Water Corporation of Western Australia

Final Report
2006 Review of Effectiveness of Asset Management System

December 2006

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Infrastructure Management Advisers

Quality Record Sheet

Document	Final Report for 2006 Review of Effectiveness of Asset Management System
Ref	
Date	December 2006
Revision	

Report

Description
Final Report for 2006 Effectiveness Review of the Asset Management System

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Table of Contents

Executive Summary

The 2006 Asset Management System Effectiveness Review project required the evaluation of the effectiveness of the asset management system used by Water Corporation to manage its assets. This evaluation is a requirement under the Operating Licence issued by the Economic Regulation Authority of Western Australia.

Effectiveness has been measured and rated as to the level of maturity against key processes of the asset management system which are:

- Asset planning
- Asset creation/acquisition
- Asset disposal
- Environmental analysis
- Asset operations
- Asset maintenance
- Asset management information system
- Risk management
- Contingency planning
- Financial planning
- Capital expenditure planning
- Review of the AMS

The review examined the processes used by Water Corporation to deliver asset management, the information systems supporting asset management activities and the data and knowledge used to make decisions about asset management. These elements were examined from a life cycle perspective i.e. planning, construction, operation, maintenance, renewal, replacement and disposal using the guidelines developed by the Economic Regulation Authority with public and water business input.

Impact IMC P/L has prepared a report setting out the maturity levels of the asset management system measured against nominated areas of asset management as defined in the Audit Guidelines – Electricity, Gas and water Licences 2006 issued by the Economic Regulation Authority and contained in the brief issued for the project.

Previous reviews made recommendations on improvements and this review has established what actions the Water Corporation has taken to address such recommendations.

The report also identifies areas where improvement is continuing and recommends areas for further improvement based on the current system maturity.

The maturity ratings assigned to Water Corporation asset management key processes are summarised as follows:

Asset Management System	**Maturity Rating**					
Process	**0**	**1**	**2**	**3**	**4**	**5**
Asset Planning					X	
Asset Creation/Acquisition					X	
Asset Disposal				X		
Environmental Analysis						X
Asset Operations					X	
Asset Maintenance					X	
Asset Management Information System					X	
Risk Management						X
Contingency Planning					X	
Financial Planning					X	
Capital Expenditure Planning						X
Review of the AMS					X	

These ratings are based on the following maturity definitions:
5 – Continuously improving
4 – Quantitatively controlled
3 – Well defined
2 – Planned and tracked
1 - Performed informally
0 – Not performed

It is the opinion of Impact IMC that Water Corporation has a mature approach to asset management evidenced by the ratings applicable to each key process and is well advanced in moving all areas to a continuous improvement rating. Controls are in place to ensure consistent application of all aspects of asset management.

As a consequence of the review Impact IMC has identified some issues to be addressed by Water Corporation to move key areas to the continuous improvement status.

Key improvements identified are:

Asset Management Process	Issue	Recommendation
Asset Planning	Not all planners are using the planning process resource properly.	It is recommended refresher training be given to ensure all staff use the planning manual for consistency.
	Operating and maintenance costs in the planning estimates database can be refined	Water Corporation should consider enhancement of the estimating database
	There is no definitive list of documents that contribute to an asset management plan.	The minimum set of documents that should be available for asset management plan definition should be finalised, responsible groups advised of the need to have all such documents in the corporate document management system.
Asset Creation and Acquisition	Not all project managers follow the standard checklists and rely on their expertise to complete all expected elements of projects.	Water Corporation needs to ensure all project managers are trained to use the quality assured processes and checklists exclusively. An audit process could be implemented to review the use of the checklists.
	Asset acquisition guidelines have been revised	Water Corporation should adopt revised asset acquisition guidelines without delay, implement a communication strategy and provide staff with the necessary training.
	The Regional project managers believe documentation for minor projects is excessive.	Water Corporation should review and confirm the necessary set of documentation for minor projects to ensure effective and timely delivery of those projects.
Asset Disposal	Disposal identification and actioning processes are being developed	Water Corporation needs to finalise the disposal identification and actioning processes
	Currently some physical disposals may be deferred due to funding limitations. Risk assessments are used for	Water Corporation needs to review disposals processes to ensure funds are available for physical disposals and liabilities are not created, where risks are identified. Note: There is no evidence of current risk to services

Asset Management Process	Issue	Recommendation
	prioritising funding.	or the public in this situation.
	The renewal strategies for assets are under development	Water Corporation needs to accelerate development of strategies for renewals and establish these.
	The renewal strategy for large main sewers is a reaction to a recent failure and has taken a low risk approach to this asset group	When the renewal strategies are defined Water Corporation needs to review the large sewer main strategy for currency given the other risks in the systems and establish management strategies for assets that are high consequence irrespective of the likelihood of failure.
Environmental Analysis	Corporate scanning processes need to be enhanced to assist process divisions	Water Corporation needs to refine the corporate scanning process to support new process divisions
Asset Operations	Training responsibility is not always aligned with asset management responsibilities.	Water Corporation should investigate consistent training levels across regions to ensure adequate training for asset management purposes.
	Operators may not be referencing operations manuals when undertaking day to day operations.	Water Corporation should consider review of some operations manuals and input from experienced operators to refine the manuals. Also need to consider making the manuals available on the operations network so that operators can reference them directly.
Asset Maintenance	Maintenance plans are being loaded into SAP. Not all are aligned with schemes yet	Water Corporation should complete alignment of all schemes to maintenance plans.
	Not all operations sites are using the corporate PDAs for maintenance management	Water Corporation needs to investigate the non use of PDAs and make necessary changes to processes to reactivate their use. A monitoring process for the use of the PDA's also needs to be implemented.
	The possibility of maintenance problems being kept local without statewide recognition needs to be addressed.	Water Corporation needs to determine how information relating to failures can be accessed and applied at multiple locations when the problem may be business wide.
	Limitations on available funds for maintenance	Water Corporation should investigate in detail the move to activity based maintenance with activity

Asset Management Process	Issue	Recommendation
	could limit actions	prioritization.
Asset Management Information System	An asset and service delivery information strategy is being developed to support the new Division.	The review of the Assets and Service Delivery Information Strategy needs to be finalized, communicated and actioned
Risk Management	A criticality assessment model business case has been developed	Water Corporation to complete development of criticality tool and action risk assessment for remaining critical assets
Contingency Planning	Not all critical assets may yet be identified (Refer risk management above)	Water Corporation needs to accelerate identification of critical assets under ARA process and ensure all critical assets have suitable contingency planning
Capital Expenditure Planning	Renewal strategies definition will give clearer picture of capital investment requirement for renewals	Water Corporation needs to finalise the development of renewal strategies for all asset groups as part of reinforcing the capital expenditure plan. Review the capital investment plan when strategies are adopted.
	Asset acquisition guidelines review needs to be finalised	Water Corporation to obtain Board approval for revised asset acquisition guidelines and implement as required.
Asset System Review	Asset management plan document definition not yet complete	Water Corporation should finalise the asset management plan document requirements for use by the organization for storage of key documents.
	SAMP action plan is the key to continued improvement	Water Corporation continues the enhancement of asset management using the SAMP action plan as the key driver.

A Post Review Implementation Plan has been prepared for Water Corporation to address issues in this report and it demonstrates the effort to satisfy the continuous improvement approach.

Overall it is the opinion of Impact IMC that Water Corporation is continuing to enhance its skills in asset management and moving to a status of continuous improvement across all key processes.

Water Corporation complies with its licence requirements for the asset management system.

The progress since the last review has been appropriate for an organisation the size and complexity of Water Corporation. The recent restructure to create an Asset Management Division with responsibility for overall accountability and management of the assets to focus effort on asset management is the key to continued long term compliance with the licence.

1.0 Review Scope

1.1 Review Objectives

The review has been established as a requirement of the current Operating Licence issued by the Economic Regulation Authority to Water Corporation. Under the licence Water Corporation must develop and maintain an asset management system to manage the significant asset base for ongoing service delivery to its customers.

Every two years a review of the effectiveness of the asset management system used by Water Corporation is required to ensure the Corporation is improving in its management of the assets and is delivering cost effective services. The biggest cost impact for customers is that associated with planning, operating, maintaining, creating, replacing and disposing of assets over their life cycle.

ERA with public and Water Corporation input has prepared a set of guidelines for reviewing the effectiveness of asset management for water, electricity and gas business licences. These have been applied in this review. The intent is to measure the maturity of the asset management system

This review covers the period 1 July 2004 to 30 June 2006.

It was undertaken during October and November 2006.

1.2 Review Methodology

The methodology for the review is based on

- Analysis of documented procedures to establish their use, availability and the level of understanding associated with them
- Analysis of the information systems supporting asset management
- Examination of data used by the Water Corporation as to its effectiveness for asset management purposes as part of the system.
- Review of elements of asset management plans to ensure their appropriateness to defining asset management for the services offered by Water Corporation

- Testing the use, availability and effectiveness of the plans with those responsible for asset management or its application including regional groups
- Understand current actions to improve asset management in line with satisfying the licence requirements.

