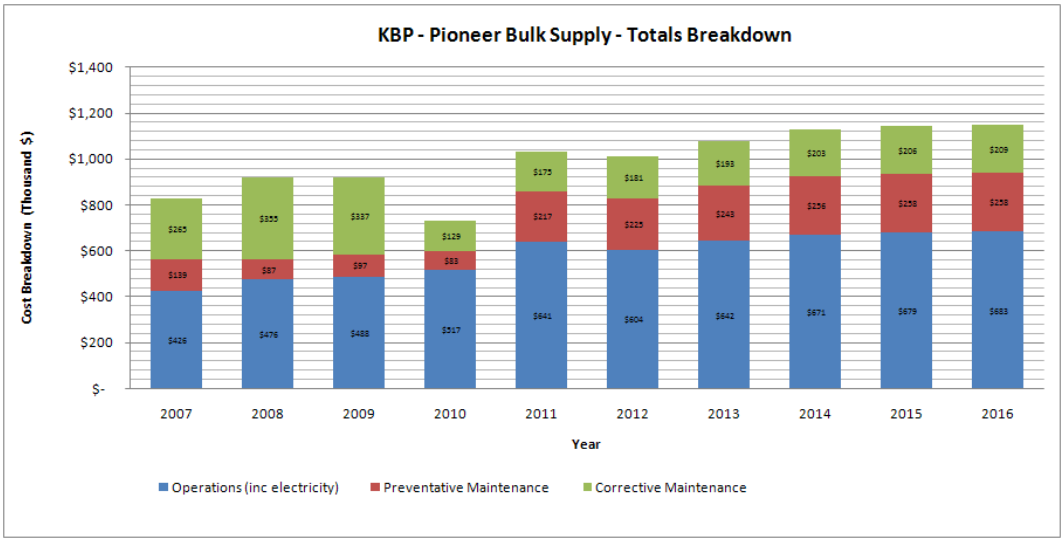


Figure 51 Pioneer Water Supply - Breakdown of Total Expenditure (Historic and Forecast)

Arup have reviewed the operational information provided by SunWater at the level of disaggregation provided. Figure 51 shows the breakdown of Opex between the various components. There is an increase in Opex overall from historic years to forecast years. Reviewing the figures further reveals that the changes are largely to do with indirect and overhead costs which are not being assessed as part of this consultancy. Generally labour costs and costs of insurance remain steady with increases in line with an accepted level of indexation.

Appendix A shows a more detailed breakdown of historical Opex. Under the operations category the largest component goes to Scheme management, dam safety and environmental management in order of magnitude. Within scheme management the 'others' component is the largest. This captures items including insurance premiums and financial charges and taxes.

Specifically 2011 has seen an increase in labour costs and this can in part be attributed to the increased surveillance of Teemburra Dam, which is a referable dam under the Water Act 2000. As stated in Chapter 6 of the Department of Environment and Resource Management dam safety guidelines a surveillance program should include:

- Monitoring of instrumentation
- Collection of information or data relating to dam performance
- Evaluation and interpretation of the data
- A range of inspections, from routine inspections by operational staff through to comprehensive inspections by engineers

Increased surveillance of the dam is necessary when water levels are high in the dam and overflow is imminent. This increased surveillance would be reflected in increased cost of labour, indirects and overheads.

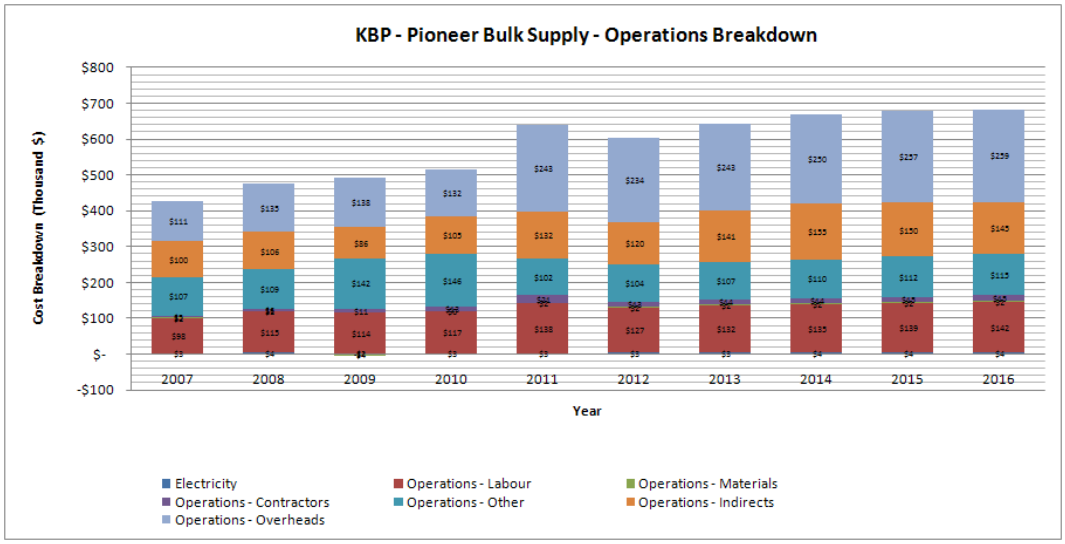


Figure 52 Pioneer Water Supply - Breakdown of Operational Expenditure (Historic and Forecast)

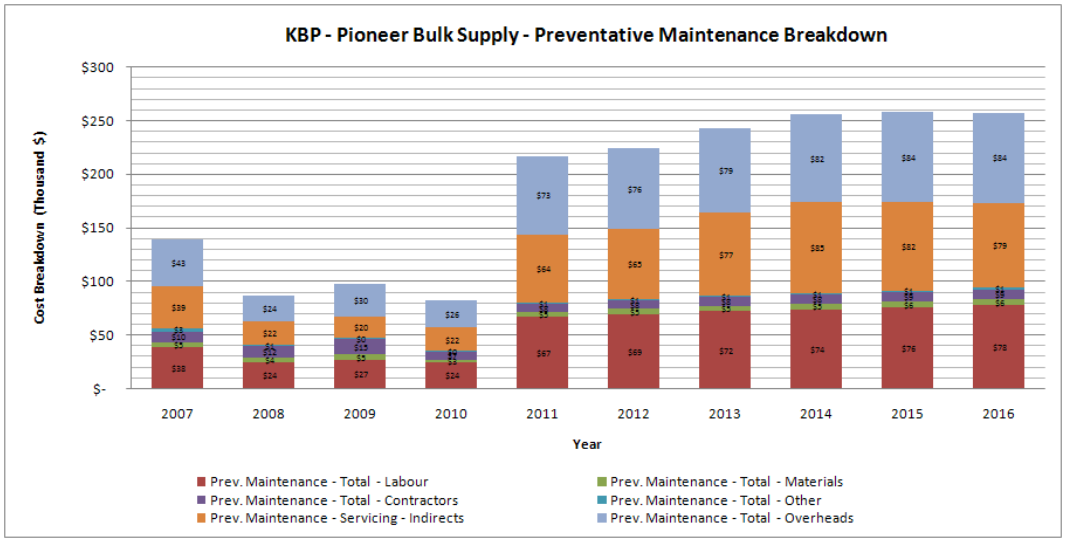


Figure 53 Pioneer Water Supply - Breakdown of Preventative Maintenance Expenditure (Historic and Forecast)

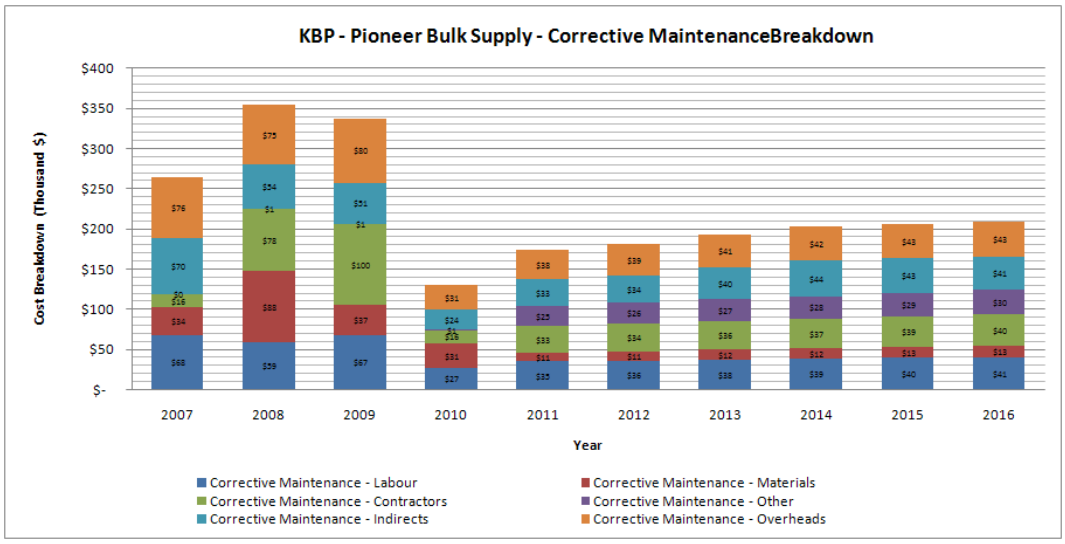


Figure 54 Pioneer Water Supply - Breakdown of Corrective Maintenance Expenditure (Historic and Forecast)

A review of PM and CM shows PM as increasing while CM is reducing. Under PM there is a notable increase for labour. We have not been able to ascertain what this increase in labour is for given that no similar trend is seen in the current price path. However there is a reduction in CM in the proposed price path where 2010 saw a significant reduction in the cost of contractors under CM. While the overall trend indicates that a reduction in CM has translated into an increase in PM, the full basis for this change has not been able to be determined.

11.3.1 Operation and Water Usage

Given the nature of the activities, some operational costs related to ‘water management’ and ‘schedule and delivery’ could be expected to be approximately proportional to the amount of water used. The charts in Figure 55 and Figure 56 below show the operational costs attributed to each of these activities, as well as the total amount of water used in the respective years. In the case of the Pioneer Water Supply, neither of these operational costs show a strong correlation with water usage.

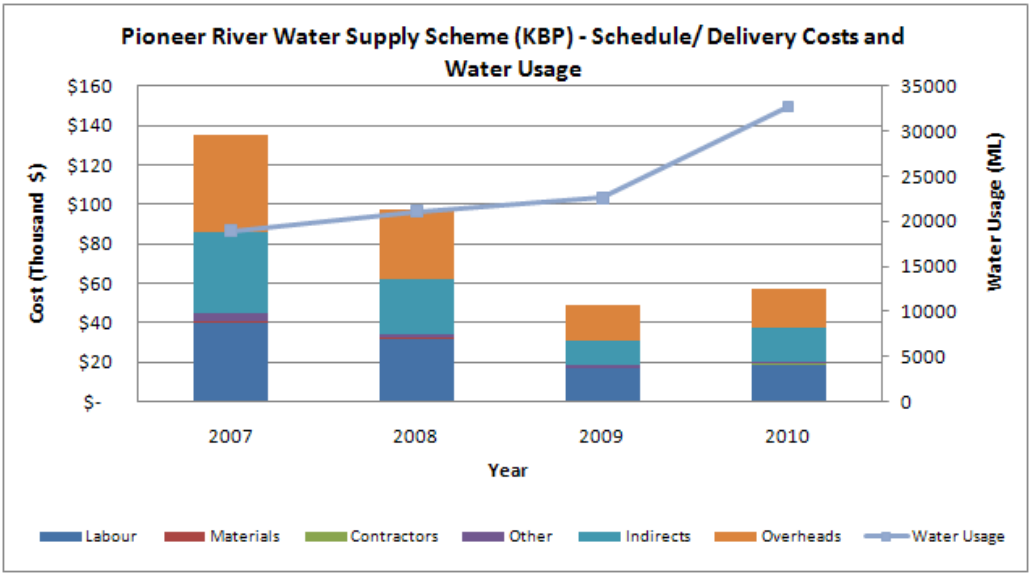


Figure 55 Pioneer Water Supply – Schedule and Delivery Operational Costs and Water Usage

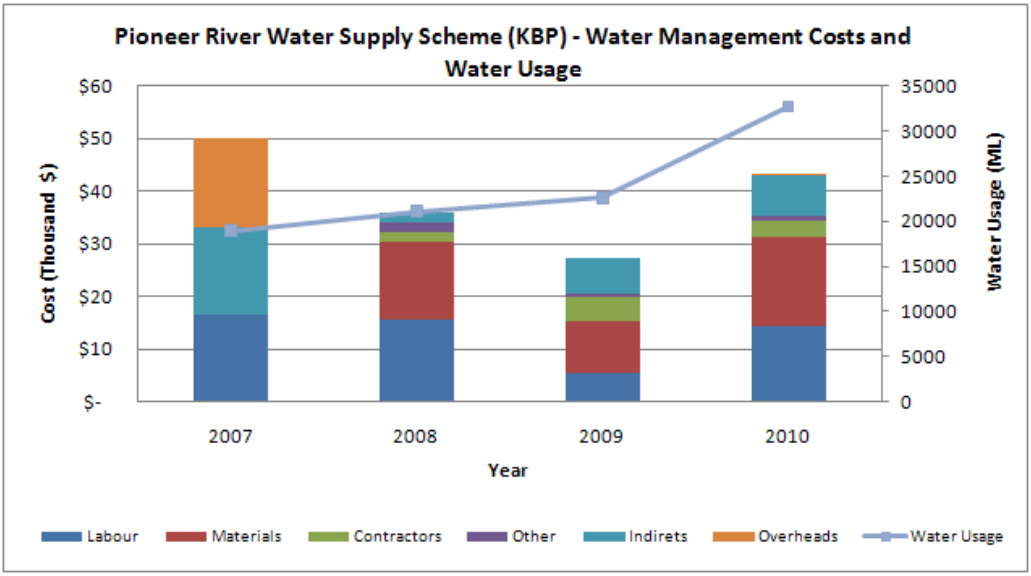


Figure 56 Pioneer Water Supply – Water Management Operational Costs and Water Usage

11.4 Assessment of Renewals

11.4.1 Renewals Accounting

An understanding of the renewals accounting process and a determination of the of the closing balance at 30 June 2011, requires detailed knowledge and data of several key aspects, these include:

PIONEER BULK ($000's)		
(a)	Renewals balance 1 July 2006	(247)

(b)	Inflows to the annuity account (income from irrigation sector 2007 -2011)	942
(c)	Renewals expenditure apportioned to irrigators 2007 - 2011	3,578
(d)	Calculating interest on account balances	9.689%
(e)	Irrigator sector balance	(3,207)
(f)	Uplift factor whole of scheme	1.65
(g)	Scheme opening balance	(5,289)

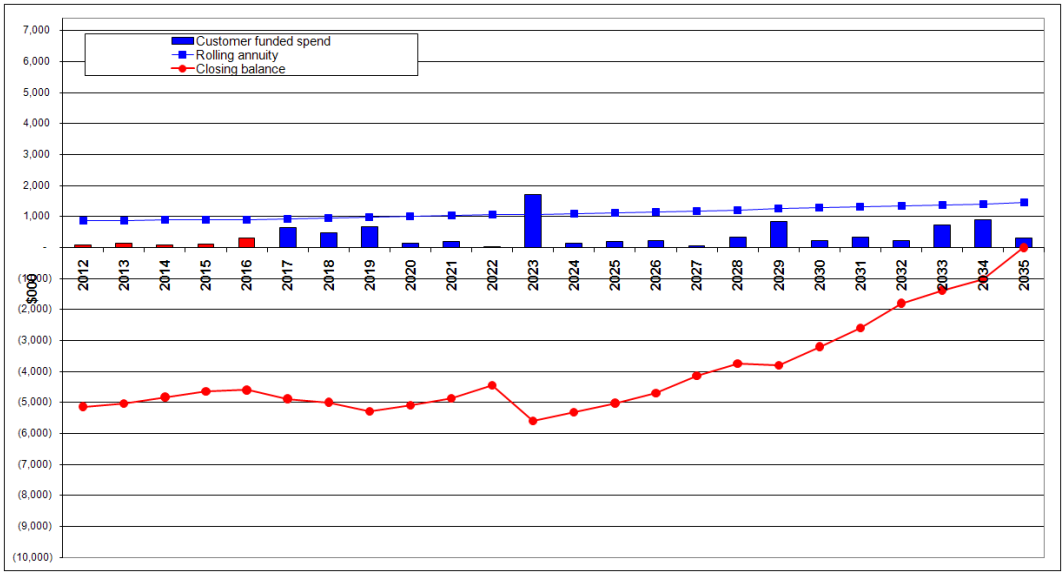


Figure 57: Renewals Annuity Chart – Pioneer Bulk Scheme

The figures show that the negative opening balance is incurring a significant interest charge which will rise for the coming 10 years.

11.4.2 Historical Renewals

Table 15: Top 10 Historical Renewals Spend - Pioneer Water Supply Scheme

	Pioneer Supply	Budget	Yearly Spend
1	07PIO02 - Enlarge Outlet Works - Marian Weir (Stage 2 - 2010) (ROP Operational Requirements) (2010)	$2,270,000	$1,658,482
2	07PIO05 - Replace Regulating Valve RV01 - Palmtree Creek Pipeline (2008)	$451,351	$470,992
3	07PIO05 - Replace Regulating Valve RV01 - Palmtree Creek Pipeline (2009)	$38,000	$350,509
4	07PIO05 - Replace Regulating Valve RV01 - Palmtree Creek Pipeline (2010)	$321,113	$321,113
5	07PIO02 - Enlarge Outlet Works - Marian Weir (Stage 2 - 2010) (ROP Operational Requirements) (2009)	$306,000	$194,015
6	07PIO02 - Enlarge Outlet Works - Marian Weir (Stage 2 - 2010) (ROP Operational Requirements) (2011)	$2,168,634	$159,180
7	08PIO11 - FD2/08 Flood Damage Repair - Pioneer Supply (2008)	$123,475	$123,475

8	11PIO04 - Teemburra Dam: Conduct 5 Year Dam Safety Inspection (2011)	$122,610	$121,587
9	07PIO02 - Enlarge Outlet Works - Marian Weir (Stage 2 - 2010) (ROP Operational Requirements) (2008)	$100,000	$73,246
10	10PIO12 - Repair Dam Wall Upstream Face Concrete - Teemburra (2010)	$61,367	$61,367

With respect to historic renewals Arup have been provided with a spreadsheet detailing the works in excess of $10K that have taken place under the R&R program since 2007. The budget column is the budget set by SunWater at the start of that financial year A significant component of the expenditure is on enlargement of outlet works on Marian Weir due to requirements under the ROP. We have not been provided further background to the reason behind these works and whether they are in response to the Final ROP from 2005 or the Final amended ROP from 2007. Certainly if they are due to the latter they would not have been identified in 2006.

The Pioneer Bulk scheme has an opening balance of negative $5.3M which is significant and will be a burden on the scheme as a minimum up until 2035. This is in part due to the negative opening balance in 2006 which has been exacerbated by largely the following projects:

- Enlarging of the outlet works at Marian Weir to meet ROP operational requirements;
- Replacing regulating valve at Palmtree Creek pipeline; and
- To a lesser extent flood damage repair works

Arup have been given the background to some of the issues relating to the above projects which to some extent explain the costs incurred.

Palmtree Creek Pipeline – Regulating Valve replacement

Due to the head of water above the valve significant recurring issues have been noted and expenditure to rectify the problem has occurred since 2008. An overspend on the original allocated budget was noted for 2008 and 2010 where the final approved budget was well in excess of the original board budget. Additional monies are still being spent in 2011 to rectify the problem.

SunWater have undertaken an options study to understand the best way to solve the issue and have shortlisted a range of options to be investigated further. SunWater have also provided costs for the various options.

We note that a waterhammer analysis has been undertaken though this does not cover all the options and therefore we would also recommend that SunWater undertake the appropriate waterhammer modelling for each of the shortlisted options.

