Asset Management System Review

Water Corporation

3605-29

Prepared for
Economic Regulation Authority of Western Australia

February 2016

Cardno
Shaping the Future

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Executive Summary

General

Water Corporation is a State-owned entity that is the principal provider of water, wastewater, recycled water, drainage and bulk irrigation services in Western Australia. Its operating area covers Western Australia and it provides services where there is no other licenced supplier. Water Corporation has one shareholder being the Minister for Water. Water Corporation has offices in Perth, Bunbury, Albany, Karratha, Geraldton, Northam and Kalgoorlie.

Water Corporation has a significant asset base of $34 billion (replacement cost). This asset base includes two desalination plants, 128 dams and weirs and 96 licenced borefields for water supply. Water Corporation delivered 371GL of water in 2013/14. The largest water supply scheme is the Integrated Water Supply Scheme which supplies Perth, Kalgoorlie, the Wheat Belt and some part of the South West. This Scheme delivered 289GL of water in 2013/14, accounting for 78% of all supplies.

Water Corporation's wastewater collection and treatment network includes 16,080km of sewer mains, 1,129 pump stations and 110 treatment plants. 167.5 GL of wastewater was collected and treated in 2013/14. Water Corporation operates 84 water recycling schemes across the state and is proactively increasing the proportion of wastewater that is reused.

Water Corporation's drainage assets are located in Perth where it receives stormwater from networks owned by local governments and in the Peel, Great Southern and South West Regions. It controls 2,545 km of urban and rural drains. Water Corporation is also a bulk supplier to irrigation schemes and delivered 135ML of water for irrigation in 2013/14.

Asset Management Review Objectives

Cardno was commissioned by the ERA to undertake an asset management system review of Water Corporation in accordance with the requirements set out in Section 24 of the *Water Services Act 2012 (WA)* and also included in Clause 17 of its operating licence.

The asset management system review has been conducted in order to assess the effectiveness of Water Corporation's asset management system. The asset management system review covers the period 1 July 2012 to 30 June 2015.

This report outlines the findings of the review of Water Corporation to fulfil the above objectives, conducted between Monday 18 October and Friday 23 October.

The review was carried out in accordance with the *Audit and Review Guidelines: Water Licences*, as published by the ERA in July 2014.

Asset Management System Review

Findings of the Previous Asset Management System Review

The asset management system review assessed the performance of Water Corporation against the key asset management processes and effectiveness criteria set out in the ERA Guidelines.

The previous asset management system review identified the following recommendations:

1. Asset Planning: Renewal Planning Group to develop supporting documentation such as Business Case and Process Manual.

Resolved during review period

2. Asset Planning: Asset management planning procedures objectives, purpose and content to be reviewed. All procedures to be updated in line with agreed approach. Procedure document needs to reflect current approach including asset renewal, strategy statements, etc.

Resolved during review period

3. Asset Planning: Implement the 'Our Plan, Monitor and Assess Asset Performance, Condition & Risk Story' by setting clear target dates and responsibilities in order to achieve the desired result.

Resolved during review period

4. Asset Planning: Complete the remaining 17 Strategic Statements.

Partially resolved during review period

5. Asset Planning: Improve the renewals forecasting of sewer mains (large and small) by obtaining an appropriate tool to undertake the analysis.

Resolved during review period

6. Asset Planning: Improve forecasting of whole of life cost for mechanical and electrical assets by obtaining an appropriate tool.

Resolved during review period

7. Asset Planning: There needs to be a joint effort by the central group and regions to improve quality and accuracy of data.

Partially resolved during review period

8. Asset Planning: The data collection KPIs process needs to be re- initiated to ensure the collection of the data is undertaken in a timely manner.

Partially resolved during review period

9. Asset Planning: Enhance the current improvement implementation process by setting clear target dates, assigning responsibilities and monitoring progress monthly in line with group meetings.

Resolved during review period

10. Asset Creation and Acquisition: The Optioneering process to be implemented as a feed-in to the Asset Acquisition Process and that training includes raising awareness in relevant corporate branches and the regions.

Resolved during review period

11. Asset Disposal: Finish the development of the SCF and implement across the corporation and regions as soon as possible.

Resolved during review period

12. Asset Disposal: An audit programme should be established for assets requiring disposal across the corporation and regions.

Resolved during review period

13. Asset Disposal: Responsibility for asset disposal should be clearly identified in all situations e.g. post project disposal.

Resolved during review period

14. Asset Disposal: All personnel involved in the asset disposal process should be trained in the process end to end.

Resolved during review period

15. Asset Disposal: Develop a 3 to 5 year rolling disposal programme that is monitored as per current programme processes. The programme should become part of the normal project business requirements where it can be reported against and monitored.

Resolved during review period

16. Asset Disposal: Complete the implementation of the system capability matrix.

Resolved during review period

17. Asset Operations: Extend current training to provide operators in the field with the importance of data collection, the role they play in asset management and how their job is important to the greater business outcomes.

Partially resolved during review period

18. Asset Operations: Asset related data capture should be embedded into normal operational activities.

Partially resolved during review period

19. Asset Operations: Work towards the monitoring of Process Control Points for all treatment plant.

Resolved during review period

20. Asset Operations: Develop a plan on how to utilise SCADA data for all asset classes, e.g. Data to be used, what purpose and what asset class. Incorporate use of Data Historian within the plan.

Partially resolved during review period

21. Asset Maintenance: Continue to review and complete process documentation including maintenance standards and procedures.

Partially resolved during review period

22. Asset Maintenance: Complete the maintenance standards for the asset base.

Partially resolved during review period

23. Asset Maintenance: Document the process for incorporation of maintenance standards for new assets.

Resolved during review period

24. Asset Maintenance: Review condition assessment process to ensure that the condition assessment does not skew the rating by averaging good and bad condition, e.g. ensure the current process isolates poor condition assets from the overall condition (use of ADRs).

Resolved during review period

25. Asset Maintenance: Continue the development of dashboards as the need is identified.

Ongoing but resolved during review period

26. Asset Maintenance: Formalise fault mode analysis and develop guidelines for data requirements and analysis.

Unresolved during review period. Amended date for completion of December 2015

27. Asset Maintenance: Improve the quality of data being fed back into the work orders by providing documented direction and support for maintenance personnel.

Unresolved during review period. Amended date for completion of June 2016

28. Asset Maintenance: Incorporate the data capture as part of planned maintenance and/or inspections as part of normal operations.

Partially resolved during review period

29. Asset Maintenance: To address the issues related to the Newman assets, it is intended that the Asset Management Branch monitor repeat failures centrally and notify the regions of the repeat failure so that the regions identify the actions required to rectify the issues. Repeat failures should be monitored and reported centrally. Should repeat failures demonstrate an ongoing trend, strategies should be developed to overcome the trends.

Resolved during review period

30. Risk Management: Improve the process documentation supporting ARA, such as guidelines with examples, criteria matrix, links to planning process, etc.

Resolved during review period

31. Risk Management: On procuring the new Risk Information System (register), and in accordance with the risk management principles, existing and new corporate risk be consolidated into the new system.

Resolved during review period

32. Risk Management: When a failure is recorded and subsequently completed, the risk review should be undertaken as part of the incident process and identified on the incident form, e.g. who reviewed the risk, when it was reviewed and what the outcomes were.

Resolved during review period

33. Risk Management: Advise the regions on the benefits of the Asset Risk Assessment and how they can help the organisation achieve business objectives.

Resolved during review period

34. Risk Management: Align NW Regions approach to the use of the Asset Risk Assessment.

Resolved during review period

35. Risk Management: Improve the application of the Asset Risk Assessment in the regions.

Partially resolved during review period

36. Risk Management: Embed the Asset Risk Assessment within the organisation by making it more user friendly and improving education.

Resolved during review period

37. Risk Management: On procuring the new Risk information system (register), incorporate Water Quality risks into the system.

Resolved during review period

38. Risk Management: Establish codes for failure mode input into work orders and make it mandatory to be completed.

Resolved during review period

39. Risk Management: Implement a consistent approach to the identification of consequences of asset failure across WaterCorp.

Resolved during review period

40. Risk Management: Re-visit the recommendation from the AMSER 2009 audit and review incident reports to ensure cause of incident, links/references to the root cause analysis document and the date completed are recorded.

Resolved during review period

41. Risk Management: Develop consistency of approach to data entry by incorporating standard codes for incidents so that reporting can be structured.

Resolved during review period

42. Risk Management: Enhance the E2E process for incident management that addresses incidents that create different levels of impact.

Resolved during review period

43. Risk Management: Develop triggers within the incident management system in line with a decision tree to identify and monitor future actions to address the incident raised.

Resolved during review period

44. Risk Management: Review the data quality within the incident management system to address the supporting processes, data and the effectiveness of the system.

Resolved during review period

45. Risk Management: Water Corporation needs to complete the investigation on the Jabbarup main failure and identify future actions as required.

Resolved during review period

46. Risk Management: A formal criticality assessment be applied across the corporation.to improve the prioritisation of assets and associated works.