The actions to undertake the work included interviews with responsible officers of Water Corporation, testing of use and accessibility of asset management plans and other tools, document examination and sampling of outputs such as process documentation and asset management plans.

The Review Plan accepted by ERA details the review processes.

1.3 Use of Audit Processes and Practices

Accepted audit processes and practices have been used to complete the review. These include the sampling techniques associated with process reviews such as interviews to define accountability, observations, document sighting and testing of users.

The review addressed four key elements of successful delivery of asset management to allow the assessment of the effectiveness of the asset management system. These elements are:

- Process – the existence of a suitable process for activities
- Documentation – the existence of a document defining a process
- Availability/accessibility/understanding – the process is understood, available to those required to use it and accessible to them
- Use- confirmation the process is used consistently

A list of accountable positions has been prepared by Water Corporation and is attached as Appendix 3 to this report.

A program of interviews was developed to cover the activities associated with all the key asset management processes and following the interviews time was allowed to observe randomly selected personnel in the usage of processes to establish the knowledge of, the availability/accessibility of, and usage of those processes.

The interview list is contained in Appendix 1 of this report.

Key documents sighted and involved in testing during the review are listed in Appendix 2.

The extent of effort for the review has been proportionally based on the materiality of the four key elements for the successful delivery of asset management and the level of risk for the key processes of an asset management system, with more effort being directed against the key processes with a higher risk ranking. Risk rankings were assigned at the Review Plan stage and are as follows:

- Asset Creation and Acquisition
- Capital Expenditure Planning
- Environmental Analysis
- Risk Management
- Financial Planning
- Asset Maintenance
- Contingency Planning
- Asset Planning
- Asset Operations
- AMIS
- Review of AMS
- Disposal of Assets

The Regions are established to deliver services to customers and as such must manage and apply elements of the asset management system such as local operations, local maintenance and local capital works not under corporate programs. This means they are intimately involved in the asset management system in terms of use and development of operational level processes.

The review included a visit to a selected Region to test the use of the corporate asset management system where processes are developed centrally and applied locally and to interview a representative sample of those responsible for development and application of Regional asset management system processes. Testing of random users such as maintenance personnel was included as per the head office testing described above.

The South West Region was chosen by Impact as part of the on site information gathering.

The review was undertaken by Russell Smith of Impact IMC Pty Ltd. Time spent on the field work amounted to 40 hours with head office and regional staff of Water Corporation.

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2.0 Water Corporation Understanding

2.1 Structure

Since the last Review in 2004 Water Corporation has restructured to focus on asset management.

It has created an Asset Management Division to take responsibility for ownership of all physical assets. This has created a separation of ownership and operation.

All asset management strategies, plans and operational practices are dictated by the Asset Management Division. Regions and specialist operator groups (Water Production and Wastewater Treatment Branches) undertake operations and maintenance according to the defined plans. This leads to consistency in practices across the Corporation.

A representative group of the new Division is present in each Region to provide a clear interface between the asset owner and the operators.

Significant effort has gone into the establishment of this division and creation of the relationships with planning, creation and operations to ensure alignment of accountabilities across the organisation.

A new accountabilities framework has been developed to reflect the new Division and this is the basis of responsibilities aligned with the key processes.

2.2 Other Matters

A Strategic Asset Management Plan has now been prepared and is a key process plan for the organisation alongside a Delivery Services Plan, a Service Customers Plan and Enabling Plans. It supports the Statement of Corporate Intent and the Strategic Development Plans.

Asset management improvements are being driven by the plan.

The hard copy asset management plans originally produced by Water Corporation for all major assets and all schemes have been abandoned in favour of electronic storage of appropriate documentation to provide the content of asset management plans. Thus the organisation has asset planning reports, performance reports, maintenance plans, operational plans, etc. available to assemble into a plan if required.

This process ensures the collection of necessary information but does not require the formalisation of review and update of the AMP document, rather responsible groups are required to keep their elements of the plan current and subject to review.

2.3 Recent Asset Failures

As part of the review of the asset management system it has come to the reviewers attention that recent failures of major assets has not reflected well on Water Corporation.

These failures suggest imperfections in asset management practices currently undertaken by Water Corporation.

Water Corporation has completed studies in each case to identify whether current practices are sound and to ensure there is the opportunity to improve where necessary.

The interviews and discussions with managers and staff involved or familiar with the events allows the reviewer to form an opinion about the management of the assets affected and the performance of Water Corporation.

Three recent events are discussed here.

2.3.1 Judd St Water Main failure (13 May 2005)

Judd St water main failure appears to be the result of third party intervention on the asset some time ago in its life.

The construction some years ago (maybe more than 20 years ago) of a buried drainage pit over and around the water main so that water passes around the main and the damaging of the external

protective wrapping of the main by whoever built the pit has caused the ultimate failure of the main.

Normal inspection and maintenance using internal pipe assessment would not have exposed the problem.

The review of the failure found that the Water Corporation needs to consider among other actions:

- Identification of similar mains with high consequences of failure,
- Review of contingency plans to ensure minimised impact of failures
- Better external inspection processes for buried mains,
- Education of third parties to the importance of water mains and the fragility of such mains,
- the development of techniques that give early warning of failures and
- enhanced warning systems above ground that advise of the proximity of mains.

None of these will eliminate the risk of water main failure by third party impact but they will assist in perhaps minimising the likelihood of future failures and manage failures better should they occur.

Water Corporation has already undertaken some of these recommendations and is assessing the others progressively.

2.3.2 Hordern St Sewer Main Collapse (22 May 2005)

The investigation of the failure of Hordern St sewer indicated the failure was the result of an inappropriate design (or construction technique) some years ago. Such design practice is not now applied. The design led to internal corrosion of the concrete sewer and premature failure.

Review by Water Corporation of ways to minimise such events in future has focussed on identifying assets with similar failure potential and by applying risk assessment it has been decided to reline older sewers of a similar risk rating and extend their life. Thus all concrete mains sewers over 55 years of age in major impact areas are being relined in an ongoing program based on condition to reduce the risk of failure and hence the consequences of failure.

The program is a reaction to the failure at Hordern St. As the renewal strategies under development for all asset types are refined it is recommended the renewal strategy for these main sewer assets be revisited to ensure it is still appropriate with the models developed.

2.3.3 Caversham Rising Main across the Swan River (16 October 2004)

The failure at Caversham which led to unacceptable effluent discharge to Swan River in 2004 has been extensively examined by Water Corporation. The investigations showed that the failure was due to external corrosion when wrapping was dislodged while the pipe was being laid. Corrosion of the main over many years led to a pressure failure of the rising main discharging to the river.

Normal internal inspection techniques as used for water mains would not show the corrosion on the external surface of the pipe.

The analysis of the failure has led to:

- Review and enhancement of contingency plans for rising main crossings of significant water ways,
- Identification of all sites with similar consequences of failure,
- A major capital program to address similar sites in terms of standby pumping arrangements, bypass arrangements, site specific contingency plans, better investigative techniques, emergency onsite storage of effluent, etc.
- Identification and deployment of new inspection techniques

The program is in the second year of a fifteen year program covering over $200million for the necessary alterations and developments.

2.3.4 Conclusion

Generally Water Corporation current management practices appear sound and these failures have been caused by historical practices or events outside the normal control of the authority.

The response of the authority has been appropriate but is still seen as reactive. The development of renewal strategies that take into account risk and knowledge of the performance of the assets will in the future reduce the likelihood of such incidents but it is impossible to eliminate past unknown practices and third party impact.

3.0 Previous Review Findings

The last review in 2004 identified a number of issues to be addressed by Water Corporation under the asset management banner. The following table identifies these and makes comment on the actions taken by Water Corporation since that review. The criteria for effectiveness definition for asset management were different to the 2006 Review and hence the suggested improvements are not necessarily aligned with the current review requirements.

Asset Management Process	Recommendations from Previous Audit	Identified Actions
Asset Planning Creation and Acquisition	The continued improvements in the structure of Water Corp for asset management purposes further strengthen the capabilities and give assurance that the business is committed to meeting service delivery requirements through effective asset management.	The Asset Management Division has been created to define ownership of assets and bring uniformity to actions across the corporation. There has been a clear focus on defining responsibility and improving asset management at all locations.
Environmental Analysis	Long range planning now being recognised through the preparation of the strategic asset management plan. This will input to the future corporate plan.	SAMP completed and used as the basis for continued improvement across the business. A key corporate document supporting corporate planning.
Asset System Analysis	Progress in some areas but others have not changed since 2002. Especially influenced by Process Improvement Project.	The process improvement project has finished and the creation of the Asset Management Division completed.
Risk Analysis and Contingency Planning	Progressed at asset level. Now needs to be applied corporately using same business drivers.	Risk assessments now at asset and scheme level using Statewide Planning process to support planning and capital decisions.
Financial Planning	Strategic asset management plans still required to identify summary expenditure needs of the business long term. Refinement of maintenance plans, estimating models, etc gives more accurate	The SAMP gives support to long term capital investment but needs renewals strategies in place to consolidate long term capital need outside growth.