SunWater have also separately commissioned a peer review of the work they have so far undertaken including an independent review of the options proposed by SunWater. Specifically Glen Hobbs and associates were engaged by SunWater in May 2010 to undertake a peer review of the various control valve options and comment on whether SunWater's selected option of a globe valve was an acceptable one. Glen Hobbs and associates further commissioned two experts to

provide comment. This work found that the options proposed by SunWater were not viable including the globe valve option and instead suggested three options ranging from $0.3M to $1.3M in cost. From the information provided it is unclear on what option is being taken forward and what the justification is behind the choice. .

The highly technical nature of the problem and history of issues indicates that there is a risk that further costs will be incurred in the next price path and thereby further bringing down the annuity balances. SunWater have undertaken a risk assessment in relation to the project and a rating of high has been given to the risk of project cost escalation above budget. The proposed mitigation strategy is to secure cost and time estimates from potential contractors in developing budget. It is likely that contractors will identify this as a risk and therefore build contingencies into their budgets to mitigate. While we note that SunWater are operating in a prudent manner to develop a viable solution, the highly complex technical nature of the problem suggest that the financial risk to SunWater and therefore the irrigators are high.

Enlargement of outlet works at Marian Weir

The Marian Weir outlet upgrade project involves demolition of the existing outlet structure and the construction of a new outlet structure with an increased capacity. The increased release capacity is required under the Pioneer River ROP. Detailed design and procurement for the project was completed in September 2009 and work commenced on site in early October 2009. SunWater have stated that work on site was managed by SunWater through a combination of direct works and specialised contracts.

SunWater's board report[27] from July 2011 states that the following works have been completed:

- Construction of the control building and permanent access road
- All off-site work for the supply of the electro hydraulic equipment for the fixed wheel gate operation
- Supply of principal supply metal work; and
- Construction of temporary downstream access and work platform, however it is expected that the section in the river has been eroded by the river floods early this year.

SunWater go onto state that "*The contractor constructing the temporary upstream coffer dam had commenced construction of a sheet piled coffer dam. Work was stopped for the 2009/ 2010 wet season. Work recommenced in early June 2010 however an incident with the construction of the coffer dam in late June 2010 resulted in the site being effectively closed by Workplace Health and Safety Queensland. There has been no further construction work on Site*"

Work has been suspended since June 2010. SunWater go onto state that "*The selected option for progressing the works is an AS2124 contract with the Contractor being appointed as Principal Contractor and being responsible for the completion of all remaining works apart from the electro hydraulics. This*

[27] SunWater, Board Report – Marian Weir Outlet Works – July 2011 (#1100381)

includes the investigation and design of coffer dams, obtaining approvals and permits, providing access and construction of the new outlet and associated works. A provisional lump sum price will be tendered for the coffer dams and work platforms and a final risk adjusted lump sum amount will be negotiated on an open book basis."

SunWater have indicated that they plan to go to the marked for commissioning of a contractor in the 3rd quarter of 2011.

With regards to costing the current expenditure to date on the project is $2.838M of which $1.01M is for expenditure on legal and incident related costs from the June 2010 incident. Therefore the original budget for this project will no longer be relevant. While Arup understand the broad circumstances, details are not apparent. Certainly we would like to understand whether some legal and incident related costs can be recouped through insurances held by the contractor if they are seen to be liable for the incident. We also cannot comment on whether the mode of operation originally adopted by SunWater (ie part self management and part going to contractors) can be considered an efficient mode of operation and whether this may have in part contributed to the incident of June 2010. Obviously the impact to the irrigators here is significant and further explanation to the irrigation community needs to be provided.

11.4.3 Renewals Forecasting

The majority of costs within the next price path under the renewals program are captured in 2011. Specifically these include:

- Continued works towards the enlargement of outlet works at Marian Weir 2011-07-28
- Replacement of Palmtree Creek Regulating Valve 2011-07-28
- 5 yearly dam inspection at Teemburra Dam
- Modify release valve at Dumbleton Weir

The remainder of the works over the next 5 years are relatively minor and do not seem unreasonable. Arup believe the former two projects above pose the greatest risk to the annuity balance for this scheme

The largest expenditure proposed is continued works for the enlargement of outlet works at Marian Weir. There are only 5 items identified in the next 4 years which are in excess of $100K. The enlargement of outlet works at Marian Weir and replacement of regulating valve at Palm Tree Creek are a continuation of projects from previous years. The remaining projects are scheduled dam safety inspections which are necessary under health and safety legislation.

While we have details of the total cost expended we are still do not have a clear linkage between costs and works undertaken and therefore are not able to make an assessment regarding the opening balance.

General Observations

Each scheme has a large number of items identified under the R&R program. The timeframe for this study did not allow investigation of a large number of items. We have therefore undertaken a broad sense check of works proposed based on the spreadsheet which SunWater states is the basis for the NSP. The following are some key observations which need further explanation:

- At Teemburra dam we note that there are three expenditure amounts attached to the same item for the replacement of control equipment; one in 2018 costing $133K and another in 2023 costing $276K and again in 2033 at a value of $132K. SunWater need to clarify which is the correct item and provide justification for the cost and why there are two largely varying amounts. We would not expect that control equipment would be so frequently replaced.
- At Dumbleton Weir we note that the control building is scheduled for replacement in 2029 ($150K) along with the replacement of the switchboard ($225K) while in 2019 and 2034 the control equipment is scheduled for replacement both at the cost of $382K. This demonstrates the consequence of identifying projects based on asset life where the sequence and timing of works is not conducive to an economically efficient outcome. We would expect that SunWater would review these sequence of works along with the cost and schedule works in the most efficient manner. While this may become apparent upon reviewing works in that particular year, they will none the less have an impact on the already large negative balance current attached to the scheme.
- We also note that a large number of works are proposed for Teemburra dam in 2017 which have been individually costed based on replacement cost. Arup would expect that these works could be undertaken in a more efficient manner given that they are scheduled for the same year though this is not apparent from the costing which makes up the renewals program.
- We observe from the data provided that SunWater have scheduled a replacement of control equipment at Teemburra Dam in 2018 ($133K), 2023 ($276K), 2033 ($132K) and 2036 ($112K). This frequency of replacement is not justified and we are wondering if this is the same item of works. SunWater need to justify this and the varying costs before they are approved for inclusion in the program.
- The Palmtree Creek pipeline has an item in 2013 titled "*Refurbish: Palmtree Ck 900mm dia guard valve: total repaint and refurbish hydraulics ($22k in 2005); Reschedule to every 15 yrs*". If this costing was obtained form 2005 and therefore last done in 2005, rescheduling to every 15 years would indicate that this item should be undertaken again in 2018 and not 2013.

11.5 Summary of Observations

In summary Arup note the following observations:

- We note that the procedures adopted are prudent and that SunWater are undertaking work to make their operations more efficient.
- As outlined in the NSP and validated above, total operating costs for the new pricing path versus the previous pricing path is increasing by about $337K.

Arup have reviewed the information provided by SunWater and note that overall Opex is not rising beyond reason. As previously stated this assessment does not consider electricity expenses and their projected increases.

- Arup have insufficient information to conclude whether Opex overall is prudent and efficient as we have no method for linking costs with work orders
- There is an increase in PM which seems to offset the high historic CM
- The annuity program appears robust and is congruent, with the asset management strategy adopted by SunWater.
- The scheme is currently negative, and forecasted to remain negative for the next 25 years
- The main contributor to this starting negative balance has been the Palm Tree Creek outlet valve which seems to be incurring expenditure to bring it back to normal operation, though significant uncertainty remains around the ability to solve this problem. The options paper for the remediation works on the valve needs to provide a more robust assessment of the options focusing not just on the hard engineering. We would expect that the objective of the options paper is more clearly defined and some level of cost benefit analysis undertaken for the key options.
- Arup has some concern around the costs of rectifying the Palm Tree Creek regulating valve which continues to pose a financial risk to SunWater and irrigators due to the highly technical nature of the problem. Our review has however found that SunWater is operating in a prudent manner in trying to develop the most effective solution both technically and financially.
- The methodology used in preparing the renewals breakdown, ie itemising costs on a per asset basis, generates a large number of items many of which should be packaged up into single items that would probably be more economic in delivery. Discussions with SunWater staff suggest that this is occurring but the current level of overprediction is having an effect on the scheme.
- The methodology used in applying the annuities program appears prudent when based on asset life. However Arup feel that a more thorough sense check of the works proposed may reveal at a high level some level of inefficiency in the scheduling of works. With regards to the cost Arup are not able to make an assessment around the efficiency of specific costs given we have not been given sufficient detail of the actual works proposed.
- We recommend this scheme be investigated further for both historic expenditure and proposed expenditure before classifying as prudent and efficient.

12 Proserpine Water Supply Scheme

12.1 Scheme Summary

The Proserpine River Water Supply Scheme is located near the town of Proserpine. The scheme's bulk water components consist of:

- Peter Faust Dam
- Kelsey Creek Pipeline

Peter Faust Dam is the scheme's major bulk water asset. The dam is listed in the Interim Resource Operations Licence for the Proserpine River Water Supply Scheme (IROL), and as such, SunWater has obligations in relation to their management and operation. SunWater uses a network of hydrographical gauging stations for scheduling water deliveries and to generate stream flow data for IROL compliance reporting.

The capacity of the bulk water assets and their replacement cost as at 1 July 2011 are presented in Table 16.

Table 16. Bulk Water Assets

Asset	Capacity when Full	Optimised Replacement Cost
Dams		
Peter Faust dam	491,400 ML	$233,027,560
Other Bulk Water Assets		
Land		$10,121,875
Stream gauges		$0
Meters		$0
Working capital		$63,799
Kelsey Creek Pipeline		$0
Third party assets - access roads to dam		$0
Total		
Capital contributions received from irrigators		$57,991

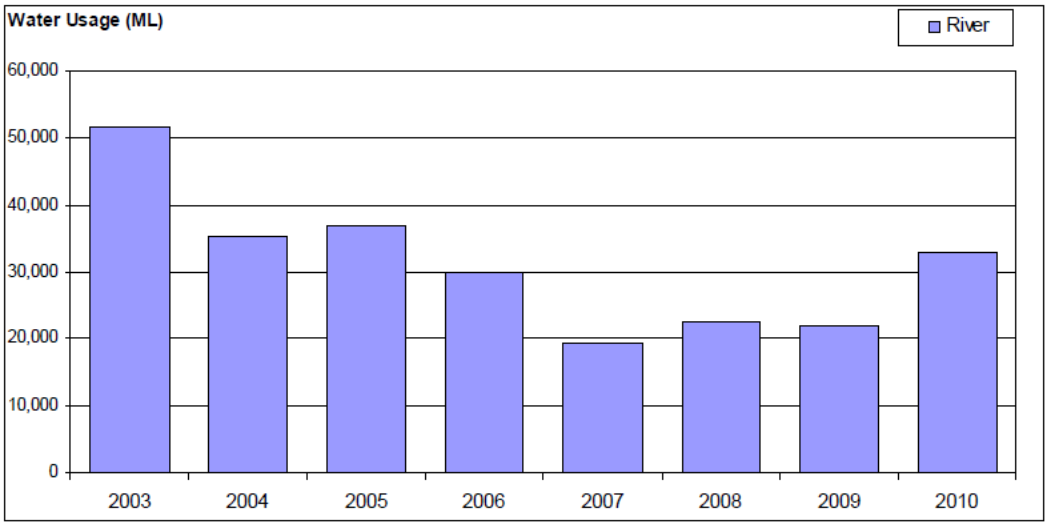


Figure 58 Proserpine Water Supply – Water Usage

The scheme has 92 customers. The scheme comprises 38,075 ML of medium priority WAE and 22,000 ML of high priority WAE.

12.2 Site Visit

Arup did not undertake a site visit to this scheme.

12.3 Operations

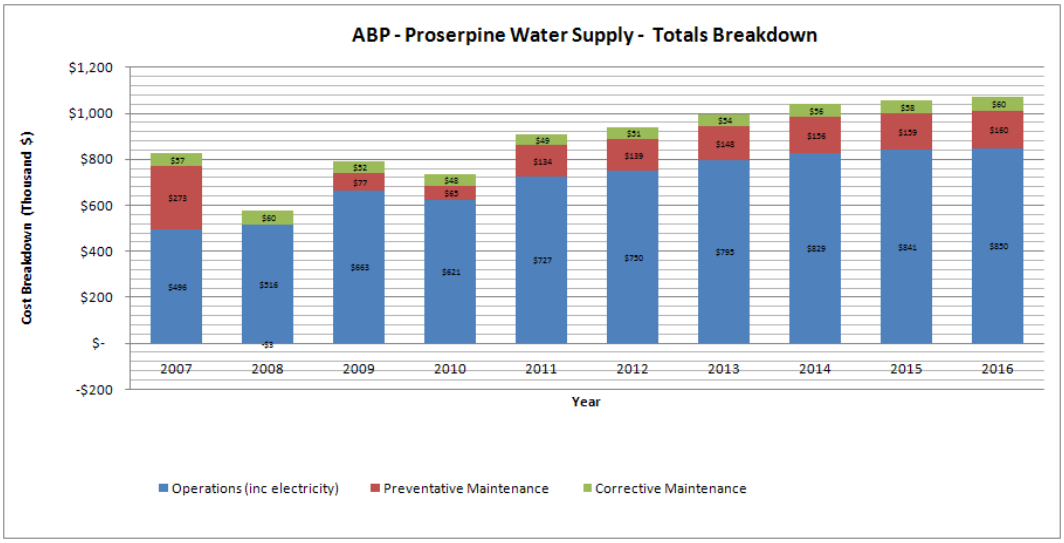


Figure 59 Proserpine Water Supply - Breakdown of Overall Operational Expenditure (Historic and Forecast)

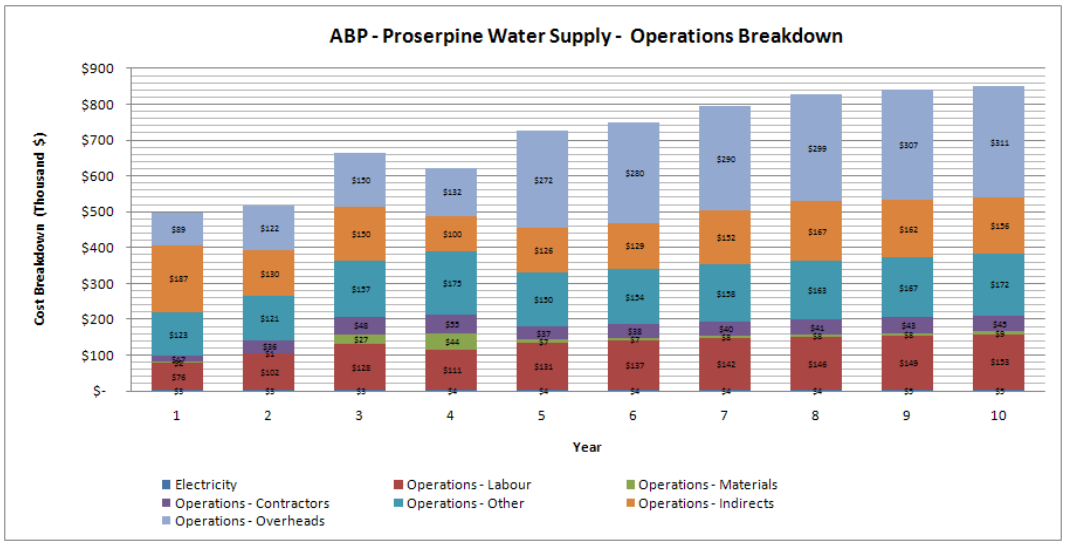


Figure 60 Proserpine Water Supply - Breakdown of Operational Expenditure (Historic and Forecast)

Arup have reviewed the Opex for the Proserpine scheme and Figure 59 shows the breakdown. Overall there is no marked change to the trend in operation costs over time. The largest components of the operations costs include:

- Scheme management
- Scheduling and delivery of water
- Environmental Management

Labour costs are generally rising in line with indexation though they would seem to have reduced from say 2008 or 2009 which could be attributed to the SLIFI review.

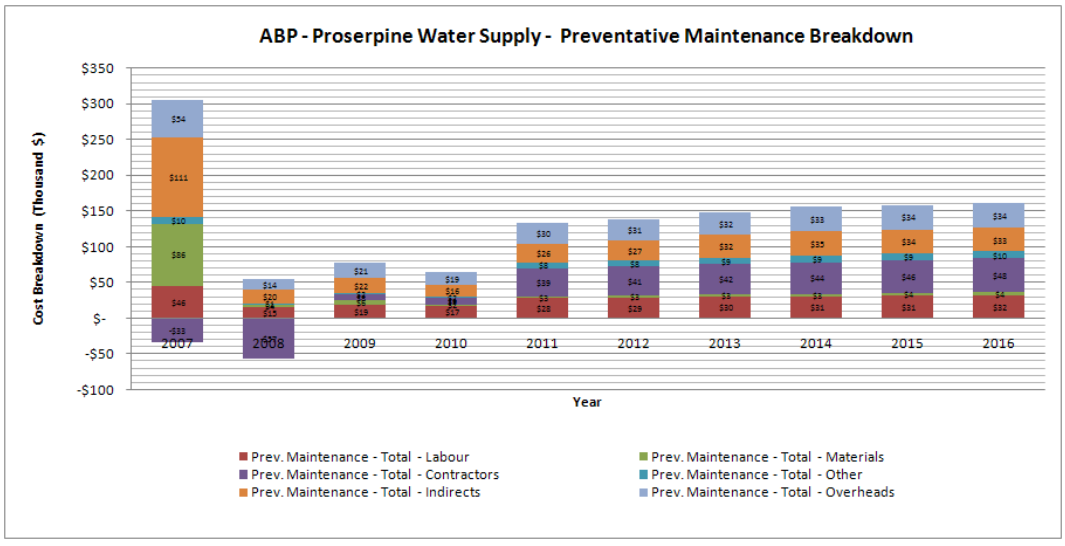


Figure 61 Proserpine Water Supply - Breakdown of Preventative Maintenance Expenditure (Historic and Forecast)

PM costs have been smoothed over time taking into account historical variability. The larger costs seen in 2007 are attributed to increased weed control costs. Additionally negative costs are evident for contractors and SunWater explaining:

"The negative value arises from the clearing of the balance of an accounting provision of $772k made for Mimosa Pigra weed eradication. The original provision was made around 2003. The balance of ~$100k was cleared over two years against expenditure type "contractors" under Preventative Maintenance - Weed Control. The clearance amounts were greater than actual spend in both these years resulting in negative values appearing in the reported figures"

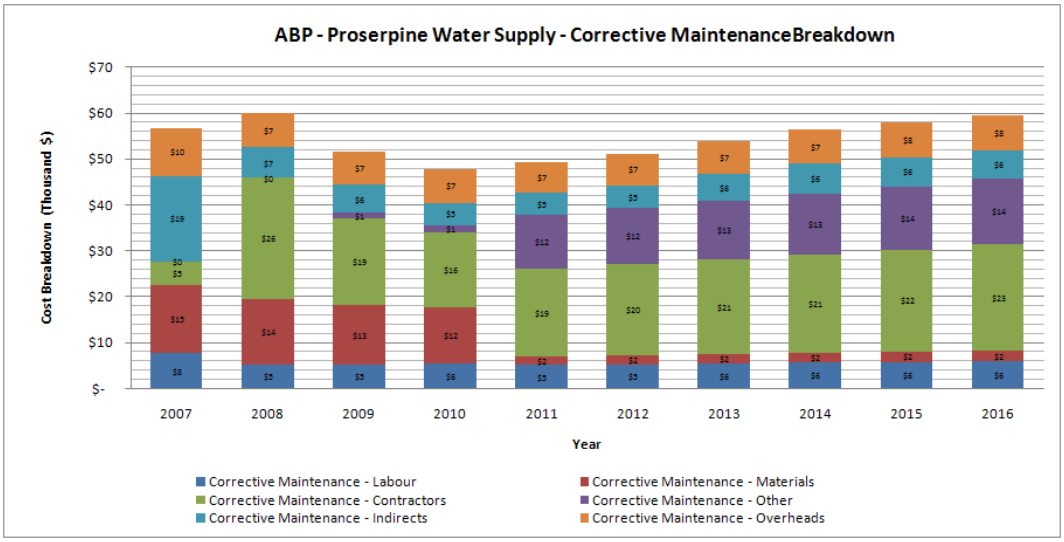


Figure 62 Proserpine Water Supply - Breakdown of Corrective Maintenance Expenditure (Historic and Forecast)

12.3.1 Operation and Water Usage

Given the nature of the activities, some operational costs related to 'water management' and 'schedule and delivery' could be expected to be approximately proportional to the amount of water used. The charts in Figure 63 and Figure 64 below show the operational costs attributed to each of these activities, as well as the total amount of water used in the respective years. In the case of the Proserpine Water Supply, neither of these operational costs show a strong correlation with water usage.