Resolved during review period

47. Risk Management: Develop and implement a strategy to ensure multiple or repeat faults or fixes for the same address or asset are highlighted and investigated.

Resolved during review period

48. Contingency Planning: Finalise the draft contingency planning guidelines.

Resolved during review period

49. Contingency Planning: In addition to the current update frequencies prioritise the update of contingency plans based on risk should be considered, e.g. use the ARA process to identify high risk assets and then update the associated contingency plan. The relationship between ARA and Contingency plans is currently being scoped.

Partially resolved during review period

50. Contingency Planning: The concept behind the NW region spreadsheet should be integrated with the corporate system such that it becomes accessible to all personnel responsible for repairing operational failures.

Resolved during review period

51. Contingency Planning: The naming convention for Contingency planning needs to be clarified and defined to Water Corporation personnel with the view to eliminating confusion between the terms incident management, emergency management and contingency planning.

Resolved during review period

52. Review of the Asset Management System: As a result of this review and the WSAA benchmarking, the SAMP should be updated to include the recommendations compiled in this review that are relevant for each group in the AM Branch. This consolidation would allow the internal and external recommendations to be captured in the one improvement register.

Resolved during review period

The following four findings were not recommendations from the previous Asset Management System Review but from the subsequent Newman Report and based on the actions proposed by Water Corporation in its letter of 30/04/2013 to the ERA.

Newman Report – Additional Requirements: Fire Hydrants: Hydrants requiring repair and replacement

Resolved during review period

Newman Report – Additional Requirements: PVC Water Mains: Managing leaks in Newman.

Resolved during review period

Newman Report – Additional Requirements: Access Chamber Lids: Asset Condition Assessment on AC lids

Partially resolved during review period but now confirmed as resolved

Newman Report – Additional Requirements: Jabbarup Crescent Main Failure: Improvement to the Incident Management System

Resolved during review period

Findings of the Current Asset Management System Review

The review of the Water Corporation asset management system identified that the majority of asset management processes were rated A1. Two processes were rated B2.

The following recommendations and process improvement opportunities were identified.

Note that the first recommendations (n/2013) pertain to issues identified in the previous review which were not fully resolved in this audit period and have not been updated with findings from the current review. The balance of recommendations (n/2015) pertain to issues identified during the current review, or to update actions from the 2013 review:

Reference (no./year)	Asset Management System Component	Issue	Auditor's recommendation
4/2013	*Asset Planning - Asset management plan covers key requirements.*	The previous review report noted the following: ▪ The AM Branch is replacing Asset Class Plans with Strategic Statements. The 2013 recommendation was for Water Corporation to complete the remaining 17 Strategic Statements. WC has completed asset class strategies for 15 Asset Class Strategies. The need for the remaining Strategies is currently being reviewed.	We recommend that Water Corporation complete the remaining Asset Class Strategies, should they be required.
7/2013	*Asset Planning - Planning process and objectives reflect*	The 2013 recommendation was that there needs to be a joint effort by the central group	We recommend that Water Corporation complete this recommendation by

Reference (no./year)	Asset Management System Component	Issue	Auditor's recommendation
	the needs of all stakeholders and is integrated with business planning.	and regions to improve quality and accuracy of data. Water Corporation has completed a number of actions related to this recommendation which have been detailed in Section 3.1 Table C to this report.	commencing implementation of data standards that have been developed, prioritised by business value.
8/2013	*Asset Planning - Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning.*	The previous review report noted the following: ▪ Good quality data for strategic planning is not currently available. The 2013 recommendation was that Water Corporation's data collection KPIs process need to be re- initiated to ensure the collection of the data is undertaken in a timely manner.	Refer back to the recommendation for 7/2013.
17/2013	*Asset Operations - Staff resources are adequate and staff receive training commensurate with their responsibilities.*	The previous review report noted the following: ▪ While operational data is being captured good quality data is not being captured to support operations. The 2013 recommendation was for Water Corporation to extend current training to provide operators in the field with the importance of data collection, the role they play in asset management and how their job is important to the greater business outcomes. Water Corporation has completed a number of actions related to this recommendation which have been detailed in Section 3.1 Table C to this report.	We recommend Water Corporation complete this recommendation to support implementation of prioritised data standards referenced in 7/2013.
18/2013	*Asset Operations - Operational policies and procedures are documented and linked to service levels required.*	The previous review report noted the following: ▪ Good quality data is not being captured to support operations. Based on the review, gaps in the asset and asset attributes currently exist. Also the maintenance data being recorded in the region reviewed is inconsistent and difficult to interpret. The 2013 recommendation was that asset related data capture should be embedded into normal operational activities by Water Corporation. Water Corporation has completed a number of actions related to this recommendation which have been detailed in Section 3.1 Table C to this report. Aroona has an initiative to improve collection of asset condition data from the field, capturing condition data as part of routine maintenance activities at Beenyup WWTP. Condition data capture rates are up to 85%.	We recommend that Water Corporation consider the need for further actions, pending the outcome of the Aroona Alliance trial.

Reference (no./year)	Asset Management System Component	Issue	Auditor's recommendation
		Another trial commenced early in 2015 based on tagging equipment with its Functional location (FL). Over half the assets have now been physically tagged.	
20/2013	*Asset Operations - Operational policies and procedures are documented and linked to service levels required.*	The previous review report noted the following: ▪ SCADA data is collected, however a plan is needed that guides the use of this data for planning purposes. The 2013 recommendation was for Water Corporation to develop a plan on how to utilise SCADA data for all asset classes, e.g. Data to be used, what purpose and what asset class and to incorporate the use of the Data Historian within the plan. Water Corporation has completed a number of actions related to this recommendation which have been detailed in Section 3.1 Table C to this report.	We recommend that Water Corporation implement the SCADA Data Standards into its business processes, prioritised by business value.
21/2013	*Asset Maintenance - Maintenance policies and procedures are documented and linked to service levels required.*	The previous review report noted the following: ▪ The current documentation process needs to be completed. The 2013 recommendation was for Water Corporation to continue to review and complete process documentation including maintenance standards and procedures. Water Corporation has completed a number of actions related to this recommendation which have been detailed in Section 3.1 Table C to this report. However, due to a restructure completed outside of this review period, the documentation will need to again be updated to reflect the new business structure.	We recommend that Water Corporation update maintenance standards and procedures to reflect the new business structure.
22/2013	*Asset Maintenance - Maintenance policies and procedures are documented and linked to service levels required.*	The previous review report noted the following: ▪ The maintenance standards are stored in a library (spreadsheet) and incorporated in SAP for new assets. 83% of the asset base is covered by the new generation maintenance standards. The 2013 recommendation was for Water Corporation to complete the maintenance standards for the asset base. Water Corporation has completed a number of actions related to this recommendation which have been detailed in section 3.1 Table C to this report. However, due to a restructure completed outside of this review period, the documentation will need to again be updated to reflect the new business structure.	Refer to 21/2013
26/2013	*Asset Maintenance - Failures are analysed and*	The previous review report noted the following:	We recommend that Water Corporation formalises its approach to fault mode analysis

Reference (no./year)	Asset Management System Component	Issue	Auditor's recommendation
	operational / maintenance plans adjusted where necessary.	▪ Fault mode analysis is being applied inconsistently. The 2013 recommendation was for Water Corporation to formalise fault mode analysis and develop guidelines for data requirements and analysis. Water Corporation has completed a number of actions related to this recommendation which have been detailed in Section 3.1 Table C to this report.	and develops guidelines to assist in its application.
27/2013	*Asset Maintenance - Regular inspections are undertaken of asset performance and condition.*	The previous review report noted the following: ▪ Data is entered into the maintenance management system inconsistently resulting in poor quality supporting data. The 2013 recommendation was for Water Corporation to improve the quality of data being fed back into the work orders by providing documented direction and support for maintenance personnel. The actions that Water Corporation developed for completing this recommendation were: 1. Review the detailed data needs for the maintenance process, including data integrity requirements and source system. 2. Implement system changes and changes to collection processes where required. 3. Develop reports to review and validate the data and to KPI's monitor process compliance. 4. Monitor data on a regular basis and feedback KPI's and non-compliance to Field Users. However, the original dates for completing these actions were not achieved during the review period.	We recommend that Water Corporation completes the actions it has developed to address the 2013 recommendation. It has amended the original dates for completing each of the four actions to the following dates: 5. December 2015 6. January 2016 *7.* March 2016 8. June 2016
28/2013	*Asset Maintenance - Regular inspections are undertaken of asset performance and condition.*	The previous review report noted the following: ▪ Good quality data is not being captured to support asset information and analysis. The 2013 recommendation was for Water Corporation to incorporate the data capture as part of planned maintenance and/or inspections as part of normal operations. Although Water Corporation has completed most of the actions associated with this recommendation, it will need to review additional feedback requirements following the actions included in 27/2013.	We recommend that Water Corporation completes the actions it has developed to address the 2013 recommendation.