Asset Management Process	Recommendations from Previous Audit	Identified Actions
	outcomes as to expenditure targets.	
Capital Expenditure Planning	The establishment of the CIPB should enhance the management of capital investment better.	The Capital Investment Branch has been created to consolidate capital expenditure planning and budget management. Significant enhancement of processes.
Review	WSAA study has further identified opportunities for improvement. These are being addressed within the process improvement project across Water Corp	The SAMP has taken up the mantle of the driver for asset management improvement. Action plans available and monitored.

The Water Corporation appears to have adequately addressed the recommended improvements under the 2004 Effectiveness Review model.

The 2006 Review is more aligned with the practice of asset management under the 12 key processes and gives Water Corporation a better chance to align improved practices with the effectiveness model now used.

4.0 Performance Summary

The 2006 Effectiveness Review has found the following ratings to be appropriate for Water Corporation.

Asset Management System	Maturity Rating					
Process	**0**	**1**	**2**	**3**	**4**	**5**
Asset Planning					X	
Asset Creation/Acquisition					X	
Asset Disposal				X		
Environmental Analysis						X
Asset Operations					X	
Asset Maintenance					X	
Asset Management Information System					X	
Risk Management						X
Contingency Planning					X	
Financial Planning					X	
Capital Expenditure Planning						X
Review of the AMS					X	

The stated maturity ratings for each key process are the interpretation of the reviewer of the observations made of each process, the consideration of the effectiveness criteria assigned to each process and the maturity score definition used in the Audit Guidelines - Gas, Electricity and Water Licences issued by ERA.

The following section details the observations.

Also provided to ERA are the working papers that assembled these observations and indicated how the reviewer was able to satisfy through healthy scepticism the validity of the observations.

5.0 Observations and Recommendations

Asset Planning

Interviewees: Paul Van Der Waal, Manager Strategic Asset Management,
Chris Vigus, Acting Manager, Infrastructure Planning Branch
Stuart Gee, Capability Planner, South West Region
Bishu Devkota and Julia Krsnik, Planning Branch Officers

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
Asset planning strategies are focused on meeting customer needs in the most effective and efficient manner (delivering the right service at the right price).	Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning	Infrastructure Planning Branch uses a defined process – the infrastructure planning process, for all planning studies. The Statewide Planning Program (SWPP) allows assessment of risks at the scheme level to ensure planning considers all business issues. Input from Regions is provided in scoping up scheme studies. Planning Branch has targets to be met in terms of number of studies provided against priorities and late requests. Testing of the knowledge of planners of the processes and their use was carried out.	In testing the use of the planning process it became evident not all planners were using the resource properly. It is recommended refresher training be given to ensure all staff use the planning manual for consistency
	Service levels are defined	Licence service levels e.g. quality and availability of supply are converted to technical levels of service associated with water supply, wastewater and drainage management e.g. water meets Australian Drinking Water Guidelines standards and water pressures are set for zones. Documented as “regulated water supply technical levels of service”. The standards set by the Strategic Asset Management Branch to define plans and activities are developed against the licence and technical levels of service to provide clear linkage to actions. Standards were examined for identification of levels of service.	

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
	Non-asset options (e.g. demand management) are considered	In developing the brief for a planning study Planning Branch consult with the Region Capability planners to establish if non-asset solutions should be considered in the study. Where necessary these are evaluated. The Capability planner at South West Region was tested as to the relationship with Planning Branch.	
	Lifecycle costs of owning and operating assets are assessed	The assessment of options includes NPV analysis of the life cycle costs associated with a solution. Operating costs, maintenance costs and capital investment costs are covered. Planning Branch holds an estimating database with such costs.	The operating and maintenance costs can be refined in the database and Water Corporation should consider enhancement of these costs
	Funding options are evaluated	Funding options are evaluated where the need is identified. The regions establish the need based on the type of project and expected funding arrangements. The Pricing and Evaluation Branch undertakes such evaluations at the request of the Planning Branch.	

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
	Costs are justified and cost drivers identified	The estimating database held by Planning Branch is kept current with the latest costs for operations, maintenance and capital investment. Testing is against the Estimating Branch database for consistency. The client, generally the Region, identifies the cost drivers as part of agreeing the brief for the planning study.	
	Likelihood and consequences of asset failure are predicted	Water Corporation uses two risk assessment tools. The Statewide Planning Program (SWPP) assesses risk at scheme level and provides risk ratings for preferred planning options at scheme level. The Asset Risk Assessment tool provides a risk assessment at asset level and is used for detailed analysis of individual assets. Both tools include consequences linked to business drivers and as such provide compatible outcomes against business drivers. The ARA model and the processes associated with its use were examined. The testing of users ensured understanding of the processes and the outcomes	
	Plans are regularly reviewed and updated	Planning studies are reviewed on a prioritized basis based on a risk assessment using the SWPP. Each year studies listings are prepared using the assessment for prioritizing both new studies and reviews. Targets are set for achievement of total work load and reported as a Branch KPI.	The minimum set of documents that should be available for asset management plan definition should be

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
		The Asset Management Plans are now developed by Water Corporation as electronic documents that assemble relevant documentation to cover the necessary components of asset management plans i.e. planning including demand projections, current performance, operations and maintenance plans, capital investment plans, etc. It is the responsibility of each Branch associated with an element of the plans to keep information current. Thus Planning Branch reviews the planning reports associated with schemes and major assets and these are stored with the other documents for retrieval. The documentation associated with asset management plans is being captured to the corporate document management system and flagged as relevant to asset management. The content and documentation that must be linked to an asset management plan is being refined currently. Examination of random samples of document lists assigned to specific asset management plans and observation of these documents indicates the availability of current relevant documents.	finalised responsible groups advised of the need to have all such documents in the corporate document management system.

Documents sighted:

Planning Branch Process Manual

Asset Management Plan document listings on the corporate document management system

Key Process	Maturity Rating

Asset Planning	4 – Quantitatively controlled

Asset Creation/Acquisition

Interviewees: Mike Taylor, Manager Capital Investment Branch,
Neil La Roche, Manager Project Management, Harvey Dennison, Project Management Best Practice Manager
Steve Illich and Allan Waugh, Project Managers, Project Management Branch
Paul Chan, Team Leader SWR Projects and Franco Angeloni, Projects Coordinator, South West Region

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
Asset creation/acquisition means the provision or improvement of an asset where the outlay can be expected to provide benefits beyond the year of outlay.	Full project evaluations are undertaken for new assets, including comparative assessment of non-asset solutions	The implementation business case is a full project evaluation and is required as part of the approval of capital investment. The business case requires justification of the investment, scope of the project, estimate of the project cost and duration, risk assessment for delivery, financial implications including operating costs (life cycle)and funding requirements. Generally non-asset solutions have been considered at the planning phase and so only asset creations are considered in the implementation phase business case. As discussed under Asset Planning all appropriate options including non-asset solutions are evaluated. The project management phase of asset creation is a quality accredited process that is subject to external audit and review. A significant set of processes exist. The processes are held on the Waternet for access by those required to use the processes. Testing covered examination of the processes on the intranet and questioning of users for assurance that they followed the processes. Randomly sampled	Discussion with Project Management Branch staff indicated that some project managers rely on their expertise to complete all expected elements of projects and do not always follow the checklists. Water Corporation needs to ensure all project managers are trained to use the quality assured processes and checklists. An audit process could be implemented to review the use of the checklists.

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
		project checklists were examined for completion of project phases according to the processes. This included Project Management Branch and Regional projects.	
	Evaluations include all life-cycle costs	The costs of all aspects of long term asset management are incorporated into the evaluation process. Operational and maintenance costs are included with capital investment costs in NPV assessments of each logical option. The preferred option is agreed with operators as part of acceptance and the operational costs are signed off by the relevant operations group for future recognition of annual costs.	
	Projects reflect sound engineering and business decisions	Projects represent sound engineering based on adopted standards, policies and procedures associated with development of an asset. The business case development and approval ensures appropriate business decisions. Asset Acquisition Guidelines are developed to final draft stage and have been sighted.	Water Corporation should adopt asset acquisition guidelines without delay to demonstrate soundness of processes.
	Commissioning tests are documented and completed	The project delivery process includes representation of the operating group, the designers and the project managers at	The Regional project managers thought the

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
		formal meetings to ensure the product delivered is as required and appropriate. Commissioning of assets is a key phase of the asset creation and requires input from the operators as well as the project managers. Checklists cover commissioning activities. Testing included sighting completed checklists covering activation, definition (design), implementation (construction) and closeout (commissioning and handover) phases for select projects at Project Management Branch and at the Region.	documentation for minor projects was excessive given the size and value of the individual projects. Water Corporation should review and confirm the necessary set of documentation for minor projects to ensure effective and timely delivery of those projects.
	Ongoing legal/environmental/safety obligations of the asset owner are assigned and understood	The asset creation phase includes definition of obligations at the project phase and also for the operating period post commissioning. Designs and commissioning need to consider the legal, environmental and safety obligations associated with supply and use of assets or equipment. These are identified in the checklists used.	