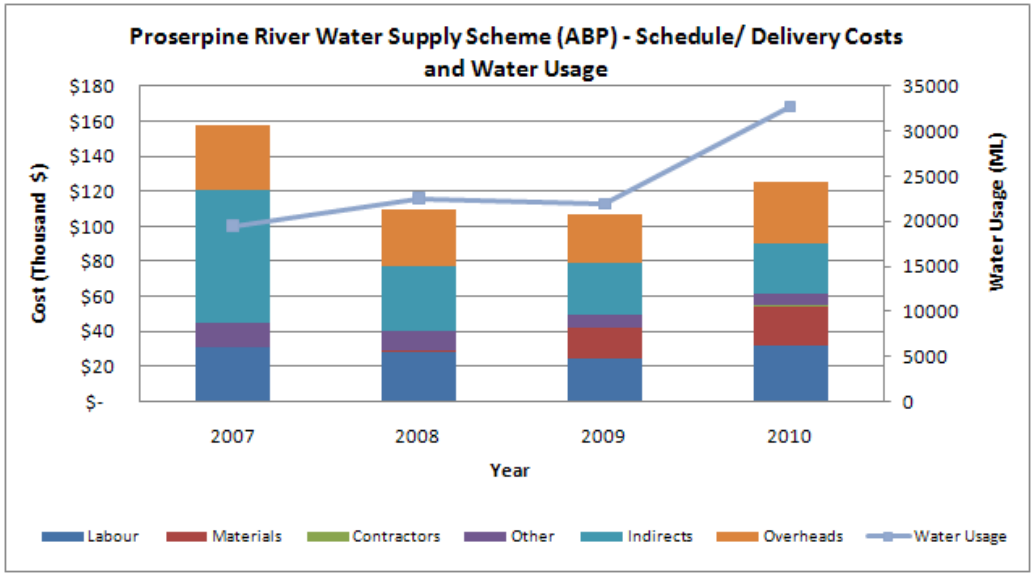


Figure 63 Proserpine Water Supply – Schedule and Delivery Operational Costs and Water Usage

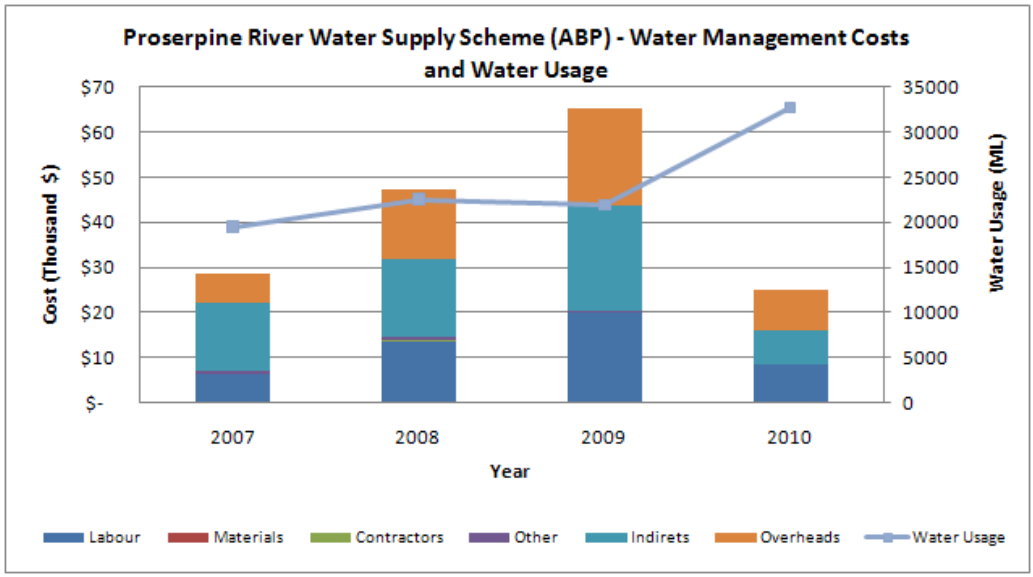


Figure 64 Proserpine Water Supply – Water Management Operational Costs and Water Usage

12.4 Assessment of Renewals

12.4.1 Renewals Accounting

The Proserpine Bulk scheme has an opening balance of negative $122K which is not significant given the methodology used for renewals forecasting. Some items of work not previously budgeted for are identified and include:

- Installation of signs at Peter Faust Dam
- Replacement of Meter for Proserpine Mill
- Install Marker Buoys – Peter Faust Dam

- Refurbishment of Shelter Shed, Toilet Block and Site Irrigation Facilities at Peter Faust Dam

An understanding of the renewals accounting process and a determination of the closing balance at 30 June 2011, requires detailed knowledge and data of several key aspects, these include:

PROSERPINE BULK ($000's)		
(a)	Renewals balance 1 July 2006	(20)
(b)	Inflows to the annuity account (income from irrigation sector 2007 -2011)	159
(c)	Renewals expenditure apportioned to irrigators 2007 - 2011	182
(d)	Calculating interest on account balances	9.689%
(e)	Irrigator sector balance	(62)
(f)	Uplift factor whole of scheme	1.98
(g)	Scheme opening balance	(122)

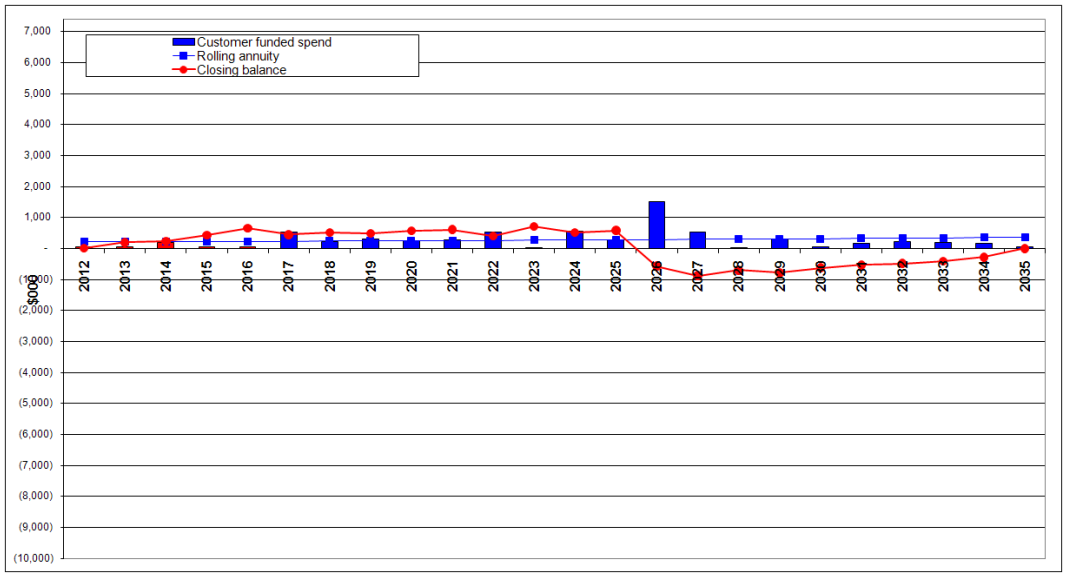


Figure 65: Renewals Annuity Chart – Proserpine Bulk Scheme

12.4.2 Renewals Forecasting

Arup reviewed the list of work forecast under the Renewals Annuity including:

Refurbishment of guard valve – 2011 - $20K

Kelsey Creek Pipeline – Replacement of control equipment – 2014 – ($79K)

Arup note that the guard valve has been in operation from 1990 with an asset life of 40 years. The refurbishment will seek to fix the cracking and corrosion that was noted in the 2008 condition assessment where a condition score of 4 was assigned on which basis we consider it to be a prudent expenditure. SunWater have allocated $15K to contractors with the remaining $5K for internal SunWater costs. We are unclear on what the basis of the contractor cost is and therefore cannot

state if this is an efficient cost though we do not think it to be unreasonable for the works proposed.

The control equipment of the Kelsey Creek Pipeline has been in operation from 1996 and has an asset life of 15 years. In 2006 it was assigned an overall condtion score of 2 indicating that it was still functioning and did not pose a serious risk. The project though scheduled for 2011 has been moved to 2014 for replacement with an options analysis planned for 2013. Arup note that Cardno's 2008 revaluation stated that the cost of this asset as being $61.4K which the SAP system noting a replacement cost of $79K in 2011 dollars taking into account SunWater's internal cost. Arup considered this an appropriate and efficient sum.

12.5 Summary of Observations

In summary Arup note the following observations:

- We note that the procedures adopted are prudent and that SunWater are undertaking work to make their operations more efficient.
- Arup have insufficient information to conclude whether Opex overall is prudent and efficient as we have no method for linking costs with work orders
- The annuity program appears robust and is congruent, with the asset management strategy adopted by SunWater.
- The scheme is currently slightly negative and likely to return to positive in the next few years.
- The methodology used in applying the annuities program appears prudent but Arup are not able to make an assessment around the efficiency of costs given we have not been given sufficient detail of the actual works proposed.

13 Bowen Broken Water Supply Scheme

13.1 Scheme Summary

The Bowen Broken Water Supply Scheme is located near the town of Collinsville. The scheme's bulk water components include:

- Eungella Dam
- Bowen River Weir
- Gattonvale Offstream Storage

The capacity of the bulk water assets and their replacement cost as at 1 July 2011 are presented in Table 17.

Table 17. Bulk Water Assets

Asset	Capacity when Full	Optimised Replacement Cost
Dams		
Eungella Dam	112,400 ML	$76,622,449
Weirs		
Bowen River Weir	2,361 ML.	$21,980,225
Other Bulk Water Assets		
Land		$1,793,750
Gattonvale Offstream Storage	5,232 ML.	$27,110,150
Stream gauges		$0
Meters		$0
Working capital		$171,313
Third party assets	-	-
Total		$127,677,887
Capital contributions received from irrigators		$0

The storages above are listed in the Burdekin Basin Resource Operations Plan (ROP) and as such, SunWater has obligations in relation to their management and operation. SunWater uses a network of hydrographical gauging stations for scheduling water deliveries and to generate stream flow data for Resource Operations Licence (ROL) compliance reporting.

The scheme's Water Access Entitlements (WAE) are listed in the Burdekin Basin ROP. The scheme has 51customers, 38 of whom take water for non-irrigation use from pipelines supplied from the scheme. The scheme comprises of 5,676 ML of medium priority WAE and 33,254 ML high priority WAE.

A site visit was not undertaken to this scheme.

13.2 Operations

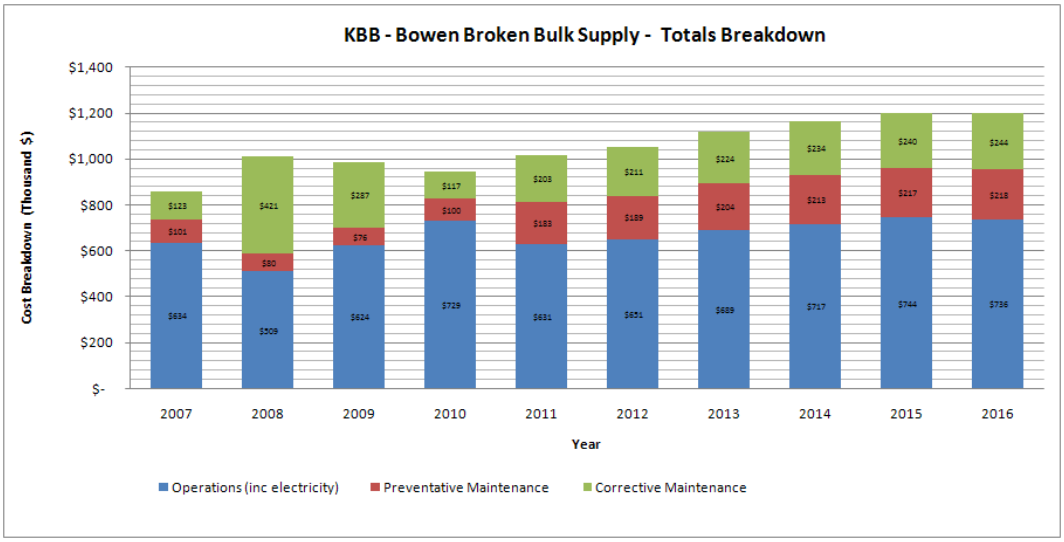


Figure 66 Bowen Broken Water Supply - Breakdown of Total Expenditure (Historic and Forecast)

In this particular scheme overall operational costs are forecasted to increase annually at about 2.0% on top of 2011 real dollars, when using an average of the 2006-2011 operating costs. SunWater have indicated that the expense fluctuations are due too;

a) Service delivery strategies have achieved efficiencies in better utilisation of their labour force and as a result there is a change in the distribution of costs and duties between operations and preventative maintenance (refer above table).

b) Preventative maintenance costs have risen marginally due to the 2009/10 ROP revisions,

c) The major change is in the apportionment of costs with larger costs being apportioned to PM from historic years.

d) The SLIFI review has also reduced costs at the regional level.

With regards to Opex we note that the cost associated with the operations component is relatively consistent with the patterns in the current price path. Certainly we note a spike in labour in 2010 which upon further inspection is shown to be due to scheme management, though we are unclear as to the exact nature of the work which has contributed to this.

The other components of Opex include PM and CM. PM is shown as increasing from 2011 onwards with labour being the largest component. We are unclear as to the reason behind the large labour increases for PM given that there is no equivalent reduction in the cost of contractors as might be expected. Under CM the costs are shown to decrease from 2011 onwards though again it is noted that the cost of neither labour nor contractors has decreased. Overall we do not that the trend in Opex does not show any notable increase and certainly the increase in PM seems to have been offset by the decrease in CM. Further explanation is necessary to explain the increase in labour costs.

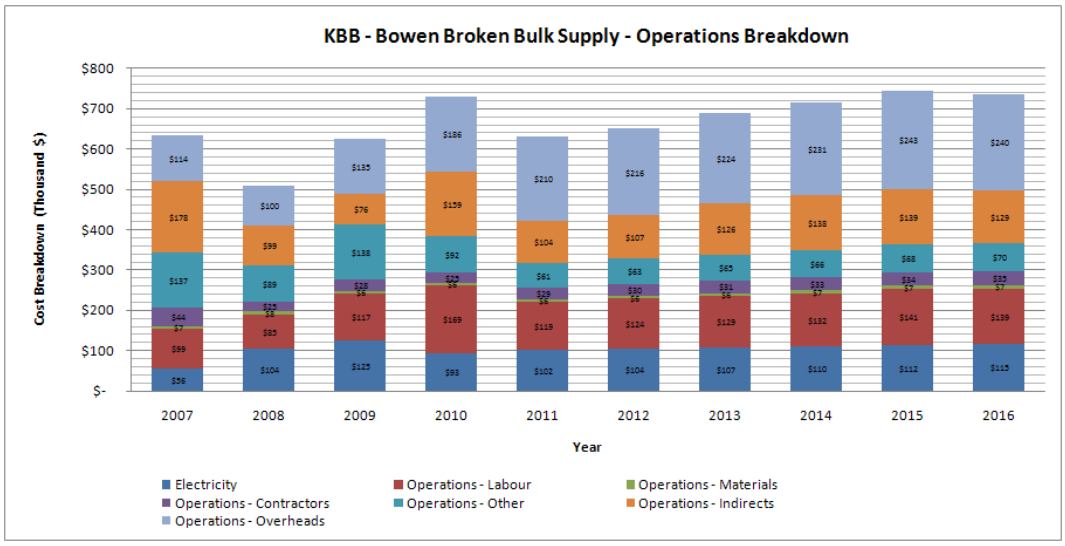


Figure 67 Bowen Broken Water Supply - Breakdown of Operations Expenditure (Historic and Forecast)

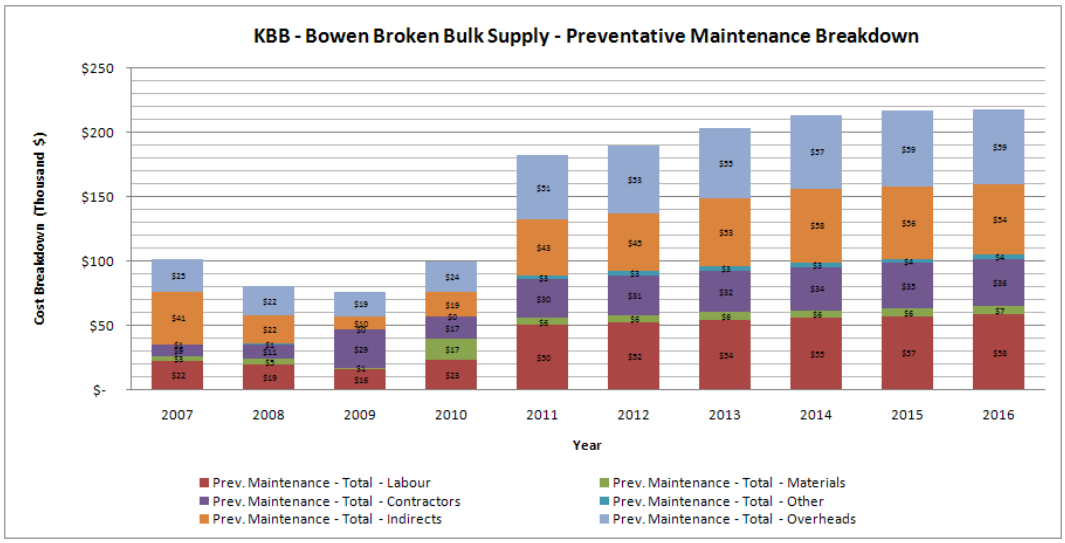


Figure 68 Bowen Broken Water Supply - Breakdown of Preventative Maintenance Expenditure (Historic and Forecast)

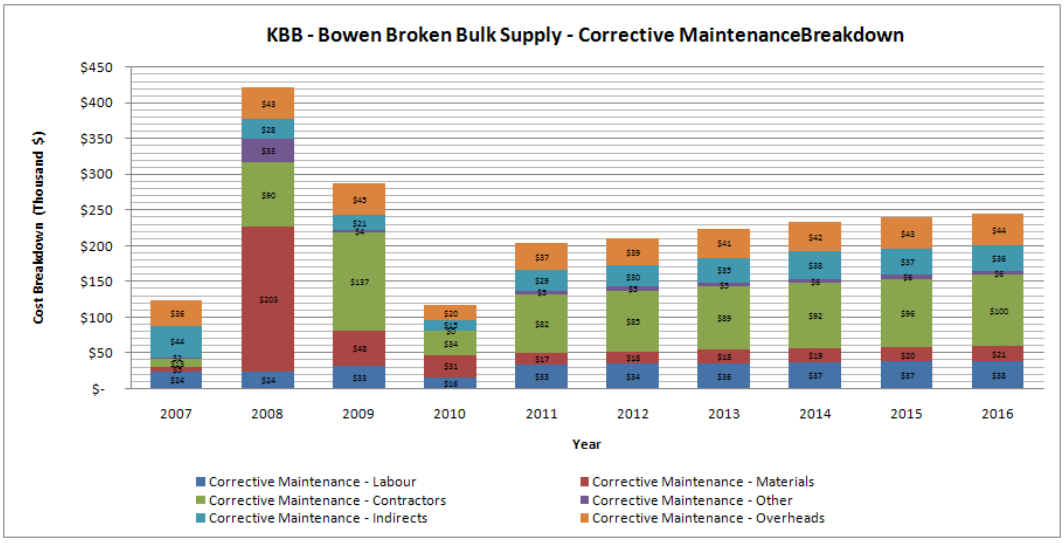


Figure 69 Bowen Broken Water Supply - Breakdown of Corrective Maintenance Expenditure (Historic and Forecast)

Being a Bulk Water Supply scheme, the majority of costs relate to scheme assets, which create and maintain a customer's Water Access Entitlement (WAE). The delivery of water and other service cost aspects are relatively minor when compared alongside the compliance based activities. For this particular scheme the Bowen Broken Water ROP was introduced in 2009/10.