Reference (no./year)	Asset Management System Component	Issue	Auditor's recommendation
35/2013	*Risk Management - Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system.*	The previous review report noted the following: ▪ Application of Asset Risk Assessment in the regions can be greatly improved. The 2013 recommendation was for Water Corporation to improve the application of the Asset Risk Assessment in the regions. However, our review found that there is still opportunity to improve use of the asset risk assessment tool.	We recommend that this recommendation be superseded by recommendations R1/2015 and R2/2015 of this review.
49/2013	*Contingency Planning - Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks.*	The previous review report noted the following: ▪ A formal and prioritised approach to contingency planning is required. The 2013 recommendation was for Water Corporation to consider prioritising the update of contingency plans based on risk, in addition to the current update frequencies, e.g. use the ARA process to identify high risk assets and then update the associated contingency plan. As a result, the relationship between ARA and Contingency plans was scoped. Water Corporation commenced definition work in July 2014 and agreed the conceptual needs related to developing a formal and prioritised approach to contingency planning. However, the further detailed definition that was necessary to complete the application programming scoping phase of the work was delayed due to other higher branch priorities. Due to the current activities surrounding the Business Review, all 'new' work was halted by Water Corporation and this has had a direct impact on the development work that had been proposed for this project. Water Corporation has completed a number of actions related to this recommendation which have been detailed in section 3.1 Table C to this report. However, it has not completed all of the actions that it were proposed to complete the recommendation.	We recommend that this recommendation be superseded by recommendation R5/2015 of this review.
R1/2015	*Risk Management - The probability and consequence of risk failure are regularly assessed*	We found that Water Corporation staff take differing approaches to completing asset risk assessments	We recommend that Water Corporation review its guidance material for the Asset Risk Assessment too with a group of users (input and end users) to identify any areas of ambiguity in the guidance provided or opportunities for improvement.
R2/2015	*Risk Management - The probability and consequence of risk failure are regularly assessed*	We found that Water Corporation staff take differing approaches to completing asset risk assessments	We recommend that Water Corporation communicates to all users of the Asset Risk Assessment tool its desired approach to scoring the likelihood and consequence of

Reference (no./year)	Asset Management System Component	Issue	Auditor's recommendation
			asset risks. That is, whether the risk scorer is to consider business as usual operations, a worst case scenario or some other operating context when undertaking the scoring. This communication should occur after the findings from the previous recommendations are endorsed.
R3/2015	*Risk Management - The probability and consequence of risk failure are regularly assessed*	We found that a number of risk rated as "high" in the System Risk Assessment tool had not been reviewed and endorsed in the desired timeframe	We recommend that Water Corporation reviews all existing System Risks to identify high risks that are overdue for review and/or endorsement and completes the scheduled review and/or endorsement of the risks.
R4/2015	*Risk Management - The probability and consequence of risk failure are regularly assessed*	We found that a number of risk rated as "high" in the System Risk Assessment tool had not been reviewed and endorsed in the desired timeframe	We recommend that Water Corporation reviews the review and endorsement process (activities and timing) for system risks to confirm if the current approach is appropriate for its business needs and implements any changes that it determines are necessary
R5/2015	*Contingency Planning - Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks*	We were unable to conclude that Water Corporation has adequately identified the highest operational risks to its business and undertaken contingency planning to address them. This is because contingency planning has been undertaken inconsistently across the business	We recommend that Water Corporation identifies for its operations the desired: a) level of application b) coverage and c) contents of contingency plans, and implements contingency planning consistently using these criteria through a program of activity.
R6/2015	*Capital Expenditure Planning - The plan provides reasons for capital expenditure and timing of expenditure*	We noted during the site visit to Newman that Water Corporation's sewer access chamber covers are not capitalised assets. This policy differentiates from numerous other Australian water businesses, where the covers are considered to be capital expenditure items. We also note that some of the work to replace the lids has involved construction work to alter the size of the chamber due to it being covered and needing to be raised back to ground level.	We recommend that Water Corporation reviews its capitalisation policy to confirm whether the access chamber lids should be treated as capital assets.
R7/2015	*Review of AMS - A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current*	During the discussions for the Review of the AMS section, there was uncertainty relating to whether Water Corporation has a Correction Action Register (CAR) system that is used to record deficiencies and improvements recommendations/opportunities so that actioning them can be managed, with reminders automatically sent out to the responsible officers and escalation if they are not completed within the set timeframes.	We recommend that Water Corporation reviews this to confirm whether it has a corporate CAR system and, if not, looks to implement such a system.

Assessment of the Effectiveness of the Asset Management System

Based on the outcomes of the Review, the Reviewers found that the asset management processes and measures have been well implemented and are being followed. It is the Reviewers' opinion that the asset management system is operating satisfactorily given the provision of the licensee's potable and non-potable water supply service, sewerage services, irrigation services and drainage services.

The gradings awarded reflect that Water Corporation generally has well developed asset management practices which in some areas are leading amongst Australian water utilities.

We have made recommendations for improvement in the areas of risk management, contingency planning, capital expenditure planning and for review of the AMS.

Asset Management System Review - Overall Effectiveness

A summary of our assessment of the effectiveness of Water Corporation's Asset Management System is provided in Section 4.2. All elements except two were rated "A" or better for policy and procedures. All elements but two were graded "1" or better for performance. One element, Contingency Planning, was rated B3 and we have made recommendations for improvement in this area.

Table of Contents

Tables

Appendices

1 Introduction

1.1 Background

The Economic Regulation Authority (ERA) is responsible for regulating the licensing schemes for gas, electricity and water services in Western Australia. The primary objective of regulation is to ensure the provision of a competitive and fair environment, particularly where businesses operate as natural monopolies.

Water Corporation holds a water services operating licence (WL32, Version 13) which permits it to provide potable water supply services, non-potable water supply services, sewerage services, drainage services and irrigation services and undertake, maintain and operate any associated works within the relevant operating areas set out in Plan Numbers OWR-OA-301(B) (potable water services) , OWR-OA-302(B) (sewerage services), OWR-OA-306 (drainage services), OWR-OA-175(E) (irrigation services) and OWR-OA-175-1(B) (irrigation services). Under the terms of the licence, Water Corporation can provide non-potable water supply services in any of the operating areas set out in the Plan Numbers listed above.

The operating licence was granted by the ERA on 28 June 1996 and last amended on 13 February 2014. This is the fourth revision of Water Corporation's operating licence since the previous asset management system review was carried out. The licence was amended on 18 September 2013 to take account of changes to pressure and flow standards for farmlands and then amended on 18 November 2013 to make the licence consistent with the *Water Services Act 2012*.

Water Corporation's operating licence was further amended on 29 January 2014 to remove controlled areas and expand operating areas to match the boundary of the Contiguous Zone off the Western Australian coast. In addition, the drainage operating area boundary was expanded to match the Western Australian State Boundary, which replaced maps OWR-OA-179(C), OWR-OA-180(C) and OWR-OA-181(C) with new map OWR-OA-182. A formatting error in the table in Schedule 3, clause 1.1 was also corrected at this time and clause 1 of Schedule 2 (customer complaints) was removed. The most recent amendment to the operating licence was undertaken to allocate a new plan number to the operating area map for the Corporation's drainage services.

1.2 Overview of the Water Corporation Area and the Role of Water Corporation

Water Corporation is a State government-owned entity that is the principal provider of water, wastewater, recycled water, drainage and bulk irrigation services in Western Australia. Its operating area covers Western Australia and it provides services where there is no other licenced supplier. Water Corporation is accountable to the Minister for Water. Water Corporation has offices located across Western Australia.

Water Corporation ('the licensee') has a significant asset base of $19 billion (replacement cost). This asset base includes two desalination plants, 128 dams and weirs and 96 licenced borefields for water supply. Water Corporation delivered 371GL of water in 2013/14. The largest water supply scheme is the Integrated Water Supply Scheme which supplies Perth, Kalgoorlie, the Wheatbelt and some parts of the South West. This scheme delivered 289GL of water in 2013/14, accounting for 78% of all supplies.

Water Corporation's wastewater collection and treatment network includes 16,080km of sewer mains, 1,129 pump stations and 110 treatment plants. 167.5 GL of wastewater was collected and treated in 2013/14. Water Corporation operates 84 water recycling schemes across the state and is proactively increasing the proportion of wastewater that is reused.

The replacement cost and fair values for Water Corporation's assets as reported in its 2014 Annual Report are summarised in Table 1-1.

Table 1-1 Summary of Water Corporation assets by replacement cost and fair value ($M 2014)

	Replacement cost ($M 2014)	Fair value ($M 2014)	% replacement cost of sub-total
Pipelines and fittings	11,345	8,926	63%
Dams, reservoirs and tanks	1,541	1,216	8%
Ocean outfalls	205	152	1%
Pump stations and treatment plants	2,072	1,669	11%
Drains and channels	103	78	1%
Other structures	90	56	0%
Plant and equipment	2,782	1,821	15%
Sub-total system assets	**18,138**	**13,918**	**100%**
Land	344	344	50%
Buildings and associated works	347	237	50%
Sub-total land and buildings	**691**	**581**	**100%**
Plant and equipment	132	46	48%
Computer equipment	74	8	27%
Vehicles and mobile plant	67	36	25%
Subtotal - plant and equipment	**273**	**90**	**100%**

Water Corporation's drainage assets are located in Perth where it receives stormwater from networks owned by local governments and in the Peel, Great Southern and South West Regions. It controls 2,545 km of urban and rural drains. Water Corporation is also a bulk supplier to irrigation schemes and delivered 135 ML (excluding the south-west irrigation area) of water to four irrigation schemes in 2013/14.