Documents sighted:

Listing of project management procedures documents held on Waternet for access by all project managers

Copies of checklists completed for sample Project Management Branch projects.

Copies of checklists for completed projects for SW Region

SW Region Managed Projects Status Report October 2006

Period Estimates and expenditures Report October 2006 SW Region

Sample Checklists for Project Implementation, Project Start-up

Design Standard DS91 – Stad for Selection, Design and Monitoring of Cathodic Protection Systems

Key Process	Maturity Rating
Asset Creation	4 – Quantitatively controlled

Asset Disposal

Interviewees: Paul Van Der Waal, Manager Strategic Asset Management,
Steve Wisdom, Manager Tactical Asset Management
Janet Ham, Asset Officer, TAM
Franco Angeloni, Minor Works Program Manager, SW Region
John Creer, Program Manager, Capital Investment Branch

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
Effective asset disposal frameworks incorporate consideration of alternatives for the disposal of surplus, obsolete, under-performing or unserviceable assets. Alternatives are evaluated in cost-benefit terms	Under-utilised and under-performing assets are identified as part of a regular systematic review process	Tactical Asset Management Branch of Asset Management Division is developing programs for disposal of surplus or redundant assets. Processes associated with the disposals identification, prioritisation and actioning are under development. Decommissioning procedures have been prepared and are available on the Waternet. This document was sighted. Regional staff are aware of the procedures but there are limited events requiring its use. Decommissioning is generally associated with project delivery where the old asset is replaced and or upgraded by a new asset at the location e.g. pumping station upgrading. Regions and the Water Production and Wastewater Treatment Branches undertake performance assessment of assets in association with Operational Asset Management branch of Asset Management Division, as part of routine operational activities. Under performing assets are assessed and if necessary replaced following planning and capital investment approval processes.	Water Corporation finalise the disposal identification and actioning processes

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
	The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken	Operational assessments include root cause analysis, KPI analysis, maintenance analysis and operating cost analysis. Corrective actions include modification of maintenance plans, modification of operational plans or capital investment to alter or replace the asset.	
	Disposal alternatives are evaluated	The development of programs for disposal of surplus assets requires identification of options for disposal. Projects where an asset will be replaced or disposed of as part of capital investment include disposal alternatives evaluation. The Corporation prioritises capital and operating expenditures based on risk assessment. There are situations where assets that are no longer required remain in place post decommissioning due to the limitations in funds.	Water Corporation needs to review disposals processes to ensure funds are available for physical disposals and liabilities are not created, where risks are identified.
	There is a replacement strategy for assets	Renewal and replacement strategies are being prepared at this time for all asset classes. These will be aligned with renewal models such as those used in the UK for pipeline renewals. Recent major failures such as the Hordern St sewer have led to investment in renewals based on detailed investigations and	Water Corporation needs to accelerate development of strategies for renewals and establish these. The strategy for

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
		risk assessments for those asset types. This is the basis for renewal strategies for large sewers. It needs to be reassessed when the overall renewal strategies are finalized. The asset management officer developing these strategies was questioned as to her understanding of the processes and the objectives of the strategies. There are procedures documented for rehabilitation and replacement activities and these were sighted. Regional projects were checked for disposal and rehabilitation activities by sighting of the checklists for asset disposal as part of capital projects.	renewal of large main sewers may need to be reassessed at that time to ensure it is still appropriate and establish management strategies for assets that are high consequence irrespective of the likelihood of failure.

Documents sighted:

Replacement and Rehabilitation Processes

Decommissioning Processes

Regional checklists for minor projects including disposal activities

Key Process	Maturity Rating
Asset Disposal	3 – Well defined

Environmental Analysis

Interviewees: Paul Van Der Waal Manager Strategic Asset Management,
John Janssen, Manager Corporate Planning,
Mike Tarca, Manager Regulatory Compliance, Kevin Davies, Regulatory Compliance Officer,
Regional Management Team, South West Region

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
Environmental analysis examines the asset system environment and assesses all external factors affecting the asset system	Opportunities and threats in the system environment are assessed	The Accountability framework defines the process responsibilities in Water Corporation. Management of assets is the responsibility of the General Manager Asset Management. Planning and acquiring assets is the accountability of the General Manager Planning and Infrastructure. Each of these GMs is responsible to identify, assess and manage threats in their environment. The Strategic Asset Management Plan has been developed to recognize and address threats associated with the management of assets. Projects to address threats have been defined and assigned to project managers. An action plan is monitoring progress. The SAMP links with the Strategic Development Plan and the processes associated with the preparation of the SDP include input from the SAMP. Scanning within the SAMP was identified through internal workshops and a blue sky workshop with an external facilitator. The Corporate Planning Branch inputs to the process scanning by advising on stakeholder issues, environmental issues, state and national issues. Still developing revised process for	Water Corporation needs to refine the corporate scanning process to support new process divisions

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
		external scanning to support processes based on new structure. Testing sighted the latest action plan for strategic issues in the SAMP, the SAMP document and the corporate information available to support SAMP development.	
	Performance standards (availability of service, capacity, continuity, emergency response, etc) are measured and achieved	Customer levels of service are set corporately based on customer charter, legislative requirements and regulatory requirements. Process managers input to this and have KPIs set to report against these standards. A robust business process reports performance monthly at Branch, Division and Corporate levels, called Business Performance Reporting. Compliance is tested monthly and non-compliance at any level is subject to explanation and actions to address situation immediately. The business performance reporting process documentation was sighted and finance officers charged with the preparation of reports tested as to knowledge of the processes.	
	Compliance with statutory and regulatory requirements	Water Corporation appears to hold continued compliance with all regulatory, charter and legislative requirements. Internally at Branch and Divisional levels there are non-compliance issues that are addressed as required.	

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
		In testing for corporate compliance the review identified areas where there was internal non-compliance related to asset management and assessment of actions to achieve compliance were evaluated. The South West Region while compliant last month was questioned as to its recognition of non-compliant issues elsewhere. It showed awareness of the non-compliance (e.g. country water allocation licence compliance) and demonstrated its internal actions to ensure that such issue was not likely to occur within that region.	
	Achievement of customer service levels	Water Corporation continues to comply with all performance indicators externally defined by legislation, regulation or the customer charter The Customer Service Division Council (Regional Managers) meets regularly and addresses customer service issues and non-compliance issues. The GM Asset Management has addressed the meeting on a number of occasions re the major failures recently, advising on the cause, effect and impact on the business. Any regional issues arising have been considered and addressed. An example was the sewer overflow to the Swan River at Caversham where each region has reviewed its contingency plans and submitted projects for capital improvement as part of	

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
		the overall program underway to minimize risks associated with critical waterway crossings by sewers or pressure mains. South West Region was checked as to their knowledge and actions to address the issues associated with the Caversham failure.	

Documents sighted:

Strategic Asset Management Plan 2006

Critical Infrastructure Audit 2005

Performance Report for ERA June 2006

Water Corporation Corporate Performance Scorecard September 2006

Various performance scorecards for Divisions and Branches September 2006

Manage Strategic Direction process document

Accountability matrix for business processes

Business Environment- Corporate perspective 2005

Business Scan Prompts Feb 2006

Strategic Development Plan 2006/07 to 2010/11

Our Business Story for Water Corporation

Our Vision for Water Corporation

Key Process	Maturity Rating
Environmental Analysis	5 – Continuously Improving

Asset Operations

Interviewees: Steve Wisdom, Manager Tactical Asset Management,
Steve Little, Asset Manager WWT, Mark Herbert, Business Manager WWT, Margaret Domurad, Manager WWT Operations,
Mal Day, FLER Operator, TAM Branch,
Colin Cisero, Asset Manager Water Production, OAM, Murray Johnson, Business Manager Water Production Branch, Shoerd Sibma Manager Desalination Water Production Branch, Kingsley Quartermain, Manager Water Treatment Operations, Water Production Branch
Operator at Bunbury Water Treatment Plant, South West Region

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
Operations functions relate to the day-to-day running of assets and directly affect service levels and costs.	Operational policies and procedures are documented and linked to service levels required	Strategic Asset Management Branch develop policies with standards for levels of service for operations, Tactical Asset Management Branch develops procedures based on standards and issue to operators. The operators, either the Regions or Water Production or Wastewater Treatment Branches apply the standards and procedures and are checked for compliance by Operational Asset Management Branch. The same procedure applies to maintenance practices. All procedures relating to operations are on the Waternet. Observation of the Waternet documentation has occurred.	
	Risk management is applied to prioritise operations tasks	Operations plans are developed based on the standards and policies issued by SAM Branch and are developed to meet levels of service requirements. Operators are required to perform to these operational plans. Evaluation of performance of assets or variance to operational budget may lead to identifying under performing assets and in this case actions	