Review of electricity prices is not part of the Arup scope, however in our investigations into SunWater's expenses we can comment that, SunWater have undertaken extensive cost benefit analyses into when and where they should adopt contestable or franchise tariffs. Specialist consultants in this field have been employed to advise SunWater on such strategies, and for this particular scheme the current advice is to run a franchise tariff.

13.2.1 Operation and Water Usage

Given the nature of the activities, some operational costs related to 'water management' and 'schedule and delivery' could be expected to be approximately proportional to the amount of water used. The charts in Figure 70 and Figure 71 below show the operational costs attributed to each of these activities, as well as the total amount of water used in the respective years. In the case of the Bowen Broken Water Supply, neither of these operational costs show a strong correlation with water usage.

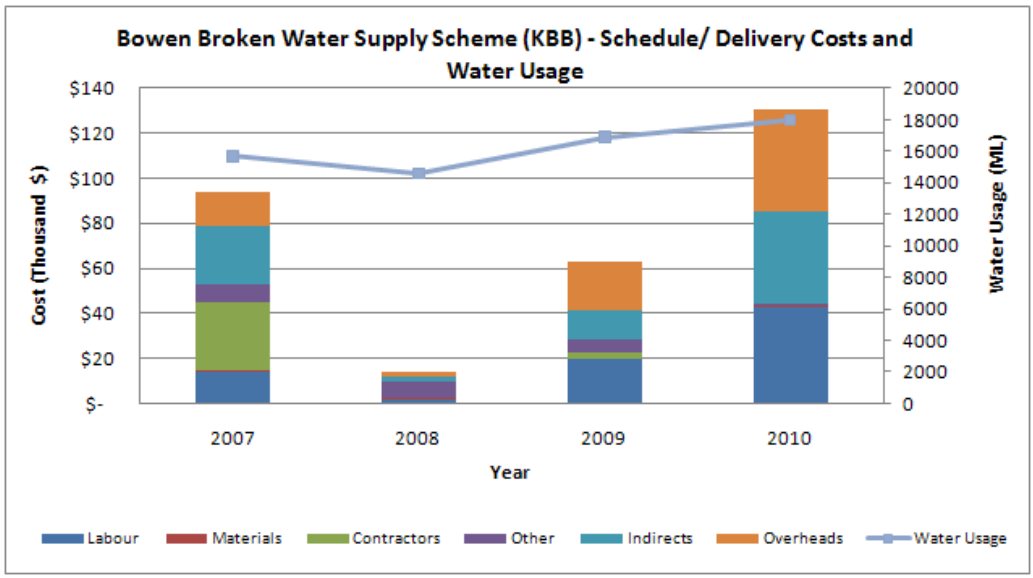


Figure 70 Bowen Broken Water Supply - Schedule and Delivery Operational Costs and Water Usage

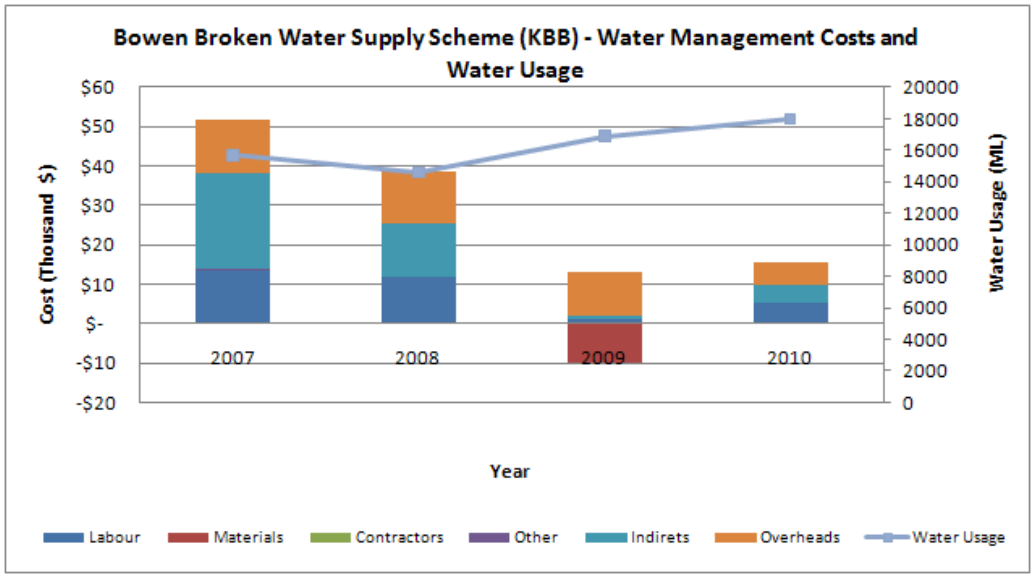


Figure 71 Bowen Broken Water Supply - Water Management Operational Costs and Water Usage

13.3 Assessment of Renewals

13.3.1 Renewals Accounting

The scheme has a large negative opening balance of $2.03M.

An understanding of the renewals accounting process and a determination of the of the closing balance at 30 June 2011, requires detailed knowledge and data of several key aspects, these include;

BOWEN BROKEN BULK WATER SCHEME ($000's)		
(a)	Renewals balance 1 July 2006	(116)

(b)	Inflows to the annuity account (income from irrigation sector 2007 -2011)	18
(c)	Renewals expenditure apportioned to irrigators 2007 - 2011	11
(d)	Calculating interest on account balances	9.689%
(e)	Irrigator sector balance	(176)
(f)	Uplift factor whole of scheme	11.55
(g)	Scheme opening balance	(2030)

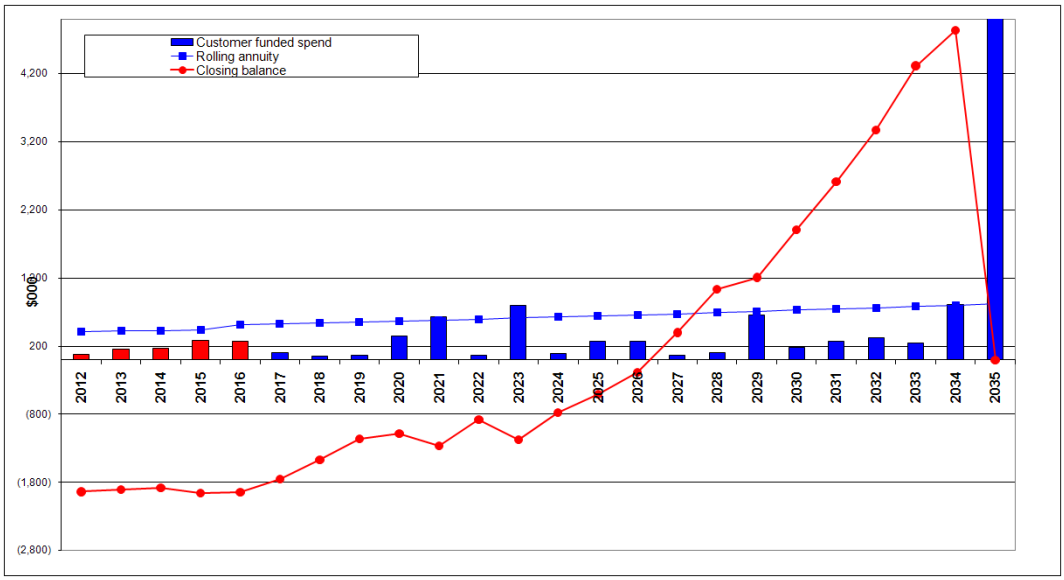


Figure 72: Renewals Annuity Chart – Bowen Broken Bulk Scheme

a) The renewals balance has be taken from SunWater's paper, Renewals Annuity Calculation - Internal Working Paper. It is not in Arup's scope to critique this paper.

b) Available in SunWater's annual report and same internal paper reference in (a)

c) This data is detailed in SunWater's paper, Renewals Annuity Calculation - Internal Working Paper. Arup has also checked these numbers with Annuity data for 2007-2011 provided by SunWater for all projects. Though we cannot get the numbers to precisely match on an annual basis, the 5 year price path variance is negligible, particularly when the irrigators are only apportioned 1% of the annuity program expenses.

d) There are some discrepancies in the interest rate to be used on balances. The SunWater paper, Renewals Annuity Calculation - Internal Working Paper, talks about using a 9.689%, but then renewal annual financial model – version 610.03 uses 6% for 2012 balances and then 5% for balances from 2012 and beyond. QCA need to determine the actual % rate.

e) The irrigation sector balance is the result of (a) x interest on balances +(b) –(c).

f) Uplift factor used to multiple (e). Not in Arup's scope to review HUF factors.

g) Scheme opening balance

13.3.2 Historical Renewals

The Bowen Broken Scheme has a large negative opening balance with the top 10 expenditure items listed in Table 10.

Table 18: Top 10 historical renewals items - Bowen Broken Water Supply Scheme

	Bowen Broken Supply	Budget	Yearly Spend
1	09BBR23 - Replace Fishway - Bowen River Weir (2010)	$4,429,507	$4,429,507
2	09BBR23 - Replace Fishway - Bowen River Weir (2009)	$1,388,708	$463,411
3	09BBR23 - Replace Fishway - Bowen River Weir (2011)	$137,693	$301,431
4	07BBR09 - Gattonvale Offstream Storage - Complete Internal Batter Protection Works and Install Permanent Boat Ramp Access (2008)	$209,535	$209,534
5	09BBR03 - Refurbish Protection Works - Bowen River Weir (2009)	$24,919	$165,332
6	10BBR26 - Rectify/Repair Gattonvale Off Stream Storage Crest Cracks (2010)	$133,725	$133,725
7	09BBR01 - Decommission Bowen River Weir Fishway (2009)	$86,375	$115,351
8	10BBR14 - Dam Safety Inspection - 5 Year - Eungella (2010)	$73,709	$73,710
9	08BBR02 - Bowen River Weir - Reinstate Gabions & Anchors (wire replace, stabilise) (2008)	$32,475	$32,476
10	08BBR32 - FD2/08 Flood Damage Repair - GOSS (2008)	$31,420	$31,949

The term budget used above is the budget set at the start of the financial year and is not the budget set at the start of the 2006 price path. Arup note that a large proportion of value of works relate to the fishway on Bowen River Weir. This included decommissioning of the previous 1982 built fishway with a fish lock which is thought to be much more efficient at transferring fish upstream. Arup are not able to comment on the efficiency of these costs without a more indepth discussion and understanding of the works that were done, issues faced and moneys spent.

13.3.3 Renewals Forecasting

Arup have requested more detailed information for the following projects for this scheme:

- Rectification of Gattonvale Off Stream Storage (GOSS) Embankment Cracks – 2011- $82K
- Stabalise embankment and replace embankment protection – GOSS – 2012-2015 - $420K

Rectification of GOSS embankment cracks was an unbudgeted piece of work for the rectification of cracking in the surface of the GOSS embankment during the 2010 financial year. This 2011 item is a continuation of this project. SunWater have stated that the estimate of additional funds has been based on previous

experience. A breakdown of the cost has been provided indicating that $68K is associated with plant hire and equipment and materials with the remainder being SunWater costs. Given that the costing for this project is based on work currently being undertaken at site we consider it to be a sound basis and consider it as prudent and efficient.

The second project above as arisen out the project just discussed where additional defects were identified. These included:

- Cracking on bank pavement material
- External bank erosion
- Wave induced erosion

SunWater have provided a functional specification which prioritises these works and identifies wave induced erosion as being the most serious. The costing provided is indicative and SunWater state that detailed costing can only be done when the water level is drawn down below the lowest major movement of material on the inside batter. The scope of the project includes:

- Project management
- Hire of appropriate equipment and contractors
- Commissioning

The costing was determined based on experience with the current project and is therefore considered prudent and efficient.

General Observations

Each scheme has a large number of items identified under the R&R program. The timeframe for this study did not allow investigation of a large number of items. We have therefore undertaken a broad sense check of works proposed based on the spreadsheet which SunWater states is the basis for the NSP. The following are some key observations which need further explanation:

- In 2023 we note that both toilet block 1 (compost toilet) and toilet block 2 (septic system) are scheduled for replacement. The total cost for the works proposed in 2011 dollars is $450K with a cost of $225K each. Arup believe this cost of for the composting toilet is excessive and the cost for the overall project does not seem to capture the economy of undertaking similar works at the site. We note that potential exploration of this project in 2023 may result in a different outcome, though given the large expenditure we would recommend that SunWater revisit the cost and consider changing to composting toilets altogether.
- We also note that a large number of works are proposed at Eungella dam in 2035 with no real justification of why these are suddenly included in the program. Specifically we note the inclusion of $1.65M for the replacement of a submersible Flygt pump. Arup have undertaken a quick search of the revaluation data and note that the largest cost for such a pump (not knowing the specification of this particular pump) is $220K. Even with installation, overhead and indirects, a total value of $1.65M is not justified. Without further explanation from SunWater we would recommend that this figure we significantly reduced to reflect more likely costs to reflect the specification of

the pump. We would also seek explanation from SunWater regarding the reason behind the large number of work identified for 2035 before agreeing to their inclusion into the program.

13.4 Summary of Observations

In summary Arup note the following observations:

- We note that the procedures adopted are prudent and that SunWater are undertaking work to make their operations more efficient.
- As outlined in the NSP and validated above, total operating costs for the new pricing path versus the previous pricing path is increasing by some $277k
- Overall we do not believe the increase in Opex to be unreasonable though we question some of the internal trends with respect to an increase in labour which has not been appropriately justified.
- Arup have insufficient information to conclude whether Opex overall is prudent and efficient as we have no method for linking costs with work orders
- The annuity program appears robust and is congruent, with the asset management strategy adopted by SunWater.
- The scheme is currently negative and is planned to stay so (albeit a smaller negative number) until 2026, when it starts to bank money for major expenditure in 2035.
- The methodology used in applying the annuities program appears prudent for works in the near future. We however note that SunWater need to provide further explanation for some of the project identified post 2016 and specifically justify the large number of works identified for 2035.
- Further investigation/explanation is necessary before classifying this scheme as prudent or efficient.

14 Conclusion

Arup have undertaken a review of Opex and Capex (Renewals) for six schemes and eight scheme segments. Over the duration of the study, requests for information were provided to SunWater. Additionally two Arup staff members were escorted around four out of the six schemes.

With regards to the provision of information we note the following:

- Site visits were worthwhile to understand the types of works to be undertaken, journey times to various sites, site specific issues which are encountered and confidence that the operators have extensive knowledge of the scheme which we believe would add to the schemes being operated in a prudent and efficient manner.
- SunWater was not able to provide us all the information we requested though a large proportion was made available.
- We acknowledge that SunWater's systems are not set up to provide the information required to assess prudency and efficiency and that significant effort is required by the organisation to provide the level of information necessary to truly determine prudency and efficiency.

We make the following recommendations with regards to the allocation of Opex to customer groups:

- High priority allocations provide a greater reliability for accessing water. We believe that SunWater's proposed method of allocation favours the High Priority group in that it assumes the Medium Priority group will receive their full water allocations. A more equitable system should make allowance for the fact that lower priority groups may not receive their full allocations of water and therefore should not have to pay the same cost as someone who will. We suggest as an alternative that the allocation of distribution asset costs, both CAPEX and OPEX, could be made using a Distribution System Utilisation Factor (DSUF) which takes into account historic allocations and is discussed early on in this report.

We make the following recommendations with regards to cost escalation factors:

- Having reviewed the Labour Price Index (LPI) and the Average Weekly Ordinary Time Earnings(AWOTE) for the Energy, Gas and Water sector we conclude that 4% is an appropriate escalation factor and believe that the use of CPI post 2012 underestimates the value of labour in this skills constrained market.
- Arup believe that the use of Macromonitor's work represents the most up to date and appropriate assessment of the sector and we believe that SunWater's 4% escalation factor for materials and contractors is appropriate given the trends predicted in this report. We believe the use of CPI underestimates the level of activity and demand within this sector.
- The risk for SunWater (and its customers) in applying an assumption of CPI to electricity prices each year is that there will be a higher cost of debt which SunWater will need to carry forward and ultimately pass onto its customers.

We make the following recommendations with respect to SunWater processes and methodology:

- Develop a clear methodology which staff can use to assign their time to improve forecasting processes
- Develop a clear methodology for assessment of options and development of options papers with regards to replacement items under the renewals schedule
- Where future expenditure on a particular item such as the Palm Tree Creek valve is uncertain, more detailed discussion around the options involving irrigators need to be undertaken to come to an agreement on whether a reduced level of service would be accepted to offset the increase in costs.
- Many issues with irrigation groups can be attributed to poor communication and there is a need to ensure that a strict protocol is followed with respect to informing irrigators of any major decisions which affect the organisation.

We provide the following table to help answer some of the questions raised by the irrigators;

	Comments	Arup Response
1	NSP's are lacking detailed information and stakeholders lack the data to make meaningful comments	Arup agrees with this comment, and subsequent NSP's or an alternative plan needs to address this issue for the next review
2	Has legal advice on the fencing policy been sought, and has SunWater's response been to conservative	Arup has read SunWater's position papers on the Fencing Policy and the investment to upgrade the WHS structures to reduce risks to SunWater's field personal. Arup believe both papers are appropriate responses to these matters and they represent prudent and cost effective expenditures.
3	SCADA systems have not worked well	Thefts of photovoltaic panels have not helped this issue, and systems are now been wired into electrical network
4	Numerous questions on the appropriateness of the annuities program	Arup talks to the pro's & con's of this method throughout the report. Yes, it has issues, but so do the alternatives. The current system is being operated to its intended design function
5	Concerns around the forced implementation of the new meter replacement program	The irrigators and SunWater are on the same page with this concern and together they need to lobby the appropriate decision makers.
6	Are insurance payments being credited back to irrigator revenues	SunWater have confirmed that any Insurance claim revenue received is prorated to each service contract against the entire related spend and then included as a revenue in the annuity calculation. This means that any amounts not able to be claimed and the deductable are spread against the service contracts that are affected by the event..This has been reviewed by Indec and they have raised no issues with the treatment.
7	Pioneer Water Board deliver some of the irrigator services in the area, but no credit or recognition is given by SunWater	Not part of the Arup review
8	Can SunWater be given some incentive to reduce costs	Not part of the Arup review, but possibly something for QCA to consider

We make the following comments with regards to prudency and efficiency:

- In all cases we were not able to directly link costs with specific activities under the operational budget making it difficult to assess costs as being prudent and efficient;
- In the absence of this, Arup have explored trends in Opex between current and forecast price path and in most cases found the trends to be justified with the exception being the Eton distribution scheme where costs where inexplicably higher than expected;
- We additionally undertook a review of the processes and procedures and found them to be appropriate and fitting for the type of work being undertake and found that SunWater was committed to evolving to better streamline the operations of the organisation to reduce costs to customers
- The renewals annuity approach is considered appropriate in meeting the agreed standards of service and maintaining assets to the level that is necessary;
- The methodology used in preparing the breakdown, ie itemising costs on a per asset basis, generates a large number of items many of which should be packaged up into single items that would probably be more economic in delivery.
- We believe that the costs of delivering water are directly related to the 'standards of service' and that the irrigation community needs to be engaged in understanding the implications of maintaining assets to this level of service;
- We believe that SunWater needs to address some of the specific issues raised under each scheme and more detailed exploration of a couple of schemes is necessary to understand overall level of accuracy in the costing of projects before they can be classified as efficient;
- There seems to be a widespread thrust to replace control equipment at all schemes and we note that no strategy has been developed as has been the case with the replacement of switchboards.
- We however acknowledge that in some instances there may be potential for over-estimation using the automated approach SunWater currently use to identify and cost works as part of the renewals program, specifically multiple works at the same site where economies of scale could be achieved;
- Without in depth analysis of the historical basis for inclusion of the various items in the breakdown, which is beyond the scope of the current assignment, it is impossible to definitively state whether renewal annuities are being over stated or are really justified given the current state of the assets.
- Arup would also like to see some formal criteria regarding prudency and efficiency from the Queensland Competition Authority which will make the process of assessment more transparent and ensure that the assessment across schemes is consistent; and
- Arup question the value of benchmarking. Further, benchmarking the various schemes against each other and other external schemes can only provide limited value, as each scheme has particular features which make them unique from other scheme. For example, the poor starting asset condition of one scheme may mean that that scheme will require considerably more renewal expenditure in the short term (next 5 years) than an apparently similar scheme

that has been better maintained in the past; or schemes having the same or similar total entitlements may have substantially different infrastructure, one scheme could have a large geographic footprint while the other is compact.