1.3 Current Water Corporation Business-wide Review and Restructure

Water Corporation is currently going through a business-wide review and restructure. This work consists of four overall areas of change.

- **Reshape** – As part of a restructure, Water Corporation has identified areas of its organisation that it does not consider to be core business and that it considers that it no longer needs to be in. Previously the Business's capital works (approximately $80 – 100M/year) were carried out in house by the Engineering and Construction Branch. Water Corporation has recently sold this part of the business to RCR Tomlinson Ltd. As part of the sale, Water Corporation has guaranteed $130M of work over three years and also made RCR the selected bidder to tender for additional Water Corporation works for an initial two year term with prospect for this to be extended.

- **Revitalise** – Water Corporation has carried out an internally-focused bottom-up productivity review that has looked to assess the workflows with the organisation and identify improvement opportunities. This work is approximately two-thirds complete, with implementation partially complete in the organisation's Asset Planning Group.

- **Redesign** – Water Corporation is currently going through a corporate restructure that has included a change of the Executive from 1 July 2015. The restructure has also involved a greater definition of roles within the Business.

  During our initial review of the asset management documentation provided to us by Water Corporation, which was carried out in advance of the site work, we observed that a large number of Water

Corporation's documents were out of date, with the review date having passed with no updates being recorded. However, Water Corporation has held off on the 2015 reviews and updates of its documents as a result of the changes to the business that are currently being carried out. Once the restructure of the organisation has been completed, Water Corporation intends to complete the overdue reviews of its documents in order to better allocate ownership of the documents and align them with the new structure.

- **Refresh** – Water Corporation has been identifying improvement opportunities through a variety of different benchmarking studies (e.g. Aquamark). This work involves a business case phase of rebooting the Business's processes, systems and tools.

1.4 Purpose of this Report

As a condition of its licence, Water Corporation is required to conduct an asset management review that assesses the measures taken by the licensee for the proper management of assets used in the provision and operation of services and, where appropriate, the construction or alteration of relevant assets .

Section 24 of the *Water Services Act 2012* obligates the licensee to provide the Authority with a report by an independent expert acceptable to the Authority as to the effectiveness of the asset management system not less than once in every 24 month period (or such longer period as the Authority allows).

The asset management system review covers:

- 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 asset management system.

2 Scope of Works

2.1 Asset Management System Review Objectives

The overall objectives of this asset management system review were to:

1. Provide the Authority with an independent assessment of the effectiveness of the licensee's asset management system in respect of the assets that are delivering the services covered by the licence.
2. Provide recommendations to address asset management deficiencies, or opportunities to improve the standard of asset management, if any.

2.2 Scope of Works

The scope of works of this review included:

- Interviews with key staff members from Water Corporation to:
  - assess the effectiveness of the actions taken to address the recommendations included in the previous review report
  - assess performance against each asset management process specified in the ERA Audit and Review Guidelines: Water Licences (July 2014) (Audit Guidelines).
- Reviews of documents, procedures and policy manuals in relation to financial management and planning, service performance standards, asset management, operations and maintenance functions and reporting
- Testing and assessment to determine whether the procedures and policies are followed and determine their effectiveness
- Preparation of a review report in accordance with the format specified in the Audit Guidelines.

2.2.1 Areas of Special Focus

The ERA set out a number of areas of special focus for this current review arising from the findings of the previous review. These areas of special focus were as follows:

2.2.1.1 Asset Risk Management Framework

ERA required Water Corporation to commission an independent review of its Asset Risk Management Framework and report on the review by 31 March 2014. This report identified a number of improvement opportunities but did not include any recommendations.

As part of this review, the ERA asked us to:

- set the priority for all risk management sub-components to 2 (which required us to undertake a greater depth of testing)
- examine the operation of the Corporation's asset risk management practices at the corporate, planning, and operational levels.
- undertake site visits to selected regional offices to confirm that the risk management policies and procedures have been embedded into local work practices.
- validate the findings in the independent risk management review report prepared by Odysseus-imc Pty Ltd.
- validate the information provided to the ERA in the periodic updates to the post-review implementation plan.

2.2.1.2 Newman Asset Condition

The 2012 asset management system review noted problems with the condition of assets transferred to Water Corporation from BHP.

Consequently, for this assignment, the ERA requested that we review:

- the remedial actions taken by the Corporation to address the asset maintenance issues disclosed in the 2012 Review
- the performance of the water and sewerage assets during the period covered by the 2015 Review.

A site visit to Newman to inspect the assets, interview Water Corporation staff and examine documents was required.

2.2.1.3 Assets taken over from Third Parties

The 2012 asset management system review report identified issues with the robustness of the Water Corporation's policies and practices for taking over assets from third parties.

Therefore, for the 2015 review, the ERA requested that we undertake an assessment of a sample of the assets were transferred to the Corporation after 1 July 2006.

For the selected sample, we were required to determine whether, during the Review period, the transfer of assets from third parties met the Corporation's standards in relation to:

- asset condition, compared to Corporation owned and constructed assets in the same asset class
- asset records
- asset performance
- safety
- reliability.

In discussion with ERA and Water Corporation, it was identified that there are only two instances of asset transfers that meet the criteria in the brief:

1. Assets transferred from the Nilgen Service Company (transferred 1/10/2006)
2. Fire hydrants

ERA advised that as the Nilgen assets were transferred before the commencement of the review period they should be excluded from the review. Therefore, only fire hydrants fall within the scope of the review.

We have included commentary regarding the transfer of fire hydrant assets in Table 5-6 (Asset Maintenance).

2.3 Methodology and Approach

The review was undertaken in accordance with ASAE3000. Our approach to the reporting work was to work closely with the licensee so that comments and challenges could be responded to and addressed before the review report was finalised. The key areas of our approach included:

- A start-up discussion (by telephone) with Water Corporation and ERA to discuss the scope of works for the review, identify any new issues arising from changes to the Licence or operating environment requirements and review timing and logistics.

- Preparation of a draft review plan for comment by the Water Corporation. The review plan identified the number and location of reviews, the information to be addressed and the reviewers responsible.
- Submission of the draft review plan to the ERA for approval
- Establishing a secure FTP site for Water Corporation to upload documents to. This allowed us to be substantially across the response to each a review area before we commenced the site work and to make efficient use of the time of all involved parties.
- A start-up meeting on-site at the beginning of our review work
- On-site review work comprising:
  - Face to face interviews with business staff responsible for the review area
  - Demonstration of key systems
  - Sample testing for outcome compliance (assessing a sample of documents to confirm procedures / policies are followed and implemented)
  - Review breach register and any non-compliances and assess if any corrective action was undertaken and its effectiveness
  - Site visits to view water service assets.
- Preliminary review feedback at the review close-out meeting
- Preparation of a draft report for the ERA and Water Corporation's review and comment
- Preparation of a final report for submission to the ERA

Our methodology for completing this asset management system review assignment was based on:

- A risk assessment that determined the priority of each review area, using the risk management framework in Appendix A
- Our understanding of the licensee's business
- The experience of our review team in undertaking regulatory reviews which has been gained in several jurisdictions in Australia and in the United Kingdom
- The outcome of the previous review of the licensee

Our review methodology, including the key documents required to be reviewed and the supporting systems that we requested to see demonstrated, is detailed in Table 2-1.