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
		include modifying the plan or investing in changes to the assets, usually a capital investment. Only when there is a need to change the operational plan is risk used to prioritise actions.	
	Assets are documented in an Asset Register including asset type, location, material, plans of components, an assessment of assets' physical/structural condition and accounting data	The asset register for Water Corporation is a subset of SAP/PM Financials. It contains a module called Functional Location Equipment Register and includes data necessary to manage assets – operations plans, maintenance plans, locational data, dimensional data and asset descriptions. SAP also holds asset condition, asset risk, asset performance data and cost data but not necessarily in the same module as the asset descriptive data. Access is good though to all asset related data with appropriate linkages. Testing for the asset register involved sighting the register and observing the use of the register by Regional and Asset Management Division operators.	
	Operational costs are measured and monitored	Operational costs are reported as part of monthly Business Performance Reporting. Variance at Branch level is investigated and if specific assets considered to be contributing to variance rather than regional management practices then Operational Asset Management Branch investigates to determine if assets	

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
		operations plan should be altered or capital invested to replace or upgrade the asset. Testing required examination of performance reports and observation of actions to address the lack of performance.	
	Staff receive training commensurate with their responsibilities	Training for operators is based on business drivers such as occupational health and safety and water quality. Competency based training now used for operators where there are certification levels necessary for specific tasks .There is a corporate training management system to record all formal training. As well as formal training there are designated technical experts who can assist operators as required on specific issues. Asset Management Division holds most of these experts with the Operational Asset Management Branch or the Water and Wastewater Treatment Branches (technical experts in treatment processes). Discussions re training with OAM suggested there may be inconsistent training across Regions as each Regional manager is responsible for his regions training program. Observation at South West Region did not show this to be the case but it requires an across regions view not available with this review. Testing involved questioning an operator at South West Region in the use of the operations manual and other tools for site operations. The operator consulted indicated little use of the	Water Corporation should investigate consistent training levels across regions to ensure adequate training for asset management purposes. Water Corporation should consider review of some operations manuals and input from experienced operators to refine the manuals. Also need to consider making the manuals available on the operations network so that operators can reference them directly.

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
		operations manual as he was expert in the particular plant processes. (Bunbury Water Treatment Plant). His knowledge of the plant was good but the lack of use of the operations manual suggests the manual may not be current or needs to be reviewed with input form the operator to ensure its currency.	The use of the network is required for plant monitoring so access to the documents becomes available.

Documents sighted:

Engineering Brief M&ESB Belmont PS Nov 2005

Design standards Selection, Design, Monitoring and Cathodic Protection Systems September 2006

Water Production Business Story

Asset Management Model for Water Production Branch

Key Process	Maturity Rating
Asset Operations	4 – Quantitatively controlled

Asset Maintenance

Interviewees: Paul Van Der Waal, Manager Strategic Asset Management,
Steve Wisdom, Manager Tactical Asset Management,
Scott Moorhead, Maintenance Manager, Tactical Asset Management
Terry Hambleton, Manager Operational Asset Management,
Steve Graham, Manager Mechanical and Electrical Services,
K Bradley and G Rimmer, Service Delivery Branch,
Steve Little, Asset Manager WWT, OAM, Mark Herbert, Business Manager WWTB, Margaret Domurad, Manager Ops WWTB,
Colin Cisero, Asset Manager Water Production, OAM, Murray Johnson Business Manager Water Production, Shoerd Sibma Manager Desalination Water Production, Kingsley Quartermain, Manager Treatment Plant Ops Water Production
Alex Ham, TAM, Scott Moorhead, Maintenance Manager TAM
South West Region Officers – maintenance fitter, maintenance supervisor, P McCleary – Asset Performance officer

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
Maintenance functions relate to the upkeep of assets and directly affect service levels and costs.	Maintenance policies and procedures are documented and linked to service levels required	Strategic Asset Management Branch develop policies with standards for levels of service for maintenance, Tactical Asset Management Branch develops procedures based on standards and issue to operators. The operators, either the Regions or Water Production or Wastewater Treatment Branches apply the standards and procedures and are checked for compliance by Operational Asset Management Branch. All procedures relating to maintenance are on the Waternet. Maintenance plans are being loaded into the SAP module for application across the corporation. Observation of the Waternet documentation has occurred. Testing of the loading of maintenance plans occurred at South West Region where the user was questioned about the	

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
		processes and the status of the loading. All important plans associated with dams, treatment plants and pumping stations have been loaded.	
	Regular inspections are undertaken of asset performance and condition	Regular inspections of asset condition are undertaken according to the processes defined in Asset Condition Assessment (ACA). Performance assessments relate to monthly cost reporting against targets for maintenance at grouped asset level and specific reports associated with planned maintenance covering inspection of select assets. At treatment plants and major pumping facilities maintenance analysis is undertaken to optimize maintenance activities.	
	Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule	Maintenance plans have been developed for all asset types and are loaded into SAP to ensure consistency in maintenance practices across the organization. Maintenance performance is assessed by OAM against the plans and non-compliance addressed with the relevant maintenance group. The alignment of all schemes to the plans is not yet complete. Testing of field staff at South West Region in application and completion of maintenance tasks was undertaken. In assessing the actions of a fitter at the Bunbury Wastewater plant it was established that he no longer used the PDAs issued by Water	Water Corporation to complete alignment of all schemes to maintenance plans. Water Corporation needs to investigate the non use of PDAs and make necessary changes to

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
		Corporation for maintenance issue and tracking. He felt the device was inappropriate for his activities as he has open work orders for a number of weeks and his training on the use may have been less than adequate. It was established that the Region is not using the PDAs for mechanical and electrical asset maintenance. While the fitter was able to demonstrate sound practices applying a paper based work order system the failure to use the PDAs compromises the objectives of the program to issue and capture single work order information more efficiently and quicker.	processes to reactivate their use. Additional information attached to the PDA work order would assist field staff in locating asset correctly and providing valuable instructions in maintenance practices. A monitoring process for the use of the PDA's also needs to be implemented.
	Failures are analysed and operational/maintenance plans adjusted where necessary	For Water Production and Wastewater Treatment Branches Root cause analysis is used to identify top 10 cost areas each month for wastewater treatment and water production assets. Decision then is for OAM to change maintenance plan, change operations plan or invest capital. At regions maintenance is analysed and where cause can not be addressed under current budget then asset management group in the Region is responsible to revise plans or develop case for capital investment. In observing this aspect of maintenance it came to the reviewer's attention that problems within a Region might not be recognized outside that region even though they may be more	Water Corporation needs to determine how information relating to failures can be accessed and applied at multiple locations when the problem is business wide.

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
		widespread. The example discussed was the failure of certain types for chlorinators that were observed in one Region but only when reported at the highest level of the organization was it realized the failures were also occurring in other regions.	
	Risk management is applied to prioritise maintenance tasks	Maintenance plans are developed with consideration of risk by prioritization of tasks - some actions are critical and must be done, others should be done and others can be done if funds available. The risk model used is consistent with the corporate risk model.	
	Maintenance costs are measured and monitored	Maintenance costs are analysed and monitored at three levels. Regions report and analyse maintenance costs at regional level, maintenance groups within the regions analyse costs at maintenance plan level and also at select asset level. It is up to OAM to decide what should be done at the maintenance plan and individual asset level i.e. change the plan or invest capital. At the Regional level it is the responsibility of the Region to address overall budget variance. Observation was that the maintenance budget is not meeting the overall maintenance requirement at Regions and so there is consideration of activity based maintenance to refine maintenance plans.	Water Corporation should investigate in detail the move to activity based maintenance with activity prioritization.

Documents sighted:

ADWG Chlorinator Failures Analysis Report April 2005

Wastewater Reticulation Maintenance Standards including levels of service objectives

Water Reticulation Maintenance Standards including levels of service objectives

Wastewater Pumping Station Maintenance Standards

Maintenance Task List for Minor servicing at a Pump Station

Wanneroo GWTP CL#2 Outlet Turbidity Meter Safe Work Instructions

Monthly performance report Water Production Branch and Treatment operations sub-branch Sept 2006

Serpentine 1065mm Trunk Main Burst Contingency Plan May 06

AM Model for Water Production Branch - relationship with AM Division

Business Story Water Production

Engineering Brief for Non-Return Valves Modification Trials

Plan and Analyse Asset Maintenance Procedures

Asset Condition Assessment procedures

Asset Risk Assessment Procedures

Capability Management Procedures

PSN Water (Contractor) Maintenance Reports Samples

Root Cause Analysis Sample Action Plan

Critical Infrastructure Audit July 2005

Key Process	Maturity Rating
Asset Maintenance	4 – Quantitatively controlled

Asset Management Information System

Interviewees: Mark Gregor Team Leader System Management, Dave Currell, Manager Information Systems, Bernie Sloan, Security Specialist
Tino Gallati, IT Specialist, TAM,
Ken Smith, TAM,
Spencer Stewart, TAM,
Mal Day, TAM,
Sue Parsons, SAP Operator, South West Region