- We also note that the duration of the assessment and resources within SunWater were not adequate to drill down extensively into the costs and associated activities to classify them as being prudent and efficient at this level.

Appendix A

Disaggregated Operation Cost Data

A1 Burdekin Bulk Water Supply

A1.1 Operations

Cost element	2007	2008	2009	2010
Operations - Customer Mgt - Labour	$ 2	$ 16	$ 13	$ 32
Operations - Customer Mgt - Materials	$ 1	$ -	$ -	$ -
Operations - Customer Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Customer Mgt - Other	$ 0	$ 152	$ 1	-$ 0
Operations - Customer Mgt - Indirects	$ 3	$ 19	$ 16	$ 31
Operations - Customer Mgt - Overheads	$ 3	$ 25	$ 14	$ 34
Operations - Workplace H&S - Labour	$ -	$ 4	$ 0	$ 3
Operations - Workplace H&S - Materials	$ -	$ 2	$ 0	$ 5
Operations - Workplace H&S - Contractors	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Other	$ -	$ -	$ -	$ 0
Operations - Workplace H&S - Indirects	$ -	$ 5	$ 0	$ 3
Operations - Workplace H&S - Overheads	$ -	$ 2	$ -	$ 3
Operations - Enviro Mgt - Labour	$ 50	$ 40	$ 40	$ 48
Operations - Enviro Mgt - Materials	$ -	$ 0	$ 0	$ 4
Operations - Enviro Mgt - Contractors	$ 56	$ 52	$ 7	$ 30
Operations - Enviro Mgt - Other	$ 3	$ 0	$ 0	$ 0
Operations - Enviro Mgt - Indirects	$ 66	$ 48	$ 49	$ 45
Operations - Enviro Mgt - Overheads	$ 51	$ 47	$ 43	$ 53
Operations - Water Mgt - Labour	$ 29	$ 208	$ 175	$ 81
Operations - Water Mgt - Materials	$ 0	$ 0	$ -	$ 0
Operations - Water Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Water Mgt - Other	$ 0	$ 2	$ 2	$ 5
Operations - Water Mgt - Indirects	$ 39	$ 250	$ 216	$ 76
Operations - Water Mgt - Overheads	$ 30	$ 233	$ 189	$ 87
Operations - Scheme Mgt - Labour	$ 131	$ 388	$ 400	$ 190
Operations - Scheme Mgt - Materials	$ 37	$ 73	$ 4	$ -
Operations - Scheme Mgt - Contractors	$ 11	$ 32	$ 1	$ 6
Operations - Scheme Mgt - Other	$ 550	$ 383	$ 421	$ 466
Operations - Scheme Mgt - Indirects	$ 174	$ 466	$ 494	$ 178
Operations - Scheme Mgt - Overheads	$ 149	$ 455	$ 453	$ 226
Operations - Dam Safety - Labour	$ 1	$ 6	$ 5	$ 9
Operations - Dam Safety - Materials	$ 0	$ 1	$ -	$ -
Operations - Dam Safety - Contractors	$ -	$ -	$ -	$ -
Operations - Dam Safety - Other	$ 0	$ 3	$ 1	$ 2
Operations - Dam Safety - Indirects	$ 1	$ 7	$ 6	$ 9
Operations - Dam Safety - Overheads	$ 1	$ 7	$ 5	$ 10
Operations - Sched/Deliver - Labour	$ 146	$ 93	$ 89	$ 101
Operations - Sched/Deliver - Materials	$ 5	$ 3	$ 12	$ 27

Operations - Sched/Deliver - Contractors	$ -	$ -	$ 1	$ 1
Operations - Sched/Deliver - Other	$ 20	$ 15	$ 17	$ 11
Operations - Sched/Deliver - Indirects	$ 194	$ 112	$ 109	$ 95
Operations - Sched/Deliver - Overheads	$ 170	$ 105	$ 97	$ 110
Operations - Metering - Labour	$ 1	$ 7	$ 6	$ 9
Operations - Metering - Materials	$ -	$ -	$ -	$ -
Operations - Metering - Contractors	$ -	$ -	$ -	$ -
Operations - Metering - Other	$ -	$ -	$ -	$ -
Operations - Metering - Indirects	$ 2	$ 8	$ 7	$ 8
Operations - Metering - Overheads	$ 1	$ 8	$ 6	$ 9
Operations - Facility Mgt - Labour	$ 106	$ 102	$ 96	$ 93
Operations - Facility Mgt - Materials	$ 20	$ 20	$ 14	$ 18
Operations - Facility Mgt - Contractors	$ 3	$ 4	$ 13	$ 11
Operations - Facility Mgt - Other	$ 4	$ 5	$ 2	$ 2
Operations - Facility Mgt - Indirects	$ 141	$ 123	$ 119	$ 88
Operations - Facility Mgt - Overheads	$ 125	$ 116	$ 105	$ 101
Operations - Other - Labour	$ 0	-$ 0	$ 0	$ -
Operations - Other - Materials	-$ 46	-$ 4	-$ 1	-$ 1
Operations - Other - Contractors	$ 1	-$ 8	$ -	$ -
Operations - Other - Other	$ 322	$ 3	$ 0	-$ 0
Operations - Other - Indirects	$ -	$ 0	$ 0	$ 0
Operations - Other - Overheads	$ 1	$ 1	$ 1	$ 0
Prev. Maintenance - Cond. Monitoring - Labour	$ 32	$ 29	$ 35	$ 28
Prev. Maintenance - Cond. Monitoring - Materials	$ 38	$ 1	$ 3	$ 5

A1.2 Preventative Maintenance

Cost element	2007	2008	2009	2010
Prev. Maintenance - Cond. Monitoring - Labour	$ 32	$ 29	$ 35	$ 28
Prev. Maintenance - Cond. Monitoring - Materials	$ 38	$ 1	$ 3	$ 5
Prev. Maintenance - Cond. Monitoring - Contractors	$ 15	$ 12	$ 17	$ 6
Prev. Maintenance - Cond. Monitoring - Other	$ 1	$ 1	$ 1	$ 1
Prev. Maintenance - Cond. Monitoring - Indirects	$ 42	$ 35	$ 43	$ 26
Prev. Maintenance - Cond. Monitoring - Overheads	$ 38	$ 32	$ 38	$ 30
Prev. Maintenance - Servicing - Labour	$ 54	$ 25	$ 40	$ 29
Prev. Maintenance - Servicing - Materials	$ 5	$ 4	$ 8	$ 8
Prev. Maintenance - Servicing - Contractors	$ 21	$ 9	$ 13	$ 12
Prev. Maintenance - Servicing - Other	$ 40	$ 35	$ 2	$ 37
Prev. Maintenance - Servicing - Indirects	$ 72	$ 30	$ 49	$ 27
Prev. Maintenance - Servicing - Overheads	$ 66	$ 28	$ 44	$ 34
Prev. Maintenance - Weed Control - Labour	$ 11	$ 1	$ 1	$ 1
Prev. Maintenance - Weed Control - Materials	$ 3	$ 0	$ 4	$ 1
Prev. Maintenance - Weed Control - Contractors	$ -	$ -	$ -	$ 9
Prev. Maintenance - Weed Control - Other	$ 0	$ -	$ -	$ -
Prev. Maintenance - Weed Control - Indirects	$ 15	$ 1	$ 1	$ 1

A1.3 Corrective Maintenance

Cost element	2007	2008	2009	2010
Corrective Maintenance - scheduled corr - Labour	$ 101	$ 62	$ 82	$ 121
Corrective Maintenance - scheduled corr - Materials	$ 137	$ 76	$ 122	$ 175
Corrective Maintenance - scheduled corr - Contractors	$ 3	$ 2	$ 28	$ 96
Corrective Maintenance - scheduled corr - Other	$ 3	$ 9	$ 2	$ 3
Corrective Maintenance - scheduled corr - Indirects	$ 134	$ 75	$ 99	$ 111
Corrective Maintenance - scheduled corr - Overheads	$ 122	$ 74	$ 94	$ 139
Corrective Maintenance - emergency maint - Labour	$ 8	$ 2	$ 1	$ 4
Corrective Maintenance - emergency maint - Materials	$ 9	$ 2	$ -	$ 3
Corrective Maintenance - emergency maint - Contractors	$ -	$ 3	$ -	$ 2
Corrective Maintenance - emergency maint - Other	$ 0	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Indirects	$ 10	$ 2	$ 1	$ 4
Corrective Maintenance - emergency maint - Overheads	$ 10	$ 2	$ 1	$ 4

A2 Burdekin Distribution Scheme

A2.1 Operations

Cost element	2007	2008	2009	2010
Operations - Customer Mgt - Labour	$ 13	$ 3	$ 3	$ 3
Operations - Customer Mgt - Materials	$ 1	$ -	$ -	$ -
Operations - Customer Mgt - Contractors	$ 0	$ -	$ -	$ -
Operations - Customer Mgt - Other	$ 38	$ 0	$ -	$ 1
Operations - Customer Mgt - Indirects	$ 12	$ 2	$ 2	$ 2
Operations - Customer Mgt - Overheads	$ 14	$ 3	$ 4	$ 3
Operations - Workplace H&S - Labour	$ 4	$ 19	$ 28	$ 46
Operations - Workplace H&S - Materials	$ 1	$ -	$ 1	$ 26
Operations - Workplace H&S - Contractors	$ 16	$ -	$ 4	$ -
Operations - Workplace H&S - Other	$ 0	$ -	$ 0	$ 1
Operations - Workplace H&S - Indirects	$ 3	$ 13	$ 21	$ 28
Operations - Workplace H&S - Overheads	$ 5	$ 21	$ 31	$ 50
Operations - Enviro Mgt - Labour	$ -	$ 1	$ 8	$ 5
Operations - Enviro Mgt - Materials	$ -	$ -	$ 0	$ -
Operations - Enviro Mgt - Contractors	$ 2	$ -	$ 3	$ 3
Operations - Enviro Mgt - Other	$ -	$ -	$ -	$ -
Operations - Enviro Mgt - Indirects	$ -	$ 1	$ 6	$ 3
Operations - Enviro Mgt - Overheads	$ -	$ 1	$ 9	$ 6
Operations - Water Mgt - Labour	$ -	$ -	$ -	$ -
Operations - Water Mgt - Materials	$ -	$ -	$ -	$ -
Operations - Water Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Water Mgt - Other	$ -	$ -	$ -	$ -
Operations - Water Mgt - Indirects	$ -	$ -	$ -	$ -
Operations - Water Mgt - Overheads	$ -	$ -	$ -	$ -
Operations - Scheme Mgt - Labour	$ 91	$ 90	$ 94	$ 178
Operations - Scheme Mgt - Materials	-$ 20	$ 5	$ 18	$ 35
Operations - Scheme Mgt - Contractors	$ -	$ 5	$ 26	$ 12
Operations - Scheme Mgt - Other	$ 1	$ 1,008	$ 845	$ 886
Operations - Scheme Mgt - Indirects	$ 83	$ 65	$ 69	$ 108
Operations - Scheme Mgt - Overheads	$ 132	$ 126	$ 139	$ 234
Operations - Dam Safety - Labour	$ -	$ -	$ -	$ -
Operations - Dam Safety - Materials	$ -	$ -	$ -	$ -
Operations - Dam Safety - Contractors	$ -	$ -	$ -	$ -
Operations - Dam Safety - Other	$ -	$ -	$ -	$ -
Operations - Dam Safety - Indirects	$ -	$ -	$ -	$ -

Operations - Dam Safety - Overheads	$ -	$ -	$ -	$ -
Operations - Sched/Deliver - Labour	$ 832	$ 597	$ 590	$ 580
Operations - Sched/Deliver - Materials	$ 24	$ 22	$ 24	$ 34
Operations - Sched/Deliver - Contractors	$ -	$ -	$ -	$ 10
Operations - Sched/Deliver - Other	$ 44	$ 45	$ 32	$ 24
Operations - Sched/Deliver - Indirects	$ 760	$ 433	$ 431	$ 351
Operations - Sched/Deliver - Overheads	$ 966	$ 672	$ 640	$ 621
Operations - Metering - Labour	$ 46	$ 16	$ 34	$ 30
Operations - Metering - Materials	$ 39	$ -	$ 0	$ -
Operations - Metering - Contractors	$ 17	$ -	$ -	$ -
Operations - Metering - Other	$ 0	$ -	$ -	$ 0
Operations - Metering - Indirects	$ 42	$ 11	$ 25	$ 18
Operations - Workplace H&S - Materials	$ 213	$ 165	$ 160	$ 157
Operations - Workplace H&S - Contractors	$ 219	$ 170	$ 164	$ 160
Operations - Workplace H&S - Other	$ 226	$ 174	$ 168	$ 164
Operations - Workplace H&S - Indirects	$ 232	$ 178	$ 172	$ 168
Operations - Workplace H&S - Overheads	$ 239	$ 182	$ 176	$ 171
Operations - Enviro Mgt - Labour	$ 246	$ 187	$ 180	$ 175
Operations - Enviro Mgt - Materials	$ 252	$ 191	$ 184	$ 179
Operations - Enviro Mgt - Contractors	$ 259	$ 195	$ 189	$ 182
Operations - Enviro Mgt - Other	$ 265	$ 199	$ 193	$ 186
Operations - Enviro Mgt - Indirects	$ 272	$ 204	$ 197	$ 190
Operations - Enviro Mgt - Overheads	$ 279	$ 208	$ 201	$ 193
Operations - Water Mgt - Labour	$ 285	$ 212	$ 205	$ 197
Operations - Water Mgt - Materials	$ 292	$ 216	$ 209	$ 201

A2.2 Preventative Maintenance

Cost element	2007	2008	2009	2010
Prev. Maintenance - Cond. Monitoring - Labour	$ 301	$ 216	$ 201	$ 178
Prev. Maintenance - Cond. Monitoring - Materials	$ 45	$ 14	$ 47	$ 36
Prev. Maintenance - Cond. Monitoring - Contractors	$ 32	$ 21	$ 76	$ 17
Prev. Maintenance - Cond. Monitoring - Other	$ 9	$ 1	$ 2	$ 1
Prev. Maintenance - Cond. Monitoring - Indirects	$ 273	$ 157	$ 147	$ 104
Prev. Maintenance - Cond. Monitoring - Overheads	$ 340	$ 243	$ 223	$ 187
Prev. Maintenance - Servicing - Labour	$ 207	$ 163	$ 148	$ 135
Prev. Maintenance - Servicing - Materials	$ 40	$ 44	$ 55	$ 67
Prev. Maintenance - Servicing - Contractors	$ 15	$ 43	$ 27	$ 26
Prev. Maintenance - Servicing - Other	$ 4	$ 1	$ 0	$ 0
Prev. Maintenance - Servicing - Indirects	$ 186	$ 118	$ 108	$ 81
Prev. Maintenance - Servicing - Overheads	$ 235	$ 185	$ 164	$ 147
Prev. Maintenance - Weed Control - Labour	$ 184	$ 81	$ 217	$ 241
Prev. Maintenance - Weed Control - Materials	$ 398	$ 368	$ 538	$ 711
Prev. Maintenance - Weed Control - Contractors	$ 404	$ 690	$ 483	$ 763
Prev. Maintenance - Weed Control - Other	$ 1	$ 0	$ 0	$ 4
Prev. Maintenance - Weed Control - Indirects	$ 157	$ 56	$ 146	$ 146
Prev. Maintenance - Weed Control - Overheads	$ 228	$ 124	$ 267	$ 328

A2.3 Corrective Maintenance

Cost element	2007	2008	2009	2010
Corrective Maintenance - scheduled corr - Labour	$ 403	$ 499	$ 433	$ 240
Corrective Maintenance - scheduled corr - Materials	$ 442	$ 1,937	$ 1,103	$ 432
Corrective Maintenance - scheduled corr - Contractors	$ 59	$ 97	$ 160	$ 59
Corrective Maintenance - scheduled corr - Other	$ 2	$ 2	$ 7	$ 2
Corrective Maintenance - scheduled corr - Indirects	$ 368	$ 362	$ 316	$ 143
Corrective Maintenance - scheduled corr - Overheads	$ 469	$ 660	$ 531	$ 276
Corrective Maintenance - emergency maint - Labour	$ 24	$ 16	$ 29	$ 33
Corrective Maintenance - emergency maint - Materials	$ 7	$ 6	$ 34	$ 17
Corrective Maintenance - emergency maint - Contractors	$ 1	$ 6	$ 39	$ 1
Corrective Maintenance - emergency maint - Other	$ -	$ 0	$ 0	$ -
Corrective Maintenance - emergency maint - Indirects	$ 22	$ 12	$ 21	$ 20
Corrective Maintenance - emergency maint - Overheads	$ 29	$ 18	$ 35	$ 35

A3 Mareeba Bulk Water Supply

A3.1 Operations

Cost element	2007	2008	2009	2010
Operations - Customer Mgt - Labour	$ 9	$ -	$ 2	$ 2
Operations - Customer Mgt - Materials	-$ 3	$ -	$ -	$ -
Operations - Customer Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Customer Mgt - Other	$ -	$ -	$ -	$ -
Operations - Customer Mgt - Indirects	$ 12	$ -	$ 1	$ 1
Operations - Customer Mgt - Overheads	$ 11	$ -	$ 2	$ 2
Operations - Workplace H&S - Labour	$ 1	$ 1	$ 1	$ 2
Operations - Workplace H&S - Materials	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Contractors	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Other	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Indirects	$ 2	$ 1	$ 0	$ 1
Operations - Workplace H&S - Overheads	$ 1	$ 1	$ 1	$ 2
Operations - Enviro Mgt - Labour	$ 23	$ 22	$ 28	$ 27
Operations - Enviro Mgt - Materials	$ 2	$ 2	$ 3	$ 1
Operations - Enviro Mgt - Contractors	$ 4	$ 7	$ 6	$ 7
Operations - Enviro Mgt - Other	$ 0	$ 0	$ 1	$ 2
Operations - Enviro Mgt - Indirects	$ 30	$ 35	$ 10	$ 23
Operations - Enviro Mgt - Overheads	$ 21	$ 26	$ 31	$ 28
Operations - Water Mgt - Labour	$ -	$ 5	$ 58	$ 52
Operations - Water Mgt - Materials	$ -	$ -	$ -	$ -
Operations - Water Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Water Mgt - Other	$ -	$ -	$ 0	$ -
Operations - Water Mgt - Indirects	$ -	$ 8	$ 21	$ 46
Operations - Water Mgt - Overheads	$ -	$ 6	$ 63	$ 55
Operations - Scheme Mgt - Labour	$ 85	$ 82	$ 14	$ 31
Operations - Scheme Mgt - Materials	$ 0	$ 0	$ -	$ -
Operations - Scheme Mgt - Contractors	$ 1	$ -	$ -	$ 7
Operations - Scheme Mgt - Other	$ 31	$ 164	$ 184	$ 209
Operations - Scheme Mgt - Indirects	$ 114	$ 128	$ 5	$ 28
Operations - Scheme Mgt - Overheads	$ 80	$ 98	$ 25	$ 44
Operations - Dam Safety - Labour	$ 46	$ 28	$ 53	$ 36
Operations - Dam Safety - Materials	$ 1	$ -	$ 4	$ 1
Operations - Dam Safety - Contractors	$ -	$ -	$ 2	$ 1
Operations - Dam Safety - Other	$ 3	$ 1	$ 3	$ 3
Operations - Dam Safety - Indirects	$ 61	$ 44	$ 19	$ 32