Table 2-1 Asset Management Review Methodology

Audit Area	Effectiveness Criteria	Approach	Systems	Key Documents
Asset Management Review				
Asset planning	▪ Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning ▪ Service levels are defined ▪ Non-asset options (e.g., demand management) are considered ▪ Lifecycle costs of owning and operating assets are assessed ▪ Funding options are evaluated ▪ Costs are justified and cost drivers identified ▪ Likelihood and consequences of asset failure are predicted ▪ Plans are regularly reviewed and updated	▪ Review and assess the adequacy of asset planning processes ▪ Review and assess adequacy of asset management plans ▪ Assess if asset management plans are up to date ▪ Assess implementation of asset management plans (status) ▪ Assess whether the asset management plan clearly assigns responsibilities and if these have been applied in practice	▪ GIS ▪ Asset database / information system	▪ Overview of planning approach ▪ Population projections ▪ Infrastructure Planning Reports ▪ Example planning reports ▪ Review of asset management plans ▪ Service level agreements
Asset creation and acquisition	▪ Full project evaluations are undertaken for new assets ▪ Evaluations include all life-cycle costs ▪ Projects reflect sound engineering and business decisions ▪ Commissioning tests are documented and completed ▪ Ongoing legal / environmental / safety obligations of the asset owner are assigned and understood	▪ Review adequacy of policies and procedures in relation to asset creation and acquisition ▪ Review examples of creations / acquisitions to check if policies and procedures were followed and check costs against estimates	Asset database / information system	▪ Policies and procedures for asset creating and acquisition. Accounting and engineering
Asset disposal	▪ Under-utilised and under-performing assets are identified as part of a regular systematic review process ▪ The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken ▪ Disposal alternatives are evaluated ▪ There is a replacement strategy for assets	▪ Review adequacy of policies and procedures in relation to asset disposal, asset replacement, identification of under-performing assets ▪ Determine if a review on the usefulness of assets are undertaken ▪ Review examples to check that policies and procedures are being followed	Asset database / information system	▪ Policies and procedures for asset disposal. Accounting and engineering

Audit Area	Effectiveness Criteria	Approach	Systems	Key Documents
Environmental analysis	▪ Opportunities and threats in the system environment are assessed ▪ Performance standards (availability of service, capacity, continuity, emergency response, etc.) are measured and achieved ▪ Compliance with statutory and regulatory requirements ▪ Achievement of customer service levels	▪ Review performance and service standards over audit period ▪ Review performance / identify any breaches and non-compliances and corrective action taken ▪ Review adequacy of reporting and monitoring tools		▪ Policies and procedures ▪ Planning reports ▪ Customer service ▪ Compliance reports ▪ Strategic plans (if appropriate)
Asset operations	▪ Operational policies and procedures are documented and linked to service levels required ▪ Risk management is applied to prioritise operations tasks ▪ Assets are documented in an Asset Register, including asset assessment of assets' physical, structural condition and accounting data ▪ Operational costs are measured and monitored ▪ Staff receive training commensurate with their responsibilities	▪ Review adequacy of policies and procedures in relation to asset operations ▪ Review staff skills / training and resources available ▪ Check that operations procedures are being followed including testing of the asset register, observation of operational procedures and analysis of costs ▪ Identify any operational events and corrective actions	▪ Asset information system ▪ SCADA	▪ Asset register ▪ Operations procedures ▪ Operational costs ▪ Daily / weekly / monthly check sheets ▪ Staff skills / resourcing structure
Asset maintenance	▪ Maintenance policies and procedures are documented and linked to service levels required ▪ Regular inspections are undertaken of asset performance and condition ▪ Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule ▪ Failures are analysed and operational / maintenance plans adjusted where necessary ▪ Risk management is applied to prioritise maintenance tasks ▪ Maintenance costs are measured and monitored	▪ Review adequacy of policies and procedures in relation to asset maintenance / maintenance functions ▪ Check that policies and procedures have been followed including testing of maintenance schedules, analysis of costs, ▪ Review maintenance schedules / plans ▪ Identify any maintenance events and corrective actions	▪ Asset information system	▪ Maintenance procedures and schedules ▪ Record of maintenance ▪ Maintenance costs
Asset Management Information System	▪ Adequate system documentation for users and IT operators	▪ Review adequacy of asset information system: a) Asset coverage	▪ Asset Management Information system	▪ AMIS manual ▪ AMIS data coverage and quality report

Audit Area	Effectiveness Criteria	Approach	Systems	Key Documents
	▪ Input controls include appropriate verification and validation of data entered into the system ▪ Logical security access controls appear adequate, such as passwords and that appropriate system access and functionality is provided to users ▪ Physical security access controls appear adequate ▪ Data backup procedures appear adequate ▪ Key computations related to licensee performance reporting are materially accurate ▪ Management reports appear adequate for the licensee to monitor licence obligations	b) Functionality c) Data coverage d) Security e) User functionality granted is appropriate ▪ Review outputs / reports generated by systems and assess suitability for reporting against performance standards / licence obligations		▪ Asset reports
Risk management	▪ Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system ▪ Risks are documented in a risk register and treatment plans are actioned and monitored ▪ The probability and consequence of risk failure are regularly assessed	▪ Review risk assessment coverage ▪ Review sample of risk mitigation to check policies and procedures are followed ▪ Assess staff understanding of risk management and adequacy of risk management training for staff		▪ Corporate Risk management framework ▪ Risk assessment
Contingency planning	▪ Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks	▪ Review adequacy / relevance and currency of contingency plans ▪ Review if plans have been tested and report on findings ▪ Identify any improvements that have been actioned as a result of testing of the contingency plans		▪ Contingency plans
Financial planning	▪ The financial plan states the financial objectives and strategies and actions to achieve the objectives ▪ The financial plan identifies the source of funds for capital expenditure and recurrent costs ▪ The financial plan provides projections of operating statements (profit and loss) and statement of financial position (balance sheets)	▪ Review adequacy and effectiveness of financial planning and reporting processes ▪ Review current financial plan and assess whether the process is being followed		▪ Financial Plan

Audit Area	Effectiveness Criteria	Approach	Systems	Key Documents
	▪ The financial plan provide firm predictions on income for the next five years and reasonable indicative predictions beyond this period ▪ The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services ▪ Significant variances in actual / budget income and expenses are identified and corrective action taken where necessary			
Capital expenditure planning	▪ There is a capital expenditure plan that covers issues to be addressed, actions proposed, responsibilities and dates ▪ The plan provides reasons for capital expenditure and timing of expenditure ▪ The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan ▪ There is an adequate process to ensure that the capital expenditure plan is regularly updated and actioned	▪ Review adequacy and effectiveness of capital planning processes through examination of application of process and example documents	▪ Spreadsheets for capital planning and prioritisation	▪ Capital expenditure planning process outline ▪ Value engineering documents ▪ Risk management applied to investment planning ▪ Program management documents ▪ Review of capex estimate v outturn
Review of AMS	▪ A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current ▪ Independent reviews (e.g., internal audit) are performed of the asset management system	▪ Determine when the asset management plan was last updated and assess whether any significant changes have occurred ▪ Determine whether any independent reviews have been performed. If so, review results and action taken ▪ Consider the need to update the asset management plan based on the results of this review ▪ Determine when the AMS was last reviewed.		▪ Asset management plans

2.4 Time Period Covered by the Review

The asset management system review also covers the period from 1 July 2012 to 30 June 2015.

The previous asset management system review covered the period from 1 July 2009 to 30 June 2012 and was undertaken by Odysseus-imc Pty Ltd.

2.5 Time Period of the Review Process

The review commenced in September 2015 with preparation of the draft Audit Plan. Interviews with Water Corporation's staff were carried out on Monday 19 and Tuesday 20 October 2015 at the Corporation's head office in Leederville, Perth, WA. Site visits to Water Corporation's regional offices and facilities in Newman, Karratha, Bunbury and Perth Metro were carried out Wednesday 21, Thursday 22 and Friday 23 October 2015.

2.6 Details of the Licensee Representatives Participating in the Audit/Review

Details of representatives from the Water Corporation who participated in the review process[1] are provided in Table 2-2 below.

Table 2-2 Details of Licensee Representatives

Name	Role
Ashley Vincent	General Manager Planning and Capability Group
Russell Pascoe	Branch Manager Asset Management Branch
Sugandree Muruvan	Strategy & Integration Manager, Asset Management Branch
Paul Vanderwal	Section Manager – Strategic Issues, Infrastructure Planning Branch
Corey Dykstra	Manager Financial Evaluation, Pricing and Evaluation Branch
Ken Walker	Capability Assessment Manager, Asset Management Branch
Brian Robertson	Branch Manager Capital Investment Branch
Trisha Lee	Business Improvement Project Manager, Project Management Branch
Paul Prottey	Operations Services Manager
Jaimie Porteous	Manager Asset Management, Aroona Alliance
Kim Savage	Maintenance Planning Manager, Regional Asset Management Branch
Stephen Dejussing	Program Manager, Operations Integration
Michael Wright	Manager Assets, Perth Regional Alliance
Gordon Groth	Manager – Environmental Performance, Safety Environment & Aboriginal Affairs
Michael Hastings	Senior Strategy Manager, Strategy & Corporate Analytics
Claire Bickford	Business Planning Manager, Strategy & Corporate Analytics
Duncan Bell	Strategy Development Manager, Strategy & Corporate Analytics
Anthony Paonni	Senior Business Analyst, Financial Management
Paul Hurst	Program Manager, Capital Investment Branch
Mandy Damant	Manager Risk & Assurance, Risk & Assurance Branch
Elleke Bosworth	Operational Risk Manager, Risk & Assurance Branch
Sam Lee Mohan	Supervising Engineer Renewals, Asset Management Branch
Tino Galati	Information Systems & Data Manager, Asset Management Branch
Narelle D'Amico	Service Delivery Manager, North West Region

[1] As at 23 October 2015

Name	Role
Rodney Hodson	Operator, North West Region
Brad Gillies	Manager Performance & Improvement, Aroona Alliance
John Janssen	Regional Manager, South West Region
Nicky Waite	Service Delivery Manager, South West Region
Jason Ringrose	Operations Service Manager, South West Region

2.7 Details of Key Documents and Other Information Sources

Details of the key documents provided to us by Water Corporation and other information sources that were used during the course of this asset management system review are included in Appendix C.