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
An asset management information system is a combination of processes, data and software that support the asset management functions.	Adequate system documentation for users and IT operators	Documentation is available for all software used by Water Corporation. This covers technical aspects and user aspects. Quick reference documentation on Waternet for users provides uniform access. A help desk is available for both user enquiry and technical enquiry. Some regions have a local designated expert for initial enquiries within a Region. Observation of numerous user guides and quick reference documents was undertaken. Testing of users for satisfaction with the information available to assist with use of asset management related products such as ARA, ACA, SWPP, SAP modules, etc has shown a good relationship between advice and usability. Asset Management Division is refining its strategy for information systems associated with asset management activities. This is consistent with corporate information systems strategies. A number of projects are underway to address needs	The review of the Assets and Service Delivery Information Strategy needs to be finalized communicated and actioned

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
		and these are being monitored for progress as per any other capital project.	
	Input controls include appropriate verification and validation of data entered into the system	Systems are designed to ensure minimum data entry errors. Drop down menus limit selections, computational tests for number ranges and training in data entry techniques. Business processes include data validation. Testing with Regional SAP user indicated no problems with data entry or data manipulation.	
	Logical security access controls appear adequate, such as passwords Physical security access controls appear adequate	Security for systems is based on AS 17799 and includes passwords, HR listing of users referenced against the approved users (and removal of users not on the HR listing). Access levels for different users also applied where necessary i.e. administrators, data input, data users. Office security is also a key part of the system security – only staff and authorized visitors any where near systems.	
	Data backup procedures appear adequate	Data backup is based on data needs i.e. daily, weekly, and monthly. External audits of processes ensure integrity. No more than 1 day's data would be lost in any event. Separate networks	

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
		are provided for the asset management core data say in SAP and the operational performance data in the Statewide Operations Centre system.	
	Key computations related to licensee performance reporting are materially accurate	Performance reporting requires numerous internal variance reports and actioning as the data is assembled. The end data which goes to make up the external reporting data is therefore based on sound and checked data.	
	Management reports appear adequate for the licensee to monitor licence obligations	The internal reporting process (Business Performance Reporting) is well structured and requires close off of data at nominated times to build the next level. It is paramount for internal reporting and meeting of KPIs that the data is accurate and timely.	

Documents sighted:

Schematic of applications and linkages

Standard for information systems security – access controls

Standard for information systems security – roles and responsibilities

Samples of the quick reference sheets for various applications

IT Program 6 year Status report

Overview diagram of Water Corporation IT Systems

Assets and Service Delivery Information Systems Enhancement Program Oct 2006
Information Systems Strategy for Asset Management Project List Oct 2006
Business Performance Reports at Branch, Division and Corporate Level
Performance Report to ERA June 2006

Key Process	Maturity Rating
Asset Management Information System	4 – Quantitatively Controlled

Risk Management

Interviewees: S Wisdom, Manager Tactical Asset Management

P McCleary, Asset Performance Officer, South West Region

Darren Arland, Corporate Risk Consultant

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
Risk management involves the identification of risks and their management within an acceptable level of risk	Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system	The Corporation has a risk management policy and framework used for risk assessment. This is in conformity with Australian Standard 4360. Two key risk assessment models are used for asset management related activities. The Asset Risk Assessment tool (ARA) is used to evaluate current risk associated with individual assets or major components of assets. The second is the Statewide Planning Program (SWPP) that assesses risk associated with schemes and zones. It does not assess risk associated with individual assets rather it assesses risk looking at a service area and assumes all assets within the scheme are contributing to the risk. Both tools comply with the corporate risk framework and apply the same consequences albeit at different level of impact. Planning studies, implementation business cases, scheme assessments and maintenance plan prioritization are assessed for risk using SWPP. ARA as stated is used for individual asset assessments and allows development of controls or capital investments to address the risk levels for the assets.	

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
		Testing was carried out on users of the ARA to identify if they understood the model (and hence the outputs delivered) and the processes associated with obtaining a risk rating. The ARA process documentation on the Waternet was observed.	
	Risks are documented in a risk register and treatment plans are actioned and monitored	Corporate risks are captured to a corporate risk register. This is separate from that used to capture risks associated with assets. The principles are the same however in terms of identifying risk. Risks assessed using ARA are stored in a module of SAP against the relevant asset as a piece of significant data. Where a significant risk is identified, actions in terms of capital investment planning and creation are carried out and the revised risk rating captured to SAP. The recent failures such as Hordern St have led to risk assessment of all assets of a similar type to the sewer in question. This has led to prioritization of a renewal program for main sewers over 55years old based on the generic risk assessment.	
	The probability and	While risk assessments using ARA have been completed for a	Water Corporation to

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
	consequences of asset failure are regularly assessed	significant number of assets and there is a process to review the higher risks, there are at least 50,000 that could still be assessed. As a result Water Corporation is obtaining funding to develop a criticality assessment tool that will identify the more critical assets using the same consequence criteria, i.e. business drivers, and filter out those assets deemed to not require early assessment.	complete development of criticality tool and action risk assessment for remaining critical assets.

Documents sighted:

ARA Assessment guidelines

Corporate Risk Management Policy

Key Process	Maturity Rating
Risk Management	5 – Continuously Improving

Contingency Planning

Interviewees: Regional Management Team, South West Region
Paul Van Der Waal, Manager Strategic Asset Management,
Various others as part of other interviews

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
Contingency plans document the steps to deal with the unexpected failure of an asset.	Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks	Individual contingency plans being developed for major assets. Generic contingency plans for some asset types e.g. minor pumping stations. Customer Service Division Council (Regional Managers) consider outcomes of major failures investigations and implement reviews of contingency plans as required in their regions. Incident management is considered a rigorous corporate activity. Each Region has a responsible officer for contingency plan preparation and management and he is responsible for testing and adjustment. Dams managed under ANCOLD national guidelines and these require contingency plans for all structures that meet ANCOLD criteria, documented and tested. Testing includes understanding of the plan. There are no statewide guidelines for dam safety management so Water Corporation must be considered proactive. The recent failures have been investigated and a number of actions identified to address the immediate issue and subsequent issues. In all case it appears contingency plans	Water Corporation needs to accelerate identification of critical assets under ARA process and ensure all critical assets have suitable contingency planning

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
		have been reviewed and strengthened. As part of the plans strengthening standby equipment has been purchased including pump sets and generators. Contingency elements have been included in the capital programs that have emanated from at least two recent major failures, Hordern St sewer collapse and Caversham rising main failure. An internal audit of management of critical infrastructure following recent failures has assessed the contingency arrangements and recommended further generic contingency plans be developed and tested for key asset classes and risks, and specific contingency plans be developed for assets deemed critical in future assessments	

Documents sighted:

Critical Infrastructure Audit following Judd St failure

Review of Management of Critical Operational Infrastructure

Serpentine 1065mm Trunk Main – Burst Main Contingency Plan

Key Process	Maturity Rating
Contingency Planning	4 – Quantitatively Controlled

Financial Planning

Interviewees: Mike Giorgi, Manager Financial Management
Roger Mc Cutcheon, Finance Officer, South West Region
Andrew Dunne, Finance Branch Officer

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
The financial planning component of the asset management plan brings together the financial elements of the service delivery to ensure its financial viability over the long term	The financial plan states the financial objectives and strategies and actions to achieve the objectives	Water Corporation does not have financial plan as strictly defined by the effectiveness criteria. The assessment for the effectiveness criteria has therefore been on the basis of assuming Water Corporation could put such an electronic document together should it ever need to. The Strategic Development Plan includes the financial objectives of Water Corporation, the strategies to address these and the actions required. Sources of funding are defined. The Strategic Development Plan requires the development of significant financial statements to be included in the plan and therefore the reviewer can confirm that Water Corporation has the necessary material to produce a financial plan but does not produce a specific document titled financial plan. The SDP draft for 2006/07 to 2010/11 was sighted and contains the financial items indicated as part of effective asset management support criteria. The process for assembling the SDP is documented.	

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
	The financial plan identifies the source of funds for capital expenditure and recurrent costs	Development of financial requirements is a bottom up approach where budget setting takes account of Regional commitment to operating and maintenance costs and adds the capital investment requirements across the corporation to establish the total corporate need. This is balanced off against expected funding. While operating groups are responsible for data quality, Finance Branch do integrity checks against SAP data to ensure reporting accurate and reliable. A Business Performance Reporting manual is available and defines processes for assembly of financial and other KPI information. Finance branch officers and Regional finance officers were tested as to knowledge of financial reporting process and their role.	
	The financial plan provides projections of operating statements (profit and loss) and statement of financial position (balance sheets)	The SDP holds summary information on profit and loss and the statement of financial position. This was observed in the draft copy of the SDP currently being developed in Water Corporation.	