Operations - Dam Safety - Overheads	$ 41	$ 31	$ 57	$ 39
Operations - Sched/Deliver - Labour	$ 34	$ 18	$ 18	$ 13
Operations - Sched/Deliver - Materials	$ 3	$ 4	$ 13	$ 0
Operations - Sched/Deliver - Contractors	$ -	$ -	$ 0	$ 0
Operations - Sched/Deliver - Other	$ -	$ 0	$ 2	$ -
Operations - Sched/Deliver - Indirects	$ 45	$ 28	$ 7	$ 12
Operations - Sched/Deliver - Overheads	$ 28	$ 20	$ 6	$ 14
Operations - Metering - Labour	$ -	$ 4	$ 4	$ 4
Operations - Metering - Materials	-$ 9	$ -	$ 0	$ -
Operations - Metering - Contractors	$ -	$ -	$ -	$ -
Operations - Metering - Other	$ 5	$ -	$ -	$ -
Operations - Metering - Indirects	$ -	$ 6	$ 1	$ 4
Operations - Metering - Overheads	$ -	$ 4	$ 4	$ 4
Operations - Facility Mgt - Labour	$ 3	$ 5	$ 3	$ 14
Operations - Facility Mgt - Materials	$ 2	$ -	$ -	$ -
Operations - Facility Mgt - Contractors	$ -	$ -	$ -	$ 2
Operations - Facility Mgt - Other	$ -	$ 3	$ 5	$ 5
Operations - Facility Mgt - Indirects	$ 4	$ 8	$ 1	$ 12
Operations - Facility Mgt - Overheads	$ 0	$ 6	$ 4	$ 15
Operations - Other - Labour	$ -	-$ 0	$ -	$ -
Operations - Other - Materials	-$ 0	$ 5	-$ 0	$ -
Operations - Other - Contractors	$ 3	$ -	$ -	$ -
Operations - Other - Other	$ 76	$ 0	$ 0	-$ 0
Operations - Other - Indirects	$ -	$ 0	$ 0	$ 0
Operations - Other - Overheads	-$ 0	$ -	$ -	$ -

A3.2 Preventative Maintenance

Cost element	2007	2008	2009	2010
Prev. Maintenance - Cond. Monitoring - Labour	$ 44	$ 55	$ 26	$ 10
Prev. Maintenance - Cond. Monitoring - Materials	$ 2	$ 1	$ 19	$ 1
Prev. Maintenance - Cond. Monitoring - Contractors	$ 5	$ 8	$ 4	$ -
Prev. Maintenance - Cond. Monitoring - Other	$ 27	$ 26	$ 0	$ 24
Prev. Maintenance - Cond. Monitoring - Indirects	$ 59	$ 86	$ 9	$ 9
Prev. Maintenance - Cond. Monitoring - Overheads	$ 41	$ 63	$ 12	$ 11
Prev. Maintenance - Servicing - Labour	$ 95	$ 12	$ 2	$ 0
Prev. Maintenance - Servicing - Materials	$ 27	$ 15	$ 3	$ -
Prev. Maintenance - Servicing - Contractors	$ 7	$ 4	$ -	$ -
Prev. Maintenance - Servicing - Other	$ 5	$ 3	$ -	$ -
Prev. Maintenance - Servicing - Indirects	$ 128	$ 18	$ 1	$ 0
Prev. Maintenance - Servicing - Overheads	$ 84	$ 14	$ 0	$ 0
Prev. Maintenance - Weed Control - Labour	$ 18	$ 10	$ 2	$ 11
Prev. Maintenance - Weed Control - Materials	$ 2	$ 7	$ 2	$ 0
Prev. Maintenance - Weed Control - Contractors	$ -	$ -	$ -	$ -
Prev. Maintenance - Weed Control - Other	$ -	$ -	$ -	$ 0
Prev. Maintenance - Weed Control - Indirects	$ 24	$ 15	$ 1	$ 9

A3.3 Corrective Maintenance

Cost element	2007	2008	2009	2010
Corrective Maintenance - scheduled corr - Labour	$ 59	$ 40	$ 5	$ 2
Corrective Maintenance - scheduled corr - Materials	$ 56	$ 16	$ 2	$ 3
Corrective Maintenance - scheduled corr - Contractors	$ 5	$ 3	$ 0	$ -
Corrective Maintenance - scheduled corr - Other	$ 1	$ 0	$ 0	$ -
Corrective Maintenance - scheduled corr - Indirects	$ 79	$ 63	$ 2	$ 2
Corrective Maintenance - scheduled corr - Overheads	$ 58	$ 46	$ 5	$ 2
Corrective Maintenance - emergency maint - Labour	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Materials	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Contractors	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Other	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Indirects	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Overheads	$ -	$ -	$ -	$ -

A4 Mareeba Distribution Scheme

A4.1 Operations

Cost element	2007	2008	2009	2010
Operations - Customer Mgt - Labour	$ 24	$ 4	$ 9	$ 6
Operations - Customer Mgt - Materials	$ 11	$ -	$ -	$ -
Operations - Customer Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Customer Mgt - Other	$ -	$ 0	-$ 8	$ 0
Operations - Customer Mgt - Indirects	$ 25	$ 3	$ 8	$ 4
Operations - Customer Mgt - Overheads	$ 12	$ 4	$ 9	$ 6
Operations - Workplace H&S - Labour	$ 0	$ 0	$ 1	$ 6
Operations - Workplace H&S - Materials	$ -	$ -	$ -	$ 2
Operations - Workplace H&S - Contractors	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Other	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Indirects	$ 0	$ 0	$ 1	$ 4
Operations - Workplace H&S - Overheads	$ 0	$ 1	$ 1	$ 6
Operations - Enviro Mgt - Labour	$ 2	$ 8	$ 21	$ 9
Operations - Enviro Mgt - Materials	$ -	$ -	$ 2	$ 1
Operations - Enviro Mgt - Contractors	$ 3	$ 3	$ 16	$ 5
Operations - Enviro Mgt - Other	$ -	$ -	$ 0	$ 1
Operations - Enviro Mgt - Indirects	$ 2	$ 7	$ 17	$ 6
Operations - Enviro Mgt - Overheads	$ 2	$ 9	$ 23	$ 10
Operations - Water Mgt - Labour	$ -	$ -	$ 1	$ 5
Operations - Water Mgt - Materials	$ -	$ -	$ -	$ -
Operations - Water Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Water Mgt - Other	$ -	$ -	$ -	$ 0
Operations - Water Mgt - Indirects	$ -	$ -	$ 1	$ 3
Operations - Water Mgt - Overheads	$ -	$ -	$ 1	$ 5
Operations - Scheme Mgt - Labour	$ 61	$ 21	$ 219	$ 184
Operations - Scheme Mgt - Materials	-$ 28	$ 8	-$ 12	$ 0
Operations - Scheme Mgt - Contractors	-$ 2	$ -	$ 76	$ 3
Operations - Scheme Mgt - Other	$ 51	$ 304	$ 244	$ 319
Operations - Scheme Mgt - Indirects	$ 64	$ 17	$ 181	$ 116
Operations - Scheme Mgt - Overheads	$ 59	$ 37	$ 265	$ 210
Operations - Dam Safety - Labour	$ -	$ -	$ -	$ -
Operations - Dam Safety - Materials	$ -	$ -	$ -	$ -
Operations - Dam Safety - Contractors	$ -	$ -	$ -	$ -
Operations - Dam Safety - Other	$ -	$ -	$ -	$ -
Operations - Dam Safety - Indirects	$ -	$ -	$ -	$ -

Operations - Dam Safety - Overheads	$ -	$ -	$ -	$ -
Operations - Sched/Deliver - Labour	$ 326	$ 281	$ 270	$ 282
Operations - Sched/Deliver - Materials	$ 5	$ 4	-$ 8	$ 10
Operations - Sched/Deliver - Contractors	$ -	$ 1	$ -	$ -
Operations - Sched/Deliver - Other	$ 1	$ 2	$ 0	$ 0
Operations - Sched/Deliver - Indirects	$ 340	$ 233	$ 225	$ 178
Operations - Sched/Deliver - Overheads	$ 291	$ 315	$ 305	$ 301
Operations - Metering - Labour	$ 2	$ 24	$ 24	$ 23
Operations - Metering - Materials	$ 16	$ -	$ 0	$ -
Operations - Metering - Contractors	$ 1	$ -	$ -	$ -
Operations - Metering - Other	$ -	$ -	$ -	$ -
Operations - Metering - Indirects	$ 2	$ 20	$ 20	$ 14
Operations - Metering - Overheads	$ -	$ 26	$ 26	$ 24
Operations - Facility Mgt - Labour	$ -	$ -	$ -	$ 0
Operations - Facility Mgt - Materials	-$ 0	$ -	$ -	$ -
Operations - Facility Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Facility Mgt - Other	$ -	$ 0	$ 0	$ 0
Operations - Facility Mgt - Indirects	$ -	$ -	$ -	$ 0
Operations - Facility Mgt - Overheads	$ 0	$ 0	$ 0	$ 0
Operations - Other - Labour	$ -	$ -	$ -	$ 1
Operations - Other - Materials	-$ 5	-$ 20	-$ 30	$ -
Operations - Other - Contractors	-$ 10	$ -	$ -	$ -
Operations - Other - Other	$ 221	$ 0	$ 0	$ 0
Operations - Other - Indirects	$ -	$ 0	$ 0	$ 0
Operations - Other - Overheads	$ -	$ 20	$ 30	$ -

A4.2 Preventative Maintenance

Cost element	2007	2008	2009	2010
Prev. Maintenance - Cond. Monitoring - Labour	$ 1	$ 7	$ 14	$ 10
Prev. Maintenance - Cond. Monitoring - Materials	$ -	$ -	-$ 17	$ 2
Prev. Maintenance - Cond. Monitoring - Contractors	$ 6	$ -	$ 4	$ -
Prev. Maintenance - Cond. Monitoring - Other	$ 0	$ -	$ 3	$ -
Prev. Maintenance - Cond. Monitoring - Indirects	$ 1	$ 6	$ 12	$ 7
Prev. Maintenance - Cond. Monitoring - Overheads	$ 1	$ 8	$ 31	$ 11
Prev. Maintenance - Servicing - Labour	$ 66	$ 39	$ 27	$ 21
Prev. Maintenance - Servicing - Materials	$ 6	$ 5	$ 2	$ 3
Prev. Maintenance - Servicing - Contractors	$ 0	$ -	$ 1	$ -
Prev. Maintenance - Servicing - Other	$ -	$ 0	$ 0	$ -
Prev. Maintenance - Servicing - Indirects	$ 69	$ 32	$ 23	$ 13
Prev. Maintenance - Servicing - Overheads	$ 54	$ 44	$ 32	$ 22
Prev. Maintenance - Weed Control - Labour	$ 82	$ 89	$ 141	$ 133
Prev. Maintenance - Weed Control - Materials	$ 42	$ 53	$ 65	$ 98
Prev. Maintenance - Weed Control - Contractors	$ 53	$ 0	$ 8	$ 17
Prev. Maintenance - Weed Control - Other	$ 1	$ 1	$ 2	$ 1
Prev. Maintenance - Weed Control - Indirects	$ 86	$ 74	$ 117	$ 84
Prev. Maintenance - Weed Control - Overheads	$ 81	$ 102	$ 156	$ 147

A4.3 Corrective Maintenance

Cost element	2007	2008	2009	2010
Corrective Maintenance - scheduled corr - Labour	$ 314	$ 239	$ 269	$ 290
Corrective Maintenance - scheduled corr - Materials	$ 233	$ 196	$ 534	$ 448
Corrective Maintenance - scheduled corr - Contractors	$ 66	$ 104	$ 23	$ 6
Corrective Maintenance - scheduled corr - Other	$ 3	$ 0	$ 1	$ 7
Corrective Maintenance - scheduled corr - Indirects	$ 328	$ 199	$ 225	$ 183
Corrective Maintenance - scheduled corr - Overheads	$ 288	$ 283	$ 319	$ 330
Corrective Maintenance - emergency maint - Labour	$ 8	$ 2	$ 4	$ 0
Corrective Maintenance - emergency maint - Materials	$ 2	$ 0	$ 7	$ -
Corrective Maintenance - emergency maint - Contractors	$ 2	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Other	$ 27	$ -	$ 0	$ -
Corrective Maintenance - emergency maint - Indirects	$ 8	$ 2	$ 3	$ 0
Corrective Maintenance - emergency maint - Overheads	$ 6	$ 2	$ 4	$ 0
Renewals (exp+cap) - Labour	$ 325	$ 309	$ 323	$ 269
Renewals (exp+cap) - Materials	$ 295	$ 425	$ 436	$ 410
Renewals (exp+cap) - Contractors	$ 230	$ 272	$ 218	$ 1,384
Renewals (exp+cap) - Other	$ 7	$ 10	$ 12	$ 31
Renewals (exp+cap) - Indirects	$ 339	$ 257	$ 265	$ 155
Renewals (exp+cap) - Overheads	$ 298	$ 373	$ 367	$ 380

A5 Eton Bulk Water Supply

A5.1 Operations

Cost element	2007	2008	2009	2010
Operations - Customer Mgt - Labour	$ 1	$ 11	$ 14	$ 13
Operations - Customer Mgt - Materials	$ 1	$ -	$ -	$ -
Operations - Customer Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Customer Mgt - Other	$ -	$ 1	$ 3	$ 2
Operations - Customer Mgt - Indirects	$ 1	$ 13	$ 18	$ 12
Operations - Customer Mgt - Overheads	$ 0	$ 12	$ 15	$ 14
Operations - Workplace H&S - Labour	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Materials	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Contractors	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Other	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Indirects	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Overheads	$ -	$ -	$ -	$ -
Operations - Enviro Mgt - Labour	$ 21	$ 9	$ 17	$ 7
Operations - Enviro Mgt - Materials	$ 7	$ 26	$ 10	$ 0
Operations - Enviro Mgt - Contractors	$ 29	$ 29	$ 3	$ 2
Operations - Enviro Mgt - Other	$ 2	$ 0	$ 0	$ 0
Operations - Enviro Mgt - Indirects	$ 23	$ 11	$ 21	$ 6
Operations - Enviro Mgt - Overheads	$ 24	$ 13	$ 9	$ 8
Operations - Water Mgt - Labour	$ 8	$ 11	$ 0	$ 4
Operations - Water Mgt - Materials	$ -	$ -	-$ 9	$ -
Operations - Water Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Water Mgt - Other	$ -	$ 0	$ -	$ -
Operations - Water Mgt - Indirects	$ 9	$ 14	$ 0	$ 3
Operations - Water Mgt - Overheads	$ 8	$ 13	$ 9	$ 4
Operations - Scheme Mgt - Labour	$ 49	$ 36	$ 23	$ 68
Operations - Scheme Mgt - Materials	-$ 0	-$ 5	$ 0	$ 0
Operations - Scheme Mgt - Contractors	$ -	$ -	$ -	$ 6
Operations - Scheme Mgt - Other	$ 20	$ 86	$ 121	$ 129
Operations - Scheme Mgt - Indirects	$ 54	$ 44	$ 28	$ 61
Operations - Scheme Mgt - Overheads	$ 58	$ 50	$ 30	$ 78
Operations - Dam Safety - Labour	$ 32	$ 115	$ 26	$ 30
Operations - Dam Safety - Materials	-$ 18	$ 26	$ 1	$ 0
Operations - Dam Safety - Contractors	-$ 24	$ 48	$ -	$ -

Operations - Dam Safety - Other	$ 2	$ 13	$ 0	$ 1
Operations - Dam Safety - Indirects	$ 36	$ 139	$ 33	$ 27
Operations - Dam Safety - Overheads	$ 25	$ 133	$ 28	$ 32
Operations - Sched/Deliver - Labour	$ 31	$ 27	$ 18	$ 25
Operations - Sched/Deliver - Materials	$ 3	$ 0	$ 0	$ 0
Operations - Sched/Deliver - Contractors	$ 6	$ -	$ 0	$ 0
Operations - Sched/Deliver - Other	$ 1	$ 1	$ 1	$ 1
Operations - Sched/Deliver - Indirects	$ 35	$ 33	$ 22	$ 23
Operations - Sched/Deliver - Overheads	$ 37	$ 30	$ 19	$ 27
Operations - Metering - Labour	$ 0	$ 0	$ 0	$ 1
Operations - Metering - Materials	$ -	$ -	$ -	$ -
Operations - Metering - Contractors	$ 0	$ -	$ -	$ 0
Operations - Metering - Other	$ -	$ -	$ -	$ -
Operations - Metering - Indirects	$ 0	$ 0	$ 0	$ 0
Operations - Metering - Overheads	$ 0	$ 0	$ 0	$ 1
Operations - Facility Mgt - Labour	$ 12	$ 17	$ 22	$ 17
Operations - Facility Mgt - Materials	$ 4	$ 12	$ 8	$ 4
Operations - Facility Mgt - Contractors	$ 35	$ 20	$ 16	$ 19
Operations - Facility Mgt - Other	$ 14	$ 12	$ 12	$ 14
Operations - Facility Mgt - Indirects	$ 13	$ 21	$ 28	$ 16
Operations - Facility Mgt - Overheads	$ 15	$ 22	$ 26	$ 20
Operations - Other - Labour	$ -	$ 1	$ -	$ 0
Operations - Other - Materials	$ -	-$ 18	$ -	$ 0
Operations - Other - Contractors	$ 20	$ 0	$ -	$ -
Operations - Other - Other	$ 64	-$ 0	$ 0	$ 0
Operations - Other - Indirects	$ -	$ 0	$ 0	$ 0
Operations - Other - Overheads	$ -	$ -	$ -	$ 0

A5.2 Preventative Maintenance

Cost element	2007	2008	2009	2010
Prev. Maintenance - Cond. Monitoring - Labour	$ 38	$ 44	$ 11	$ 42
Prev. Maintenance - Cond. Monitoring - Materials	$ 2	$ 5	$ 1	$ 5
Prev. Maintenance - Cond. Monitoring - Contractors	$ 12	$ 10	$ 45	$ 24
Prev. Maintenance - Cond. Monitoring - Other	$ 0	$ -	$ -	$ 1
Prev. Maintenance - Cond. Monitoring - Indirects	$ 42	$ 53	$ 14	$ 38
Prev. Maintenance - Cond. Monitoring - Overheads	$ 45	$ 50	$ 14	$ 46
Prev. Maintenance - Servicing - Labour	$ 7	$ 3	$ 5	$ 4
Prev. Maintenance - Servicing - Materials	$ 4	$ 3	$ 6	$ 1
Prev. Maintenance - Servicing - Contractors	$ 3	$ 2	$ 4	$ 5
Prev. Maintenance - Servicing - Other	$ 2	$ 1	$ 1	$ 0
Prev. Maintenance - Servicing - Indirects	$ 8	$ 3	$ 6	$ 3
Prev. Maintenance - Servicing - Overheads	$ 9	$ 3	$ 6	$ 4
Prev. Maintenance - Weed Control - Labour	$ 10	$ 14	$ 9	$ 13
Prev. Maintenance - Weed Control - Materials	$ 1	$ 6	$ 12	$ 10
Prev. Maintenance - Weed Control - Contractors	$ 24	$ 42	$ 40	$ 24
Prev. Maintenance - Weed Control - Other	$ -	$ -	$ -	$ -
Prev. Maintenance - Weed Control - Indirects	$ 11	$ 17	$ 12	$ 12
Prev. Maintenance - Weed Control - Overheads	$ 12	$ 18	$ 12	$ 16