2.8 Details of Reviewers Participating in the Review and Hours Utilised

The review team comprised four staff members from Cardno.

Details of their roles and hours utilised in the review process are provided in the table below.

Table 2-3 Details of Review Team Members

Name	Organisation	Role	Summary of Task	Hours Utilised
Stephen Walker	Cardno	▪ Reviewer/ Project Manager	▪ Project Management ▪ Prepare audit plan ▪ Undertake audit ▪ Prepare audit report	120
Justin Edwards	Cardno	▪ Reviewer	▪ Undertake audit ▪ Prepare audit report	160
John MacDonald	Cardno	▪ Review assistant	▪ Prepare audit plan	40
Ella Hingston	Cardno	▪ Review assistant	▪ Documentation QA review	80

3 Licensee's Response to Previous Recommendations

In the previous asset management review, a series of actions were recommended or suggested to address asset management deficiencies or process improvement opportunities.

3.1 Previous Review Ineffective Components and Recommendations

Details of the actions completed by Water Corporation against each of the previous asset management system review recommendations are presented in Table 3-1 below.

Table 3-1 Previous Review Ineffective Components and Recommendations

A. Resolved before end of previous review period				
Reference (no./year)	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)**	**Auditor's recommendation or action undertaken**	**Date resolved**	**Further action required (Yes/No/Not applicable) & details of further action required including current recommendation reference if applicable**

B. Resolved during current review period				
Reference (no./year)	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)**	**Auditor's recommendation or action undertaken**	**Date resolved**	**Further action required (Yes/No/Not applicable) & details of further action required including current recommendation reference if applicable**
1/2013	**Asset Planning**	*Renewal Planning Group to develop supporting documentation such as:*	October 2013	No further action required

B. Resolved during current review period				
	Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning. The previous review report noted the following: ▪ The Renewal Planning Section is a recent development. Extensive effort has been applied to identify the approach to be taken for Renewal Planning. As such documentation is still to be developed.	▪ *Business case; and* ▪ *Process manual.* Water Corporation developed a number of documents to support the renewals planning process in response to this recommendation. These include: ▪ A revised process diagram that outlines the responsibilities of the Asset Management Branch, the Regions and the Corporation's Alliances in relation to planning condition assessments, risk assessments and the prioritisation of renewals projects. ▪ Renewal Planning Guidelines, which were approved and first rolled out during training sessions on the renewals planning processes in 2014 ▪ Business Rules for the Asset Condition Assessment and Asset Risk Assessment processes ▪ A 2013/14 Business Plan, with the relevant Strategic Investment Business Cases approved by the Corporation's Executive (with Business Plans to cover the 2014/15 and 2015/16 also having been developed since the previous asset management review).		
2/2013	**Asset Planning** Plans are regularly reviewed and updated. The previous review report noted the following: ▪ Asset management planning procedures are of varying state, quality and are out of date.	*Asset management planning procedures objectives, purpose and content to be reviewed. All procedures to be updated in line with agreed approach. Procedure document needs to reflect current approach including asset renewal, strategy statements, etc.* Water Corporation reviewed all processes and developed streamlined processes in alignment with its then new structure after the 2012 review. Processes were mapped, with supporting documentation updated and made available in the Corporation's CIMod and CorDocs document management systems.	December 2013	No further action required

B. Resolved during current review period				
3/2013	**Asset Planning** Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning. The previous review report noted the following: ▪ Although great effort has gone into the development of the 'Our Plan, Monitor and Assess Asset Performance, Condition & Risk Story' the implementation of the story is vital to achieving the desired state.	*Implement the 'Our Plan, Monitor and Assess Asset Performance, Condition & Risk Story' by setting clear target dates and responsibilities in order to achieve the desired result.* The strategy for condition assessment of key asset classes have been revised to ensure the program is well targeted, provides value for money, and can support robust decision making and deterioration modelling. The Asset Risk Assessment process and system was reviewed to improve usage within the business, consistency, and ensure the outcomes are embedded in capital planning processes. The Corporation's asset renewals process was updated to show the link between the Asset Risk Assessment process and the capital planning process (refer to 1/2013) Improvement opportunities and actions prioritised by Water Corporation in its Asset Strategy Development Priorities spreadsheets are actioned through the annual business plans, which is an ongoing process.	December 2013	No further action required to address recommendation. Ongoing improvements will be planned and actioned as more information becomes available
5/2013	**Asset Planning** Lifecycle costs of owning and operating assets are assessed. The previous review report noted the following: ▪ Supporting tools are needed to assist in the analysis process.	*Improve the renewals forecasting of sewer mains (large and small) by obtaining an appropriate tool to undertake the analysis.* A review of industry best practice decision support tools and suitability for Water Corporation was undertaken. A number of tools were considered, with a review completed to support the selection of the most appropriate approach. As a result of this work, Water Corporation selected the InfoNet tool to use in its data analysis process and to support the decision making process related to the renewals forecasting of its sewer mains.	October 2013	No further action required
6/2013	**Asset Planning** Lifecycle costs of owning and operating assets are assessed.	*Improve forecasting of whole of life cost for mechanical and electrical assets by obtaining an appropriate tool.*	February 2014	No further action required

B. Resolved during current review period				
	The previous review report noted the following: ▪ Supporting tools are needed to assist in the analysis process.	Water Corporation completed a comprehensive review of the available approaches to consider how these would fit with Corporation's requirements and how the systems would be integrated and supported. As a result of this work, Water Corporation has adopted and implemented SALVO (Strategic Asset Lifecycle Values Optimisation, a UK-developed asset decision tool, for this purpose.		
8/2013	**Asset Planning** Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning. The previous review report noted the following: ▪ Good quality data for strategic planning is not currently available.	*The data collection KPIs process needs to be re-initiated to ensure the collection of the data is undertaken in a timely manner.* Refer to 7/2013	Refer to 7/2013	Refer to 7/2013
9/2013	**Asset Planning** Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning. The previous review report noted the following: ▪ Current process for tracking improvements from asset class plans can be enhanced. A more robust process is required for the Strategic Statements.	*Enhance the current improvement implementation process by setting clear target dates, assigning responsibilities and monitoring progress monthly in line with group meetings.* Water Corporation monitors improvements from its Asset Class Strategies through its Asset Strategy Development Priorities. Actions are prioritised and then incorporated into the Branch Business Plan that cascade down to section plans and individual performance agreements.	August 2013	No further action required.
10/2013	**Asset Creation and Acquisition** Projects reflect sound engineering and business decisions. The previous review report noted the following: ▪ The 'Assess Asset Capability' process analyses all relevant asset performance, condition and risk information, assesses options and initiates actions in time to ensure assets can meet future performance requirements and deliver service commitments to customers. The optioneering process comes in to play when an issue of capability has been identified as an emerging issue through the Assess Asset Capability. It is in effect	*The Optioneering process to be implemented as a feed-in to the Asset Acquisition Process and that training includes raising awareness in relevant corporate branches and the regions.* The 'Optioneering' process is an initiative that Water Corporation introduced in late 2011. It is specifically geared at ensuring all available business solutions are properly considered prior to accepting a capital solution. Prior to the 2012 asset management review of the 2009-2012 period, Water Corporation work was already underway to integrate this concept into the Asset Acquisition Process.	December 2013	No further action required. As the process is now established, this action can be closed out as business as usual.

B. Resolved during current review period				
	the business case development stage where a range of options (including operational, capital, challenging of standards etc) are considered and evaluated to ensure that the most cost effective whole of life solution is being adopted. Optioneering will allow a broader project analysis to be undertaken at the high level, e.g. instead of commencing a capital project to solve the problem, identify operational projects that may solve the problem or defer the need for capital. The Optioneering process will support identification of non- capital options as an alternative to a capital solution.	The concept of Optioneering as a part of the Asset Acquisition process has been endorsed by Water Corporation's CIMC (Capital Investment Management Committee). The process for implementing the concept to Water Corporation's relevant corporate and regional branches, as well as Alliances, is ongoing. The Optioneering process has been integrated into the Asset Acquisition 'Ribbon' diagram to provide a holistic view of Water Corporation's processes. Water Corporation has identified critical assets and completed the Optioneering process for these assets. Optioneering for projects related to high risk systems is ongoing. The Optioneering process is incorporated in the training package for the 'Assess Asset Capability process' that is available through Cascade. Optioneering training has been provided for around 60 relevant staff. Further work is being done by Water Corporation to develop an enhanced Optioneering Training Package.		
11/2013	**Asset Disposal** The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken. The previous review report noted the following: ▪ The System Capability Forecasting (SCF) Tool will enable ongoing monitoring of asset performance and will support timely and effective expenditure.	*Finish the development of the SCF and implement across the corporation and regions as soon as possible.* Water Corporation has completed the SCF development program. Implementation across the Corporation for priority schemes was carried out during 2012/13 and across priority 2 and 3 schemes over the next two years. For water production and wastewater treatment assets, Aroona's system (TASK) has been used to identify the outputs of SCF and SCM that are required to facilitate the capture and monitoring of triggers for planning and making capital investment decisions. SCF indicators for wastewater, ground water and surface water have been provided and indicators for Critical Assets have been identified. SCF is being implemented on critical assets. The timeframe has been aligned with the availability of new version of SCM.	June 2015	No further action required We confirm that the SCF development program has been complete. We found at audit that Water Corporation will continue to develop the tool over time to increase coverage and functionality.