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
	The financial plan provide firm predictions on income for the next five years and reasonable indicative predictions beyond this period	Predicted income and expenditure is for a period of five years at least. The SDP covers a five year period.	
	The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services	When establishing the expenditure requirements of the corporation all expected costs are assigned. This includes administrative or support costs. This was checked with the financial officer at South West Region.	
	Significant variances in actual/budget income and expenses are identified and corrective action taken where necessary	Financial and key performance indicator reporting is on a monthly basis and includes Branch, Division and Corporate reporting. All variances are reported and actions identified. Evidence was available of Branch, Divisional and Corporate reporting. South West Region was tested as to its understanding of the actions required out of variance and while they displayed no variance at Divisional reporting they were aware of the actions required to address recent variance and indicated taking action internally to ensure they would not vary from targets for select actions.	

Documents sighted:

Various Business Performance Reports for September 2006 at Branch, Division and Corporate level

Business Performance reporting process flowchart and timetable

Performance Report to ERA June 2006

Key Process	Maturity Rating
Financial Planning	4 – Quantitatively Controlled

Capital Expenditure Planning

Interviewees: Mike Taylor, Manager Capital Investment Branch
Franco Angeloni, Projects Coordinator, South West Region
John Creer, Program Manager, Capital Investment Branch

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
The capital expenditure plan provides a schedule of new works, rehabilitation and replacement works, together with estimated annual expenditure on each over the next five or more years. Since capital investments tend to be large and lumpy, projections would normally be expected to cover at least 10 years, preferably longer. Projections over the next five years would usually be	There is a capital expenditure plan that covers issues to be addressed, actions proposed, responsibilities and dates The plan provide reasons for capital expenditure and timing of expenditure	A detailed capital expenditure plan is available and includes issues recognition, actions proposed, responsibilities assigned and timing of works. Justification for expenditure is based on implementation business cases submitted by program and project managers for corporate approval. All items on the expenditure plan must be approved. NPV analysis of the preferred option includes all life cycle costs and operators must sign off on the business case to indicate acceptance of future operating and maintenance cost commitment. Risk assessment in the implementation business case defines the level of current risk, the risk reduction achieved for the investment and allows prioritization of projects/programs based on the perceived risk. A program manager responsible for the capital investment process for defined programs was tested as to his knowledge of the processes associated with capital approval and program	

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
based on firm estimates.		management.	
	The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan	Renewal programs are part of the capital expenditure program and are based on asset life expectancy and condition where appropriate. Other factors may drive renewal or replacement and so not all expenditure timings are aligned with the condition or remaining life of the assets. For example performance testing by Water Corporation may indicate capacity issues that through planning investigation may lead to renewal and upgrading based on increasing capacity and condition or remaining life may not drive the timing of the investment. Strategic Asset Management Branch is developing key strategies for renewal or replacement of assets by type. This will reinforce the quality of the renewal investment in the capital expenditure plan. Water Corporation believes the current renewal program, while focused on addressing risks associated with recent major failures, is consistent in quantity with recent expenditure patterns for renewal of assets. The expenditure has only been reallocated to different assets.	Water Corporation needs to finalise the development of renewal strategies for all asset groups as part of reinforcing the capital expenditure plan. The capital investment plan should be reviewed when strategies are adopted.
	There is an adequate process to	The Capital Expenditure Plan is reported quarterly and annually to the board and requires variance reporting and an action plan	Water Corporation to obtain Board approval for

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
	ensure that the capital expenditure plan is regularly updated and actioned	to address variance. A revised asset acquisition manual is being produced to refine and document clearly all processes associated with capital expenditure approval and management and project delivery. The revised process manual was sighted and only requires Board approval.	revised asset acquisition guidelines and implement as required.

Documents sighted:

Asset Acquisition Guidelines

Capital investment Program 2007/08 to 2016/17

Example of Monthly Business Performance Report

Capital Investment Program 2005/06 Annual Report

Schedule for Capital Investment Program development

Extract from Financial delegations Policy PCY112

List of approved implementation business cases Nov2005 to Oct2006

List of accepted planning business cases Nov2005 to Oct2006

Key Process	Maturity Rating
Capital Expenditure Planning	5 – Continuously Improving

Asset Management System Review

Interviewees: Paul Van Der Waal, Manager Strategic Asset Management

Kerry Cable, SAM Officer

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
The asset management system is regularly reviewed and updated.	A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current	The Strategic Asset Management Plan development process includes a review requirement for the asset management system. The SAMP has an action plan that includes asset management system improvements. This is subject to regular reporting as to progress of projects assigned. Asset management plans are no longer prepared by Water Corporation as hard copy documents. Instead the authority assembles asset related information such as planning reports, performance reports, etc. into the corporate document management system with flags to identify it as necessary for asset management purposes. When an asset management plan is needed as a statement related to a facility or scheme all the necessary information in reports can be aggregated to an asset management plan. Testing of this situation involved sighting print outs of the list of documents available for different schemes and then sighting the specific documents on the corporate document management system The officer responsible for overall assembly of such information was tested as to understanding processes for getting information into the document management system and	Water Corporation finalise the asset management plan document requirements for use by all the organization for storage of key documents.

Process Definition	Effectiveness Criteria	Observations and Testing	Issues and Recommendations
		ensuring the correct information was captured to the system.	
	Independent reviews (e.g. internal audit) are performed of the asset management system	An internal audit of the asset management system this year has recognized further improvement opportunities and set improvement tasks. These have been linked with the SAMP action plan and are being addressed under the action plan. Recent reviews by external parties, the 2004 Effectiveness Review, the WSAA benchmarking of asset management in 2004 and the WSAA benchmarking of civil and mechanical and electrical maintenance in 2005 and 2006 respectively have all defined opportunities for further improvement. These have been aligned with the SAMP actions plan.	Water Corporation continues the enhancement of asset management using the SAMP action plan as the key driver.

Documents sighted:

Strategic Asset Management Plan 2006

SAMP Consolidated action Plan October 2006

WSAA Asset Management Benchmarking Report

MR&A Internal Audit Report – Review of Management of Critical Operational Infrastructure June 2006

MR&A Audit Action Plan Monitoring Oct 2006

Geraldton Allanooka Water Supply Scheme AMP Documents

Bunbury Wastewater Scheme AMP Documents

Bibra Lake Sub-Scheme AMP Documents

Perth North- Hammersley Water Supply Review 04/05 Documents

Manage the Strategic Asset Management Plan Procedures

Asset Visioning Workshop for SAMP development

Key Process	Maturity Rating
Asset Management System Review	4 – Quantitatively Controlled

The issues and recommendations identified in the tables are the subject of further action by Water Corporation that will be identified and planned in the Post Review Implementation Plan.

6.0 Review Statement

Impact IMC Pty Ltd believes it has provided an accurate presentation of its findings and opinions in the 2006 Review of the Effectiveness of the Asset Management System as applied by Water Corporation.

Below appears the signature of the reviewer.

Russell Smith
Director
Impact IMC Pty Ltd
3 Alexander St.,
Brighton East,
Victoria, 3187, Australia

Dated: 12 December 2006

Appendix 1
Interview List

List of Interviewees

	Interviewees	Branch	Division	Position
	John Tonkin Water Centre			
1	Paul Van Der Waal	Strategic Asset Management	Asset Management	Branch Manager
2	Kerrie Cable	Strategic Asset Management	Asset Management	Senior Asset Planner
3	Janet Ham	Strategic Asset Management	Asset Management	Supervising Asset Management Engineer
4	Steve Wisdom	Tactical Asset Management	Asset Management	Branch Manager
5	Scott Moorhead	Tactical Asset Management	Asset Management	Maintenance Manager
6	Alex Ham	Tactical Asset Management	Asset Management	Information & Assessment Manager
7	Terry Hambleton (Regions)	Operational Asset Management	Asset Management	Branch Manager
8	Steve Graham	Mechanical & Electrical Services	Asset Management	Branch Manager
9	Ted Sweeney	Mechanical & Electrical Services	Asset Management	Maintenance Manager
10	John Janssen	Corporate Planning	Finance	Branch Manager
11	Mike Taylor	Capital Investment	Planning & Infrastructure	Branch Manager
12	John Creer	Capital Investment	Planning & Infrastructure	Program Manager
13	Michael Giorgi	Financial Management	Finance	Branch Manager
14	Andrew Dunne	Financial Management	Finance	Business Analysis Manager
15	Neil La Roche	Project Management	Planning & Infrastructure	Branch Manager
16	Harvey Dennison	Project Management	Planning & Infrastructure	Manager, Best Practice
17	Steve Ilich	Project Management	Planning & Infrastructure	Project Manager
18	Allan Waugh	Project Management	Planning & Infrastructure	Project Manager
19	Chris Vigus	Infrastructure Planning	Planning & Infrastructure	Principal Engineer, Operational Modelling
20	Bishnu Devkota	Infrastructure Planning	Planning & Infrastructure	Engineer
21	Julia Krsnik	Infrastructure Planning	Planning & Infrastructure	Senior Environmental Officer
22	Kevin Bradley	Service Delivery	Customer Service	Branch Manager
23	Gregory Rimmer	Service Delivery	Customer Service	Application Analyst
24	Mark Herbert	Waste Water Treatment	Water Technologies	Branch Manager