A5.3 Corrective Maintenance

Cost element	2007	2008	2009	2010
Corrective Maintenance - scheduled corr - Labour	$ 38	$ 24	$ 27	$ 58
Corrective Maintenance - scheduled corr - Materials	$ 52	$ 53	$ 46	$ 73
Corrective Maintenance - scheduled corr - Contractors	$ 16	$ 16	$ 22	$ 26
Corrective Maintenance - scheduled corr - Other	$ 1	$ 2	$ 0	$ 1
Corrective Maintenance - scheduled corr - Indirects	$ 42	$ 29	$ 33	$ 52
Corrective Maintenance - scheduled corr - Overheads	$ 55	$ 30	$ 32	$ 67
Corrective Maintenance - emergency maint - Labour	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Materials	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Contractors	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Other	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Indirects	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Overheads	$ -	$ -	$ -	$ -

A6 Eton Distribution Scheme

A6.1 Operations

Cost element	2007	2008	2009	2010
Operations - Customer Mgt - Labour	$ 4	$ 5	$ -	$ -
Operations - Customer Mgt - Materials	$ -	$ -	$ -	$ -
Operations - Customer Mgt - Contractors	$ 0	$ -	$ -	$ -
Operations - Customer Mgt - Other	$ -	$ -	$ -	$ -
Operations - Customer Mgt - Indirects	$ 8	$ 3	$ -	$ -
Operations - Customer Mgt - Overheads	$ 5	$ 5	$ -	$ -
Operations - Workplace H&S - Labour	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Materials	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Contractors	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Other	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Indirects	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Overheads	$ -	$ -	$ -	$ -
Operations - Enviro Mgt - Labour	$ -	$ -	$ -	$ -
Operations - Enviro Mgt - Materials	$ -	$ -	$ -	$ -
Operations - Enviro Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Enviro Mgt - Other	$ -	$ -	$ -	$ -
Operations - Enviro Mgt - Indirects	$ -	$ -	$ -	$ -
Operations - Enviro Mgt - Overheads	$ -	$ -	$ -	$ -
Operations - Water Mgt - Labour	$ -	$ -	$ -	$ -
Operations - Water Mgt - Materials	$ -	$ -	$ -	$ -
Operations - Water Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Water Mgt - Other	$ -	$ -	$ -	$ -
Operations - Water Mgt - Indirects	$ -	$ -	$ -	$ -
Operations - Water Mgt - Overheads	$ -	$ -	$ -	$ -
Operations - Scheme Mgt - Labour	$ -	$ 29	$ 43	$ 33
Operations - Scheme Mgt - Materials	$ -	$ 6	$ 4	$ -
Operations - Scheme Mgt - Contractors	$ -	$ -	$ 16	$ 6
Operations - Scheme Mgt - Other	$ -	$ 108	$ 125	$ 133
Operations - Scheme Mgt - Indirects	$ -	$ 20	$ 38	$ 20
Operations - Scheme Mgt - Overheads	$ -	$ 31	$ 50	$ 42
Operations - Dam Safety - Labour	$ -	$ -	$ -	$ -
Operations - Dam Safety - Materials	$ -	$ -	$ -	$ -
Operations - Dam Safety - Contractors	$ -	$ -	$ -	$ -
Operations - Dam Safety - Other	$ -	$ -	$ -	$ -
Operations - Dam Safety - Indirects	$ -	$ -	$ -	$ -

Operations - Dam Safety - Overheads	$ -	$ -	$ -	$ -
Operations - Sched/Deliver - Labour	$ 93	$ 72	$ 52	$ 74
Operations - Sched/Deliver - Materials	$ 3	$ 1	$ 1	$ 0
Operations - Sched/Deliver - Contractors	$ -	$ 1	$ 1	$ -
Operations - Sched/Deliver - Other	$ 11	$ 4	$ 1	$ 0
Operations - Sched/Deliver - Indirects	$ 191	$ 50	$ 46	$ 45
Operations - Sched/Deliver - Overheads	$ 111	$ 81	$ 57	$ 79
Operations - Metering - Labour	$ 4	$ 10	$ 10	$ 11
Operations - Metering - Materials	$ 2	$ 0	$ -	$ 1
Operations - Metering - Contractors	$ 3	$ -	$ 0	$ 4
Operations - Metering - Other	$ -	$ -	$ -	$ -
Operations - Metering - Indirects	$ 9	$ 7	$ 8	$ 6
Operations - Metering - Overheads	$ 5	$ 11	$ 10	$ 11
Operations - Facility Mgt - Labour	$ -	$ -	$ -	$ -
Operations - Facility Mgt - Materials	$ -	$ -	$ -	$ -
Operations - Facility Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Facility Mgt - Other	$ -	$ -	$ -	$ -
Operations - Facility Mgt - Indirects	$ -	$ -	$ -	$ -
Operations - Facility Mgt - Overheads	$ -	$ -	$ -	$ -
Operations - Other - Labour	$ 0	-$ 0	$ 0	-$ 0
Operations - Other - Materials	-$ 0	-$ 0	-$ 0	-$ 0
Operations - Other - Contractors	$ -	$ -	$ -	$ -
Operations - Other - Other	$ 105	-$ 0	-$ 0	$ -
Operations - Other - Indirects	$ 0	$ 0	$ 0	$ 0
Operations - Other - Overheads	$ 0	-$ 0	-$ 0	$ -

A6.2 Preventative Maintenance

Cost element	2007	2008	2009	2010
Prev. Maintenance - Cond. Monitoring - Labour	$ 17	$ 4	$ 15	$ 18
Prev. Maintenance - Cond. Monitoring - Materials	-$ 0	$ -	$ -	$ 1
Prev. Maintenance - Cond. Monitoring - Contractors	$ 7	$ 4	$ 8	$ 9
Prev. Maintenance - Cond. Monitoring - Other	$ -	$ -	$ 0	$ 1
Prev. Maintenance - Cond. Monitoring - Indirects	$ 35	$ 3	$ 13	$ 11
Prev. Maintenance - Cond. Monitoring - Overheads	$ 19	$ 5	$ 16	$ 20
Prev. Maintenance - Servicing - Labour	$ 13	$ 16	$ 19	$ 12
Prev. Maintenance - Servicing - Materials	$ 0	$ 1	$ 5	$ 4
Prev. Maintenance - Servicing - Contractors	$ -	$ 0	$ 2	$ 11
Prev. Maintenance - Servicing - Other	$ 5	$ 5	$ 0	$ 0
Prev. Maintenance - Servicing - Indirects	$ 27	$ 11	$ 17	$ 7
Prev. Maintenance - Servicing - Overheads	$ 15	$ 18	$ 21	$ 13
Prev. Maintenance - Weed Control - Labour	$ 59	$ 51	$ 48	$ 63
Prev. Maintenance - Weed Control - Materials	$ 68	$ 67	$ 38	$ 107
Prev. Maintenance - Weed Control - Contractors	$ 37	$ 55	$ 60	$ 40
Prev. Maintenance - Weed Control - Other	$ 0	$ 0	$ 0	$ 3
Prev. Maintenance - Weed Control - Indirects	$ 122	$ 36	$ 42	$ 38
Prev. Maintenance - Weed Control - Overheads	$ 72	$ 64	$ 57	$ 75

A6.3 Corrective Maintenance

Cost element	2007	2008	2009	2010
Corrective Maintenance - scheduled corr - Labour	$ 76	$ 55	$ 72	$ 91
Corrective Maintenance - scheduled corr - Materials	$ 65	$ 207	$ 164	$ 156
Corrective Maintenance - scheduled corr - Contractors	$ 20	$ 26	$ 37	$ 12
Corrective Maintenance - scheduled corr - Other	$ 1	$ 3	$ 3	$ 2
Corrective Maintenance - scheduled corr - Indirects	$ 157	$ 38	$ 63	$ 55
Corrective Maintenance - scheduled corr - Overheads	$ 89	$ 73	$ 88	$ 106
Corrective Maintenance - emergency maint - Labour	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Materials	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Contractors	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Other	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Indirects	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Overheads	$ -	$ -	$ -	$ -

A7 Eton Distribution Scheme

A7.1 Operations

Cost element	2007	2008	2009	2010
Operations - Customer Mgt - Labour	$ 1	$ 6	$ 2	$ 5
Operations - Customer Mgt - Materials	$ -	$ -	$ -	$ -
Operations - Customer Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Customer Mgt - Other	$ 0	$ 0	$ 0	$ 0
Operations - Customer Mgt - Indirects	$ 1	$ 5	$ 2	$ 5
Operations - Customer Mgt - Overheads	$ 1	$ 6	$ 3	$ 6
Operations - Workplace H&S - Labour	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Materials	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Contractors	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Other	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Indirects	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Overheads	$ -	$ -	$ -	$ -
Operations - Enviro Mgt - Labour	$ 12	$ 17	$ 25	$ 24
Operations - Enviro Mgt - Materials	$ 0	$ 1	$ 0	$ 0
Operations - Enviro Mgt - Contractors	$ 5	$ 5	$ 11	$ 7
Operations - Enviro Mgt - Other	$ 1	$ 1	$ 1	$ 0
Operations - Enviro Mgt - Indirects	$ 13	$ 16	$ 19	$ 22
Operations - Enviro Mgt - Overheads	$ 14	$ 20	$ 28	$ 27
Operations - Water Mgt - Labour	$ 16	$ 18	$ 0	$ -
Operations - Water Mgt - Materials	$ -	$ -	$ -	$ -
Operations - Water Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Water Mgt - Other	$ -	$ 1	$ -	$ -
Operations - Water Mgt - Indirects	$ 17	$ 16	$ 0	$ -
Operations - Water Mgt - Overheads	$ 17	$ 20	$ 0	$ -
Operations - Scheme Mgt - Labour	$ 20	$ 31	$ 37	$ 36
Operations - Scheme Mgt - Materials	$ -	$ -	$ -	$ -
Operations - Scheme Mgt - Contractors	$ 1	$ -	$ -	$ 6
Operations - Scheme Mgt - Other	$ 8	$ 105	$ 138	$ 143
Operations - Scheme Mgt - Indirects	$ 21	$ 29	$ 28	$ 32
Operations - Scheme Mgt - Overheads	$ 22	$ 40	$ 47	$ 45
Operations - Dam Safety - Labour	$ 7	$ 11	$ 32	$ 32
Operations - Dam Safety - Materials	$ 1	$ 0	-$ 6	$ 0
Operations - Dam Safety - Contractors	$ -	$ -	$ 0	$ 0
Operations - Dam Safety - Other	$ 2	$ 1	$ 1	$ 1
Operations - Dam Safety - Indirects	$ 8	$ 10	$ 24	$ 29

Operations - Dam Safety - Overheads	$ 8	$ 13	$ 43	$ 34
Operations - Sched/Deliver - Labour	$ 40	$ 31	$ 16	$ 19
Operations - Sched/Deliver - Materials	$ 1	$ 1	$ 1	$ 0
Operations - Sched/Deliver - Contractors	$ -	$ 0	$ 0	$ 0
Operations - Sched/Deliver - Other	$ 4	$ 1	$ 1	$ 1
Operations - Sched/Deliver - Indirects	$ 41	$ 29	$ 12	$ 17
Operations - Sched/Deliver - Overheads	$ 49	$ 35	$ 18	$ 20
Operations - Metering - Labour	$ -	$ 1	$ 0	$ 1
Operations - Metering - Materials	$ -	$ -	$ 1	$ -
Operations - Metering - Contractors	$ -	$ -	$ -	$ -
Operations - Metering - Other	$ -	$ -	$ -	$ -
Operations - Metering - Indirects	$ -	$ 1	$ 0	$ 0
Operations - Metering - Overheads	$ -	$ 1	$ 0	$ 1
Operations - Facility Mgt - Labour	$ -	$ -	$ -	$ 0
Operations - Facility Mgt - Materials	$ -	$ -	$ -	$ -
Operations - Facility Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Facility Mgt - Other	$ -	$ -	$ -	$ -
Operations - Facility Mgt - Indirects	$ -	$ -	$ -	$ 0
Operations - Facility Mgt - Overheads	$ -	$ -	$ -	$ 0
Operations - Other - Labour	-$ 0	$ -	$ -	$ -
Operations - Other - Materials	$ -	$ -	$ -	$ -
Operations - Other - Contractors	$ 0	$ -	$ -	$ -
Operations - Other - Other	$ 92	-$ 0	-$ 0	$ 0
Operations - Other - Indirects	$ -	$ 0	$ 0	$ 0

A7.2 Preventative Maintenance

Cost element	2007	2008	2009	2010
Prev. Maintenance - Cond. Monitoring - Labour	$ 21	$ 17	$ 18	$ 18
Prev. Maintenance - Cond. Monitoring - Materials	$ 0	$ 1	$ 1	$ 1
Prev. Maintenance - Cond. Monitoring - Contractors	$ 2	$ 2	$ 6	$ 2
Prev. Maintenance - Cond. Monitoring - Other	$ -	$ 0	$ 0	$ 0
Prev. Maintenance - Cond. Monitoring - Indirects	$ 22	$ 16	$ 13	$ 16
Prev. Maintenance - Cond. Monitoring - Overheads	$ 23	$ 16	$ 19	$ 19
Prev. Maintenance - Servicing - Labour	$ 15	$ 4	$ 4	$ 3
Prev. Maintenance - Servicing - Materials	$ 5	$ 2	$ 3	$ 1
Prev. Maintenance - Servicing - Contractors	$ 2	$ 1	$ 0	$ 1
Prev. Maintenance - Servicing - Other	$ 3	$ 0	$ 0	$ 0
Prev. Maintenance - Servicing - Indirects	$ 15	$ 4	$ 3	$ 3
Prev. Maintenance - Servicing - Overheads	$ 17	$ 5	$ 5	$ 4
Prev. Maintenance - Weed Control - Labour	$ 3	$ 3	$ 5	$ 3
Prev. Maintenance - Weed Control - Materials	$ -	$ 1	$ 1	$ 0
Prev. Maintenance - Weed Control - Contractors	$ 6	$ 8	$ 8	$ 4
Prev. Maintenance - Weed Control - Other	$ -	$ -	$ 0	$ -
Prev. Maintenance - Weed Control - Indirects	$ 3	$ 2	$ 4	$ 3
Prev. Maintenance - Weed Control - Overheads	$ 3	$ 3	$ 6	$ 3

A7.3 Corrective Maintenance

Cost element	2007	2008	2009	2010
Corrective Maintenance - scheduled corr - Labour	$ 68	$ 59	$ 67	$ 27
Corrective Maintenance - scheduled corr - Materials	$ 34	$ 88	$ 37	$ 31
Corrective Maintenance - scheduled corr - Contractors	$ 16	$ 78	$ 100	$ 16
Corrective Maintenance - scheduled corr - Other	$ 0	$ 1	$ 1	$ 1
Corrective Maintenance - scheduled corr - Indirects	$ 70	$ 54	$ 51	$ 24
Corrective Maintenance - scheduled corr - Overheads	$ 76	$ 75	$ 80	$ 31
Corrective Maintenance - emergency maint - Labour	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Materials	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Contractors	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Other	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Indirects	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Overheads	$ -	$ -	$ -	$ -

A8 Pioneer Bulk Water Scheme

A8.1 Operations

Cost element	2007	2008	2009	2010
Operations - Customer Mgt - Labour	$ 1	$ 6	$ 2	$ 5
Operations - Customer Mgt - Materials	$ -	$ -	$ -	$ -
Operations - Customer Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Customer Mgt - Other	$ 0	$ 0	$ 0	$ 0
Operations - Customer Mgt - Indirects	$ 1	$ 5	$ 2	$ 5
Operations - Customer Mgt - Overheads	$ 1	$ 6	$ 3	$ 6
Operations - Workplace H&S - Labour	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Materials	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Contractors	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Other	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Indirects	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Overheads	$ -	$ -	$ -	$ -
Operations - Enviro Mgt - Labour	$ 12	$ 17	$ 25	$ 24
Operations - Enviro Mgt - Materials	$ 0	$ 1	$ 0	$ 0
Operations - Enviro Mgt - Contractors	$ 5	$ 5	$ 11	$ 7
Operations - Enviro Mgt - Other	$ 1	$ 1	$ 1	$ 0
Operations - Enviro Mgt - Indirects	$ 13	$ 16	$ 19	$ 22
Operations - Enviro Mgt - Overheads	$ 14	$ 20	$ 28	$ 27
Operations - Water Mgt - Labour	$ 16	$ 18	$ 0	$ -
Operations - Water Mgt - Materials	$ -	$ -	$ -	$ -
Operations - Water Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Water Mgt - Other	$ -	$ 1	$ -	$ -
Operations - Water Mgt - Indirects	$ 17	$ 16	$ 0	$ -
Operations - Water Mgt - Overheads	$ 17	$ 20	$ 0	$ -
Operations - Scheme Mgt - Labour	$ 20	$ 31	$ 37	$ 36
Operations - Scheme Mgt - Materials	$ -	$ -	$ -	$ -
Operations - Scheme Mgt - Contractors	$ 1	$ -	$ -	$ 6
Operations - Scheme Mgt - Other	$ 8	$ 105	$ 138	$ 143
Operations - Scheme Mgt - Indirects	$ 21	$ 29	$ 28	$ 32
Operations - Scheme Mgt - Overheads	$ 22	$ 40	$ 47	$ 45
Operations - Dam Safety - Labour	$ 7	$ 11	$ 32	$ 32
Operations - Dam Safety - Materials	$ 1	$ 0	-$ 6	$ 0
Operations - Dam Safety - Contractors	$ -	$ -	$ 0	$ 0
Operations - Dam Safety - Other	$ 2	$ 1	$ 1	$ 1
Operations - Dam Safety - Indirects	$ 8	$ 10	$ 24	$ 29
Operations - Dam Safety - Overheads	$ 8	$ 13	$ 43	$ 34
Operations - Sched/Deliver - Labour	$ 40	$ 31	$ 16	$ 19
Operations - Sched/Deliver - Materials	$ 1	$ 1	$ 1	$ 0
Operations - Sched/Deliver - Contractors	$ -	$ 0	$ 0	$ 0
Operations - Sched/Deliver - Other	$ 4	$ 1	$ 1	$ 1
Operations - Sched/Deliver - Indirects	$ 41	$ 29	$ 12	$ 17
Operations - Sched/Deliver - Overheads	$ 49	$ 35	$ 18	$ 20
Operations - Metering - Labour	$ -	$ 1	$ 0	$ 1
Operations - Metering - Materials	$ -	$ -	$ 1	$ -

Operations - Metering - Contractors	$ -	$ -	$ -	$ -
Operations - Metering - Other	$ -	$ -	$ -	$ -
Operations - Metering - Indirects	$ -	$ 1	$ 0	$ 0
Operations - Metering - Overheads	$ -	$ 1	$ 0	$ 1
Operations - Facility Mgt - Labour	$ -	$ -	$ -	$ 0
Operations - Facility Mgt - Materials	$ -	$ -	$ -	$ -
Operations - Facility Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Facility Mgt - Other	$ -	$ -	$ -	$ -
Operations - Facility Mgt - Indirects	$ -	$ -	$ -	$ 0
Operations - Facility Mgt - Overheads	$ -	$ -	$ -	$ 0
Operations - Other - Labour	-$ 0	$ -	$ -	$ -
Operations - Other - Materials	$ -	$ -	$ -	$ -
Operations - Other - Contractors	$ 0	$ -	$ -	$ -
Operations - Other - Other	$ 92	-$ 0	-$ 0	$ 0
Operations - Other - Indirects	$ -	$ 0	$ 0	$ 0
Operations - Other - Overheads	$ -	$ -	$ -	$ -