B. Resolved during current review period				
12/2013	**Asset Disposal** Under-utilised and under-performing assets are identified as part of a regular systematic review process. The previous review report noted the following: ▪ The corporation does not have full knowledge of the assets to be disposed.	*An audit programme should be established for assets requiring disposal across the corporation and regions.* The Corporation has compiled an extensive list of assets requiring disposal over the last four years. These were prioritised based on risk and by the end of 2012 all identified high risk assets were completed. The list of assets to be disposed is available and regularly updated. Annual working documents are available for the Surplus Asset Disposal Program, the Original Program and the 2008/09 Program, and the 8yr Program compiled in June 2011.	June 2013	No further action required
13/2013	**Asset Disposal** Under-utilised and under-performing assets are identified as part of a regular systematic review process. The previous review report noted the following: ▪ In discussions with WaterCorp personnel they expressed uncertainty about who was responsible for managing asset disposal.	*Responsibility for asset disposal should be clearly identified in all situations e.g. post project disposal.* Although included as a recommendation in the 2013 asset management system review report, Water Corporation's responsibilities for asset disposal were already defined under existing process. The responsibility for asset disposal is outlined in the Guideline. Work has been undertaken by Water Corporation to ensure relevant staff understand the process and follow it.	February 2013	No further action required
14/2013	**Asset Disposal** Under-utilised and under-performing assets are identified as part of a regular systematic review process. The previous review report noted the following: ▪ In discussions with WaterCorp personnel they expressed uncertainty about who was responsible for managing asset disposal.	*All personnel involved in the asset disposal process should be trained in the process end to end.* Water Corporation has provided awareness/training presentation to its Asset Managers, Program Managers, Regional Project Managers and Capability Managers, Infrastructure Planning Branch and Project Management Branch.	October 2013	No further action required
15/2013	**Asset Disposal** Under-utilised and under-performing assets are identified as part of a regular systematic review process. The previous review report noted the following:	*Develop a 3 to 5 year rolling disposal programme that is monitored as per current programme processes. The programme should become part of the normal project business requirements where it can be reported against and monitored.*	N/A	No further action required

B. Resolved during current review period				
	▪ Asset disposal appears to be undertaken in an adhoc manner in the Regions and as such there is the potential for assets identified as needing disposal may not be disposed.	Although this was included as a recommendation in the previous asset management review report, no action was required. Water Corporation already had a program to dispose of all surplus assets identified as not required for operating purposes that had been developed and was in implementation mode for the 3 years prior to the previous review. All high risks assets identified in this program were disposed and the program was wound up. Water Corporation's current approach for asset disposals is that funding is requested via normal budgeting process by individual operating branches as a component of new projects, where relevant, or as a standalone operating business case. This is in accordance with the Corporation's documented asset disposal process.		
16/2013	**Asset Disposal** There is a replacement strategy for assets. The previous review report noted the following: ▪ The system capability matrix process will support identification of non-capital options as an alternative to a capital solution.	*Complete the implementation of the system capability matrix.* Water Corporation has completed the implementation of SCM is complete and the application is capable of reporting capital solutions through automated links. The SCM supports identification and reporting of operational solutions, although manually at present. The Assess Asset Capability process is associated under the Level 1 process, Plan Infrastructure Assets. The Corporation's Optioneering process is associated with the Level 2 process.	December 2013	No further action required
19/2013	**Asset Operations** Operational policies and procedures are documented and linked to service levels required. The previous review report noted the following: ▪ Currently critical control points are used to monitor the performance of the assets at the treatment plants. Critical control reports are generated weekly with a monthly view. Trends are reviewed with managers each week.	*Work towards the monitoring of Process Control Points for all treatment plant.* Water Corporation has developed and implemented process control tables for all metro WWTPs and large country WWTPs. These capture both Process and Critical Control Points of the WWTPs. Aroona TASK system has been used to complete summaries for Wanneroo, Woodman Point and Beenyup. In these TASK summaries there is a chapter that is dedicated to levels of services where	June 2014	No further action required.

B. Resolved during current review period				
	The Aroona Alliance use Process Control Tables to compare operations against process control points. If results are different to set trigger points, an Asset Deficiency Report (ADR) is produced (typically mechanical and electrical equipment). Woodman Point WWTP is working towards also monitoring and reporting against Process Control Points. There is a desire to extend the monitoring of Process Control Points.	the critical control points are mentioned in order to provide operators with a threshold when monitoring these critical control points. Some control points for Beenyup and Woodman Point WWTPs that are critical for SCF are now being monitored in the SCM/SCF application.		
23/2013	**Asset Maintenance** Maintenance policies and procedures are documented and linked to service levels required. The previous review report noted the following: ▪ The current documentation process needs to be completed.	*Document the process for incorporation of maintenance standards for new assets.* Water Corporation has developed complete and detailed documentation for the "Plan Asset Maintenance Process" and the "Formulate and Review Asset Maintenance standards Process" and this is now in active use. The Plan Asset Maintenance process covers two streams, one of which is the introduction of new assets and new technologies. Maintenance standards for new assets are incorporated in hand over process.	July 2013	No further action required.
24/2013	**Asset Maintenance** Regular inspections are undertaken of asset performance and condition. The previous review report noted the following: ▪ The current process averages condition across assets with the risk that the condition rating may not reflect the actual results.	*Review condition assessment process to ensure that the condition assessment does not skew the rating by averaging good and bad condition, e.g. ensure the current process isolates poor condition assets from the overall condition (use of ADRs).* The review of the existing ACA process that commenced in the first half of 2012 identified the need to assess the condition of different components of the asset separately, e.g. tank roof, concrete structure, liner, stand, etc, in order to ensure that poor condition assets can be identified. Water Corporation has implemented the strategies that have the assets broken down into components. Renewals and ACA process are in place for identified assets.	December 2013	No further action required.
25/2013	**Asset Maintenance**	*Continue the development of dashboards as the need is identified.*	Ongoing	No further action required.

B. Resolved during current review period				
	Maintenance policies and procedures are documented and linked to service levels required. The previous review report noted the following: ▪ Dashboards are a useful and effective way of monitoring performance of the assets.	As part of its ongoing program of continuous improvements, the Corporation has developed the Asset Management Performance Dashboard, which provides a series of report that can be accessed by all staff through the intranet site. These include the Business Performance Report and the Data Quality Work Order Dashboard Report, which reports on incomplete work order information and is able to be drilled down back into the original work order recorded in SAP.		This will be an ongoing function as new needs are identified.
29/2013	**Asset Maintenance** Regular inspections are undertaken of asset performance and condition. The previous review report noted the following: ▪ Assets were inspected at Newman. Hydrants installed by BHP prior to handover to WaterCorp are American above ground hydrants. They are now exhibiting rusting failure where the riser meets the ground level. They are being replaced with standard hydrants as they fail. Inspections were being performed on the sewer manholes at the time of the visit. Inspection of the lids indicated a number of lids popping as a result of gas build up in the mains. The concrete in the lids was either cracking or breaking up as a result of upward pressures.	*As part of the Maintenance Strategy in Newman, the Corporation conducts preventative jet washing of sewers where there are known blockage hotspots based on past blockage history. It should be noted that for this specific area, there is no intensive preventative maintenance plan in place as there hasn't been a high number of blockages recorded. In addition, the following preventative actions are undertaken to minimise blockages in Newman:* ▪ *The Civil Technical Consultant uses a CCTV camera to view the internal of the sewers. He advises that his camera investigations have shown that there is some root intrusion mostly where there is earthenware pipe. Most of the roots observed in the pipes are not large, but fibres.* ▪ *The Corporation employs Industrial Waste Inspectors who are engaged to check industrial and commercial premises who have industrial waste permits to ensure that grease traps are being used and maintained correctly to prevent substances entering the sewer system which may cause blockages and inconvenience to customers.* *To address the issues related to the Newman assets above, it is intended that the Asset*	July 2013	No further action required

B. Resolved during current review period				
		Management Branch monitor repeat failures centrally and notify the regions of the repeat failure so that the regions identify the actions required to rectify the issues. Repeat failures should be monitored and reported centrally. Should repeat failures demonstrate an ongoing trend, strategies should be developed to overcome the trends. Refer to: ▪ 53/2013: Newman Report – Additional Requirements: Fire Hydrants ▪ 54/2013: Newman Report – Additional Requirements: PVC Water Mains ▪ 55/2013: Newman Report – Additional Requirements: Access Chamber Lids ▪ 56/2013: Newman Report – Additional Requirements: Jabbarup Crescent Main Failure		
30/2013	**Risk Management** Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system. The previous review report noted the following: ▪ It is recognised that improvements to the ARA are required for it to be successfully applied in the Corporation.	*Improve the process documentation supporting ARA, such as guidelines with examples, criteria matrix, links to planning process, etc.* A review of the ARA process commenced in early 2012. The process and system was reviewed to improve usage and consistency within the business and to ensure the outcomes are embedded in capital planning processes. Water Corporation has updated the ARA rules and training has been completed.	December 2013	No further action required.
31/2013	**Risk Management** Risks are documented in a risk register and treatment plans are actioned and monitored. The previous review report noted the following: ▪ Corporate risks are not currently managed centrally in one risk information system.	*On procuring the new Risk Information System (register), and in accordance with the risk management principles, existing and new corporate risk be consolidated into the new system.* Water Corporation's new Risk Information System was introduced in December 2014. The corporate risks that are centrally managed in the new, consolidated system are:	December 2014	No further action required