	Interviewees	Branch	Division	Position
25	Steve Little	Waste Water Treatment (Operational Asset Management)	Asset Management	Asset Manager, Waste Water
26	Margaret Domurad	Waste Water Treatment	Water Technologies	Supervising Engineer
27	Murray Johnson	Water Production	Water Technologies	Branch Manager
28	Colin Cicero	Water Production (Operational Asset Management)	Asset Management	Asset Manager, Water
29	Shoerd Sibma	Water Production	Water Technologies	Desalination Manager
30	Kingsley Quartermaine	Water Production	Water Technologies	Treatment Operations Manager
31	David Currell	Information Services	Business Services	Branch Manager
32	Bernard Sloan	Information Services	Business Services	Information System Coordinator
33	Mark Gregor	Information Services	Business Services	Team Leader, System Management
34	Kenneth Walker	Tactical Asset Management	Asset Management	Asset Capability Manager
35	Mike Tarca	Regulation & Compliance	Finance	Branch Manager
36	Kevin Davies	Regulation & Compliance	Finance	Acting Operating Licence Compliance Coordinator
37	Spencer Stewart	Tactical Asset Management	Asset Management	Senior Asset Management Planner
38	Malcolm Day	Tactical Asset Management	Asset Management	Senior Asset Registrar
39	Ken Smith	Strategic Asset Management	Asset Management	Supervising Asset Management Engineer
	Region			
40	Robin Belford	Operational Asset Management	Asset Management	Manager Assets
41	Franco Angeloni	Business Services	Customer Service	Projects Coordinator
42	Paul Chan	Business Services	Customer Service	Team Leader, Projects
43	Stuart Gee	Operational Asset Management	Asset Management	Assets Team Leader, Capability Planning
44	Peter McCleary	Operational Asset Management	Asset Management	Assets Team Leader, Maintenance Planning
45	Murray O'Byrne	Operational Asset Management	Asset Management	Maintenance Planner
46	Cornelius Delport	Wastewater Treatment	Customer Service	District Fitter
47	Brett Cahill	Water Treatment	Customer Service	Water Treatment Plant Operator
48	Roger McCutcheon	Finance	Finance	Business Analyst
49	Sue Parsons	Operational Asset Management	Asset Management	SAP Expert SW Region
	John Tonkin Water Centre			
50	Darren Arland (on phone)	Risk Management	Finance	Branch Manager

Appendix 2
Documentation Sighted

Document Number	List of Documents

Hard Copy

AMSER 2006 - A	Water Corporation Organisational Structure
AMSER 2006 - 1	Strategic Asset Management Plan
AMSER 2006 - 2	Critical Infrastructure Audit July 2005
AMSER 2006 - 3	Wastewater Pumping Stations Maintenance Standards
AMSER 2006 - 4	Sample Maintenance Task List
AMSER 2006 - 5	Root Cause Analysis Action Plan
AMSER 2006 - 6	Maintenance Summary Period Report Contractor Sample
AMSER 2006 - 7	Maintenance Summary Period Report Asset Sample
AMSER 2006 - 8	Ditto
AMSER 2006 - 9	Ditto
AMSER 2006 - 10	Wanneroo GWTP CL #2 Outlet Turb Meter - Safe Work Instruction
AMSER 2006 - 11	Manage Strategic Direction
AMSER 2006 - 12	SAMP Alignment diagram
AMSER 2006 - 13	WC Vision Statement
AMSER 2006 - 14	WC Business Story
AMSER 2006 - 15	Strategic Development Plan Draft 2006/07 to 2010/11
AMSER 2006 - 16	Business Scan Prompts
AMSER 2006 - 17	Business Environment Corporate Perspective Report
AMSER 2006 - 18	ADWG Chlorination Modules - Fault & Maintenance Analysis Report - April 2005
AMSER 2006 - 19	SAMP development Process
AMSER 2006 - 20	Manage the Strategic Asset Management Plan process
AMSER 2006 - 21	Asset Visioning Workshop August 2005
AMSER 2006 - 22	Management Review and Audit Internal Audit of Management of Critical Operational Infrastructure June 2006
AMSER 2006 - 23	Business Performance Reporting Manual (electronic)
AMSER 2006 - 24	Business Process Timetable for Business Performance Reporting
AMSER 2006 - 25	Performance Report Board Oct 2006
AMSER 2006 - 26	Waternet Printout of Project Management Intro Page
AMSER 2006 - 27	Waternet Project Management Procedures Listing
AMSER 2006 - 28	Project Startup Checklist
AMSER 2006 - 29	Project Implementation Checklist
AMSER 2006 - 30	Replacement and Rehabilitation Processes documentation
AMSER 2006 - 31	Decommission Assets processes documentation
AMSER 2006 - 32	Plan and Analyse Maintenance processes documentation
AMSER 2006 - 33	ACA process documentation
AMSER 2006 - 34	ACA Condition profiles
AMSER 2006 - 35	Condition Monitoring Guidelines Water Pipes
AMSER 2006 - 36	Statewide Planning Program Processes
AMSER 2006 - 37	Capability Management Processes documentation
AMSER 2006 - 38	Asset Risk Assessment Procedures
AMSER 2006 - 39	Wastewater Reticulation <300mm Maintenance Standards

Document Number	List of Documents
	Hard Copy
AMSER 2006 - 40	Maintenance Standards Water Reticulation Pipes
AMSER 2006 - 41	Engineering Brief Belmont PS Set-up Modification Trials November 2005
AMSER 2006 - 42	Design Standard DS 91 - Std for Selection, Design & Monitoring of Cathodic Protection (CP) Systems
AMSER 2006 - 43	Detailed Financial Resource Report Water Production Ops Sept 2006
AMSER 2006 - 44	Water Production - Business Story
AMSER 2006 - 45	Asset Management Model for Water Production Branch
AMSER 2006 - 46	Serpentine 1065mm Trunk Main - Burst Main Contingency Plan, Manning Rd, Wilson to Bold Park Reservoir
AMSER 2006 - 47	Performance Report ERA June 2006
AMSER 2006 - 48	Asset Acquisition Guidelines, Capital Investment Program 10 yr, Capital Investment Program 2005/06 report, Program Schedule for production, Financial Delegations, Approved Implementation Business Cases 2005/06, Approved Planning Business Cases 2005/06
AMSER 2006 - 49	South West Region Managed Projects 2006/07
AMSER 2006 - 50	Period Estimates and Expenditure Report Sample
AMSER 2006 - 51	Performance Scorecard Manager Tactical Asset Management Sept 2006
AMSER 2006 - 52	Performance Scorecard Manager Operational Asset Management Sept 2006
AMSER 2006 - 53	Performance Scorecard Water Corporation Sept 2006
AMSER 2006 - 54	Capital Project Closeout Checklist Sample
AMSER 2006 - 55	Ditto
AMSER 2006 - 56	Performance Scorecard South West Region Oct 2006
AMSER 2006 - 57	Performance Scorecard GM Customer Service Division Oct 2006
AMSER 2006 - 58	Information Strategy AM Initiatives Listing
AMSER 2006 - 59	IT Program 6yr by System Group
AMSER 2006 - 60	Overview of Water corporation IT systems
AMSER 2006 - 61	Business Information Map
AMSER 2006 - 62	Assets and service delivery Information System Strategy plan
AMSER 2006 - 63	AMPS - Group 1 - Documents for Wastewater - Bunbury Scheme
AMSER 2006 - 64	AMPS Group 2 - Documents for Geraldton/Allanooka Water Scheme
AMSER 2006 - 65	AMPS - Group 3 - Documents for Wastewater - Perth South - Bibra Lake Sub-Scheme
AMSER 2006 - 66	AMPS - Group 4 - Documents for Water - Perth North - Hamersley Water Supply Review 04/05
AMSER 2006 - 67	SAMP Action Plan Oct 2006
AMSER 2006 - 68	Internal Audit Action Plan monitoring Oct 2006
	Electronic Copy
AMSER 2006 - 69	2004 Asset Management Systems Effectiveness Review
AMSER 2006 - 70	PCY135 - Corporate Risk Management Policy

Appendix 3
Accountability Listing

Key Process	Accountable Managers
Asset Planning	Manager Infrastructure Planning, Manager Strategic Asset Management
Asset Acquisition	Manager Capital Investment, Manager Project Management
Asset Disposal	Manager Tactical Asset Management
Environmental Analysis	Manager Corporate Planning, Manager Strategic Asset Management
Asset Operations	Manager Tactical Asset Management, Manager Operational Asset Management, Manager Mechanical and Electrical Services
Asset Maintenance	Manager Tactical Asset Management, Manager Operational Asset Management, Manager Service Delivery
Risk Management	Manager Strategic Asset Management, Manager Risk Management
Contingency Planning	Manager Tactical Asset Management, Manager Operational Asset Management
Asset Management Information System	Manager Information Services
Financial Planning	Manager Financial Management
Capital Expenditure Planning	Manager Capital Investment
Review	Manager Strategic Asset Management