A8.2 Preventative Maintenance

Cost element	2007	2008	2009	2010
Prev. Maintenance - Cond. Monitoring - Labour	$ 21	$ 17	$ 18	$ 18
Prev. Maintenance - Cond. Monitoring - Materials	$ 0	$ 1	$ 1	$ 1
Prev. Maintenance - Cond. Monitoring - Contractors	$ 2	$ 2	$ 6	$ 2
Prev. Maintenance - Cond. Monitoring - Other	$ -	$ 0	$ 0	$ 0
Prev. Maintenance - Cond. Monitoring - Indirects	$ 22	$ 16	$ 13	$ 16
Prev. Maintenance - Cond. Monitoring - Overheads	$ 23	$ 16	$ 19	$ 19
Prev. Maintenance - Servicing - Labour	$ 15	$ 4	$ 4	$ 3
Prev. Maintenance - Servicing - Materials	$ 5	$ 2	$ 3	$ 1
Prev. Maintenance - Servicing - Contractors	$ 2	$ 1	$ 0	$ 1
Prev. Maintenance - Servicing - Other	$ 3	$ 0	$ 0	$ 0
Prev. Maintenance - Servicing - Indirects	$ 15	$ 4	$ 3	$ 3
Prev. Maintenance - Servicing - Overheads	$ 17	$ 5	$ 5	$ 4
Prev. Maintenance - Weed Control - Labour	$ 3	$ 3	$ 5	$ 3
Prev. Maintenance - Weed Control - Materials	$ -	$ 1	$ 1	$ 0
Prev. Maintenance - Weed Control - Contractors	$ 6	$ 8	$ 8	$ 4
Prev. Maintenance - Weed Control - Other	$ -	$ -	$ 0	$ -
Prev. Maintenance - Weed Control - Indirects	$ 3	$ 2	$ 4	$ 3
Prev. Maintenance - Weed Control - Overheads	$ 3	$ 3	$ 6	$ 3

A8.3 Corrective Maintenance

Cost element	2007	2008	2009	2010
Corrective Maintenance - scheduled corr - Labour	$ 68	$ 59	$ 67	$ 27
Corrective Maintenance - scheduled corr - Materials	$ 34	$ 88	$ 37	$ 31
Corrective Maintenance - scheduled corr - Contractors	$ 16	$ 78	$ 100	$ 16
Corrective Maintenance - scheduled corr - Other	$ 0	$ 1	$ 1	$ 1
Corrective Maintenance - scheduled corr - Indirects	$ 70	$ 54	$ 51	$ 24
Corrective Maintenance - scheduled corr - Overheads	$ 76	$ 75	$ 80	$ 31
Corrective Maintenance - emergency maint - Labour	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Materials	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Contractors	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Other	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Indirects	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Overheads	$ -	$ -	$ -	$ -

A9 Proserpine Bulk Water Supply

A9.1 Operations

Cost element	2007	2008	2009	2010
Operations - Customer Mgt - Labour	$ 1	$ 5	$ 3	$ 3
Operations - Customer Mgt - Materials	$ 1	$ -	$ -	$ -
Operations - Customer Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Customer Mgt - Other	$ -	$ 1	$ -	$ -
Operations - Customer Mgt - Indirects	$ 3	$ 6	$ 3	$ 2
Operations - Customer Mgt - Overheads	$ -	$ 5	$ 3	$ 3
Operations - Workplace H&S - Labour	$ -	$ 1	$ 0	$ 1
Operations - Workplace H&S - Materials	$ -	$ -	$ 0	$ 5
Operations - Workplace H&S - Contractors	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Other	$ -	$ -	$ -	$ 0
Operations - Workplace H&S - Indirects	$ -	$ 1	$ 0	$ 1
Operations - Workplace H&S - Overheads	$ -	$ 1	$ 0	$ 1
Operations - Enviro Mgt - Labour	$ 10	$ 10	$ 12	$ 16
Operations - Enviro Mgt - Materials	$ 0	$ 0	$ 3	$ 14
Operations - Enviro Mgt - Contractors	$ 4	$ 3	$ 5	$ 4
Operations - Enviro Mgt - Other	$ 0	$ 1	$ 2	$ 1
Operations - Enviro Mgt - Indirects	$ 25	$ 13	$ 14	$ 14
Operations - Enviro Mgt - Overheads	$ 11	$ 12	$ 14	$ 18
Operations - Water Mgt - Labour	$ 6	$ 14	$ 20	$ 9
Operations - Water Mgt - Materials	$ -	$ -	$ -	$ -
Operations - Water Mgt - Contractors	$ -	$ 0	$ -	$ -
Operations - Water Mgt - Other	$ 1	$ 1	$ 0	$ -
Operations - Water Mgt - Indirects	$ 15	$ 17	$ 23	$ 8
Operations - Water Mgt - Overheads	$ 6	$ 15	$ 22	$ 9
Operations - Scheme Mgt - Labour	$ 17	$ 23	$ 40	$ 21
Operations - Scheme Mgt - Materials	$ -	$ 0	$ -	$ -
Operations - Scheme Mgt - Contractors	$ -	$ 5	$ 7	$ 12
Operations - Scheme Mgt - Other	$ 13	$ 100	$ 141	$ 167
Operations - Scheme Mgt - Indirects	$ 43	$ 29	$ 47	$ 19
Operations - Scheme Mgt - Overheads	$ 19	$ 31	$ 51	$ 31
Operations - Dam Safety - Labour	$ 2	$ 6	$ 12	$ 15
Operations - Dam Safety - Materials	$ 0	$ -	$ -	$ -
Operations - Dam Safety - Contractors	$ -	$ 2	$ -	$ -
Operations - Dam Safety - Other	$ 1	$ 1	$ 4	$ -

Operations - Dam Safety - Indirects	$ 6	$ 8	$ 14	$ 14
Operations - Dam Safety - Overheads	$ 2	$ 7	$ 13	$ 17
Operations - Sched/Deliver - Labour	$ 31	$ 29	$ 25	$ 32
Operations - Sched/Deliver - Materials	$ 0	$ 0	$ 17	$ 22
Operations - Sched/Deliver - Contractors	$ -	$ -	$ -	$ 1
Operations - Sched/Deliver - Other	$ 14	$ 12	$ 8	$ 6
Operations - Sched/Deliver - Indirects	$ 76	$ 36	$ 29	$ 29
Operations - Sched/Deliver - Overheads	$ 37	$ 33	$ 28	$ 35
Operations - Metering - Labour	$ 1	$ 2	$ 5	$ 3
Operations - Metering - Materials	-$ 1	$ -	$ -	$ -
Operations - Metering - Contractors	$ -	$ -	$ -	$ -
Operations - Metering - Other	$ 0	$ -	$ 1	$ -
Operations - Metering - Indirects	$ 3	$ 2	$ 6	$ 2
Operations - Metering - Overheads	$ 3	$ 2	$ 5	$ 3
Operations - Facility Mgt - Labour	$ 7	$ 13	$ 12	$ 13
Operations - Facility Mgt - Materials	$ 1	$ 1	$ 6	$ 2
Operations - Facility Mgt - Contractors	$ 13	$ 26	$ 36	$ 38
Operations - Facility Mgt - Other	$ 14	$ 5	$ 0	$ 1
Operations - Facility Mgt - Indirects	$ 16	$ 16	$ 13	$ 11
Operations - Facility Mgt - Overheads	$ 10	$ 16	$ 15	$ 15
Operations - Other - Labour	$ -	$ -	$ 0	$ -
Operations - Other - Materials	$ -	-$ 1	-$ 0	-$ 0
Operations - Other - Contractors	$ -	$ -	$ -	$ 0
Operations - Other - Other	$ 80	$ 1	-$ 1	$ 0
Operations - Other - Indirects	$ -	$ -	$ -	$ 0
Operations - Other - Overheads	-$ 0	$ 1	$ 0	$ 0

A9.2 Preventative Maintenance

Cost element	2007	2008	2009	2010
Prev. Maintenance - Cond. Monitoring - Labour	$ 14	$ 9	$ 11	$ 11
Prev. Maintenance - Cond. Monitoring - Materials	$ 0	$ 1	$ 0	$ 0
Prev. Maintenance - Cond. Monitoring - Contractors	$ 3	$ 1	$ 2	$ 3
Prev. Maintenance - Cond. Monitoring - Other	$ 1	$ 0	$ 0	$ 2
Prev. Maintenance - Cond. Monitoring - Indirects	$ 35	$ 11	$ 13	$ 10
Prev. Maintenance - Cond. Monitoring - Overheads	$ 16	$ 10	$ 12	$ 12
Prev. Maintenance - Servicing - Labour	$ 19	$ 4	$ 2	$ 2
Prev. Maintenance - Servicing - Materials	$ 5	$ 0	$ 3	$ 1
Prev. Maintenance - Servicing - Contractors	$ 0	$ 3	$ 2	$ 1
Prev. Maintenance - Servicing - Other	$ 5	$ 1	$ 1	$ 0
Prev. Maintenance - Servicing - Indirects	$ 45	$ 5	$ 2	$ 1
Prev. Maintenance - Servicing - Overheads	$ 22	$ 4	$ 2	$ 2
Prev. Maintenance - Weed Control - Labour	$ 13	$ 3	$ 6	$ 5
Prev. Maintenance - Weed Control - Materials	$ 81	$ 3	$ 3	$ 0
Prev. Maintenance - Weed Control - Contractors	-$ 37	-$ 61	$ 4	$ 5
Prev. Maintenance - Weed Control - Other	$ 4	$ 0	$ 1	$ 0
Prev. Maintenance - Weed Control - Indirects	$ 31	$ 4	$ 7	$ 4
Prev. Maintenance - Weed Control - Overheads	$ 16	$ 0	$ 7	$ 5
Prev. Maintenance - Cond. Monitoring - Labour	$ 14	$ 9	$ 11	$ 11

A9.3 Corrective Maintenance

Cost element	2007	2008	2009	2010
Corrective Maintenance - scheduled corr - Labour	$ 8	$ 5	$ 5	$ 6
Corrective Maintenance - scheduled corr - Materials	$ 15	$ 14	$ 13	$ 12
Corrective Maintenance - scheduled corr - Contractors	$ 5	$ 26	$ 19	$ 16
Corrective Maintenance - scheduled corr - Other	$ 0	$ 0	$ 1	$ 1
Corrective Maintenance - scheduled corr - Indirects	$ 19	$ 7	$ 6	$ 5
Corrective Maintenance - scheduled corr - Overheads	$ 10	$ 7	$ 7	$ 7
Corrective Maintenance - emergency maint - Labour	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Materials	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Contractors	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Other	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Indirects	$ -	$ -	$ -	$ -
Corrective Maintenance - emergency maint - Overheads	$ -	$ -	$ -	$ -
Corrective Maintenance - scheduled corr - Labour	$ 8	$ 5	$ 5	$ 6
Corrective Maintenance - scheduled corr - Materials	$ 15	$ 14	$ 13	$ 12
Corrective Maintenance - scheduled corr - Contractors	$ 5	$ 26	$ 19	$ 16
Corrective Maintenance - scheduled corr - Other	$ 0	$ 0	$ 1	$ 1
Corrective Maintenance - scheduled corr - Indirects	$ 19	$ 7	$ 6	$ 5
Corrective Maintenance - scheduled corr - Overheads	$ 10	$ 7	$ 7	$ 7
Corrective Maintenance - emergency maint - Labour	$ -	$ -	$ -	$ -

A10 Bowen Broken Bulk Water Supply

A10.1 Operations

Cost element	2007	2008	2009	2010
Operations - Customer Mgt - Labour	$ 2	$ 2	$ 4	$ 3
Operations - Customer Mgt - Materials	$ 1	$ -	$ -	$ -
Operations - Customer Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Customer Mgt - Other	$ -	$ 0	$ -	$ -
Operations - Customer Mgt - Indirects	$ 4	$ 3	$ 2	$ 2
Operations - Customer Mgt - Overheads	$ 3	$ 3	$ 4	$ 3
Operations - Workplace H&S - Labour	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Materials	$ -	$ -	$ -	$ 0
Operations - Workplace H&S - Contractors	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Other	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Indirects	$ -	$ -	$ -	$ -
Operations - Workplace H&S - Overheads	$ -	$ -	$ -	$ 0
Operations - Enviro Mgt - Labour	$ 6	$ 10	$ 28	$ 13
Operations - Enviro Mgt - Materials	$ 0	$ 0	$ 10	$ -
Operations - Enviro Mgt - Contractors	$ 12	$ 16	$ 12	$ 9
Operations - Enviro Mgt - Other	$ 0	$ 1	$ 5	$ 5
Operations - Enviro Mgt - Indirects	$ 11	$ 12	$ 18	$ 12
Operations - Enviro Mgt - Overheads	$ 7	$ 12	$ 22	$ 15
Operations - Water Mgt - Labour	$ 13	$ 12	$ 1	$ 5
Operations - Water Mgt - Materials	$ 0	$ -	-$ 10	$ -
Operations - Water Mgt - Contractors	$ -	$ -	$ -	$ -
Operations - Water Mgt - Other	$ 0	$ 0	$ 0	$ 0
Operations - Water Mgt - Indirects	$ 24	$ 14	$ 1	$ 5
Operations - Water Mgt - Overheads	$ 14	$ 13	$ 11	$ 6
Operations - Scheme Mgt - Labour	$ 36	$ 26	$ 23	$ 63
Operations - Scheme Mgt - Materials	$ -	$ 0	$ -	$ 0
Operations - Scheme Mgt - Contractors	$ 0	$ -	$ -	$ 6
Operations - Scheme Mgt - Other	$ 50	$ 63	$ 106	$ 82
Operations - Scheme Mgt - Indirects	$ 65	$ 31	$ 15	$ 59
Operations - Scheme Mgt - Overheads	$ 42	$ 32	$ 30	$ 70
Operations - Dam Safety - Labour	$ 3	$ 6	$ 7	$ 11
Operations - Dam Safety - Materials	$ 0	$ -	$ -	$ 1
Operations - Dam Safety - Contractors	$ -	$ -	$ 1	$ 1
Operations - Dam Safety - Other	$ 0	$ 1	$ 0	$ 1

Operations - Dam Safety - Indirects	$ 5	$ 7	$ 4	$ 11
Operations - Dam Safety - Overheads	$ 3	$ 7	$ 7	$ 12
Operations - Sched/Deliver - Labour	$ 14	$ 2	$ 20	$ 43
Operations - Sched/Deliver - Materials	$ 1	$ 1	$ 0	$ 0
Operations - Sched/Deliver - Contractors	$ 30	$ -	$ 2	$ 0
Operations - Sched/Deliver - Other	$ 8	$ 8	$ 6	$ 1
Operations - Sched/Deliver - Indirects	$ 26	$ 2	$ 13	$ 40
Operations - Sched/Deliver - Overheads	$ 16	$ 2	$ 22	$ 46
Operations - Metering - Labour	$ 0	$ 1	$ 3	$ 1
Operations - Metering - Materials	$ -	$ -	$ 0	$ -
Operations - Metering - Contractors	$ -	$ -	$ -	$ -
Operations - Metering - Other	$ -	$ -	$ -	$ -
Operations - Metering - Indirects	$ 0	$ 1	$ 2	$ 1
Operations - Metering - Overheads	$ 0	$ 1	$ 3	$ 1
Operations - Facility Mgt - Labour	$ 24	$ 25	$ 32	$ 30
Operations - Facility Mgt - Materials	$ 5	$ 7	$ 5	$ 5
Operations - Facility Mgt - Contractors	$ 2	$ 8	$ 13	$ 8
Operations - Facility Mgt - Other	$ 14	$ 17	$ 20	$ 3
Operations - Facility Mgt - Indirects	$ 43	$ 30	$ 21	$ 28
Operations - Facility Mgt - Overheads	$ 29	$ 30	$ 37	$ 33
Operations - Other - Labour	$ 0	$ 0	$ 0	$ -
Operations - Other - Materials	$ -	$ -	$ -	$ -
Operations - Other - Contractors	$ 0	$ 0	$ -	-$ 0
Operations - Other - Other	$ 64	-$ 0	-$ 0	$ 0
Operations - Other - Indirects	-$ 0	$ 0	$ 0	$ 0
Operations - Other - Overheads	-$ 0	$ -	$ -	-$ 0

A10.2 Preventative Maintenance

Cost element	2007	2008	2009	2010
Prev. Maintenance - Cond. Monitoring - Labour	$ 14	$ 13	$ 9	$ 15
Prev. Maintenance - Cond. Monitoring - Materials	$ 0	$ 1	$ 0	$ 12
Prev. Maintenance - Cond. Monitoring - Contractors	$ 6	$ 2	$ 9	$ 5
Prev. Maintenance - Cond. Monitoring - Other	$ 1	$ 1	$ 0	$ 0
Prev. Maintenance - Cond. Monitoring - Indirects	$ 26	$ 15	$ 6	$ 14
Prev. Maintenance - Cond. Monitoring - Overheads	$ 15	$ 15	$ 10	$ 17
Prev. Maintenance - Servicing - Labour	$ 7	$ 2	$ 5	$ 3
Prev. Maintenance - Servicing - Materials	$ 3	$ 2	$ 1	$ 1
Prev. Maintenance - Servicing - Contractors	$ 2	$ 2	$ 7	$ 8
Prev. Maintenance - Servicing - Other	$ 0	$ -	$ -	$ 0
Prev. Maintenance - Servicing - Indirects	$ 12	$ 2	$ 3	$ 3
Prev. Maintenance - Servicing - Overheads	$ 8	$ 2	$ 5	$ 4
Prev. Maintenance - Weed Control - Labour	$ 2	$ 4	$ 3	$ 4
Prev. Maintenance - Weed Control - Materials	$ 0	$ 3	$ 0	$ 4
Prev. Maintenance - Weed Control - Contractors	$ 1	$ 7	$ 14	$ 4
Prev. Maintenance - Weed Control - Other	$ -	$ -	$ -	$ -
Prev. Maintenance - Weed Control - Indirects	$ 3	$ 5	$ 2	$ 2
Prev. Maintenance - Weed Control - Overheads	$ 2	$ 5	$ 4	$ 3

A10.3 Corrective Maintenance

Cost element	2007	2008	2009	2010
Corrective Maintenance - scheduled corr - Labour	$ 17	$ 19	$ 33	$ 16
Corrective Maintenance - scheduled corr - Materials	$ 3	$ 25	$ 48	$ 31
Corrective Maintenance - scheduled corr - Contractors	$ 9	$ 89	$ 137	$ 34
Corrective Maintenance - scheduled corr - Other	$ 1	$ 1	$ 4	$ 0
Corrective Maintenance - scheduled corr - Indirects	$ 31	$ 22	$ 21	$ 15
Corrective Maintenance - scheduled corr - Overheads	$ 26	$ 27	$ 45	$ 20
Corrective Maintenance - emergency maint - Labour	$ 7	$ 5	$ -	$ -
Corrective Maintenance - emergency maint - Materials	$ 2	$ 178	$ -	$ -
Corrective Maintenance - emergency maint - Contractors	$ 3	$ 0	$ -	$ -
Corrective Maintenance - emergency maint - Other	$ 1	$ 32	$ -	$ -
Corrective Maintenance - emergency maint - Indirects	$ 13	$ 6	$ -	$ -
Corrective Maintenance - emergency maint - Overheads	$ 9	$ 17	$ -	$ -