B. Resolved during current review period				
		▪ Business risks ▪ OSH risks ▪ Environmental risks ▪ Project risks The new system went live to the Business in February 2015, with the overall business starting to use the system as an active risk management tool in the first quarter of 2015.		
32/2013	**Risk Management** The probability and consequence of risk failure are regularly assessed. The previous review report noted the following: ▪ It is not evident that risk ratings have been reviewed after the asset failure.	*When a failure is recorded and subsequently completed, the risk review should be undertaken as part of the incident process and identified on the incident form, e.g. who reviewed the risk, when it was reviewed and what the outcomes were.* Water Corporation has fully implemented Sentinel, a new incident management system. This captures all incidents, including asset failures, and allows reviews to support the failure mode analysis and gather opportunistic condition data for key asset classes to be undertaken.	June 2014	No further action required
33/2013	**Risk Management** Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system. The previous review report noted the following: ▪ Understanding and acceptance of the Asset Risk Assessment in the regions can be improved.	*Advise the regions on the benefits of the Asset Risk Assessment and how they can help the organisation achieve business objectives.* Water Corporation's Renewals Planning team undertook a series of regional visits in 2013 to improve regional understanding of the ARA process. This is supported by ongoing communication with the regions about the benefits of ARA and the changes. Water Corporation considers that the revised business rules have improved the clarity on the use of ARA and links to business objectives.	December 2013	No further action required. Communication with the regions is ongoing
34/2013	**Risk Management** Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system.	*Align NW Regions approach to the use of the Asset Risk Assessment.* Refer to 33/2013.	December 2013	No further action required.

B. Resolved during current review period				
	The previous review report noted the following: ▪ NW Region is not currently using the Asset Risk Assessment.			
36/2013	**Risk Management** Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system. The previous review report noted the following: ▪ It is recognised that improvements to the Asset Risk Assessment are required for it to be successfully applied in the Corporation.	*Embed the Asset Risk Assessment within the organisation by making it more user friendly and improving education.* Refer to 33/2013.	December 2013	No further action required.
37/2013	**Risk Management** Risks are documented in a risk register and treatment plans are actioned and monitored. The previous review report noted the following: ▪ Corporate risks are not currently managed centrally in one risk information system.	*On procuring the new Risk information system (register), incorporate Water Quality risks into the system.* Water Corporation's new Risk Information System was introduced in December 2014. Water Quality process related risks are maintained in the new system. A detailed risk barrier assessment is carried out by the Drinking Water Quality process which is based on the Drinking Water Quality Guidelines methodology. This risk assessment has been translated into the Corporate risk methodology and incorporated into the new system. Regional tactical profiles refer to the cross-section of tactical risks associated with the region.	June 2014	No further action required
38/2013	**Risk Management** Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system. The previous review report noted the following: ▪ Current failure mode data especially in NW Region is of poor quality. Every "repair" work order requires mandatory fault cause and fault position in context with the repair work being undertaken to be captured and feedback. There has been extensive training and instruction issued on this requirement.	*Establish codes for failure mode input into work orders and make it mandatory to be completed.* Water Corporation introduced the capability to provide feedback during failure mode/malfunction into the business for Mechanical, Electrical, and Civil work orders in August 2014. A Quick reference sheet was communicated to all PDA users and the process is now considered BAU for those who use Fieldworks, ongoing support and clarification for users is provided.	At completion of BBB project.	No further action required.

B. Resolved during current review period				
39/2013	**Risk Management** Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system. The previous review report noted the following: ▪ Currently the identification of consequences of asset failure is adhoc.	*Implement a consistent approach to the identification of consequences of asset failure across WaterCorp.* The revised Asset Risk Assessment process and consistent decision support frameworks implemented by Water Corporation support the consistent approach to identification of consequence of failure for asset failures.	June 2015	No further action required.
40/2013	**Risk Management** Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system. The previous review report noted the following: ▪ There is no apparent link between incidents and analysis resulting from the incident.	*Re-visit the recommendation from the AMSER 2009 audit and review incident reports to ensure cause of incident, links/references to the root cause analysis document and the date completed are recorded.* As noted for 31/2013, Water Corporation has fully implemented Sentinel, a new incident management system. This captures all incidents, including asset failures, and allows reviews to support the failure mode analysis and gather opportunistic condition data for key asset classes to be undertaken.	June 2014	No further action required.
41/2013	**Risk Management** Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system. The previous review report noted the following: ▪ Data can be entered into the incident management systems resulting in inconsistent data.	*Develop consistency of approach to data entry by incorporating standard codes for incidents so that reporting can be structured.* Refer to 40/2013. Water Corporation has established a standard set of incident codes for use in incident recording in its new incident management system	June 2014	No further action required.
42/2013	**Risk Management** Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system. The previous review report noted the following: ▪ Gaps have been identified in the response to incidents based on the degree of impact of the incident e.g. need for root cause analysis	*Enhance the E2E process for incident management that addresses incidents that create different levels of impact.* Water Corporation has implemented the ICAM (Incident Cause Analysis Method) process since the last asset management review. Additionally, Aroona Asset Management has increased the focus on incident management via its Technical Service group. The Technical Service group responds to Corporate Incidents according to	December 2013	No further action required.

B. Resolved during current review period				
		any enhanced corporate process. Other local incidents are picked up and treated locally.		
43/2013	**Risk Management** Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system. The previous review report noted the following: ▪ Gaps have been identified in the response to incidents based on the degree of impact of the incident e.g. need for root cause analysis	*Develop triggers within the incident management system in line with a decision tree to identify and monitor future actions to address the incident raised.* Refer to 42/2013.	December 2013	No further action required.
44/2013	**Risk Management** Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system. The previous review report noted the following: ▪ There are gaps in the data being reported for incidents.	*Review the data quality within the incident management system to address the supporting processes, data and the effectiveness of the system.* Refer to 42/2013.	December 2013	No further action required.
45/2013	**Risk Management** Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system. The previous review report noted the following: ▪ There is no documented evidence of the issues and responses associated with the Jabbarup main failure e.g. root cause analysis, investigations etc.	*Water Corporation needs to complete the investigation on the Jabbarup main failure and identify future actions as required.* Refer to 56/2013: Newman Report – Additional Requirements: Jabbarup Crescent Main Failure	March 2013	No further action required.
46/2013	**Risk Management** Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system. The previous review report noted the following: ▪ Critical assets are not known within the North West region and, therefore, failures are occurring in areas that could have been avoided if the consequences were known and appropriate controls put in place.	*A formal criticality assessment be applied across the corporation.to improve the prioritisation of assets and associated works.* As noted previously, Water Corporation has reviewed and implemented ARA process and systems improvements. Refer to 1/2013 and 3/2013.	December 2013	No further action required.

B. Resolved during current review period				
47/2013	**Risk Management** Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system. The previous review report noted the following: ▪ With respect to the Jabbarup Crescent failure in Newman there doesn't appear to have been any internal review conducted. The Region does not appear to have contacted anyone centrally to support and/or assist them with this issue or to follow it through to a long term.	*Develop and implement a strategy to ensure multiple or repeat faults or fixes for the same address or asset are highlighted and investigated.* Refer to 56/2013: Newman Report – Additional Requirements: Jabbarup Crescent Main Failure Regional Asset Managers monitor trends in multiple failures to highlight and remedy asset issues. Water Corporation has a system is in place to provide feedback on location when work order is closed out and reports are available through SAP. "X Marks The Spot" is an application that uses the Mobile Computing Application to generate more sophisticated reporting and trend analysis to allow investigations of multiple occurrences.	March 2013	No further action required.
48/2013	**Contingency Planning** Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks. The previous review report noted the following: ▪ Generic contingency plan templates have been developed for Water Treatment Plant, Water Pumping Stations, Sewerage Treatment Plant, Sewerage Pumping Stations, Chemical Dosing Plant, Sewer Gravity Mains, Sewerage Pumping Mains, Water Mains, and Water Storage Complex's. Contingency plans are either based on safety e.g. Cl2 gas or event based e.g. cyclone, bushfires. More recently operational contingency plans have been produced in the North West Region and are in draft format. These plans have been produced for Onslow, East Pilbara and Hedland. There is confusion however across WaterCorp personnel with respect to the purpose, use and definition of contingency plans. This confusion should be addressed when personnel have access to the draft contingency planning guidelines.	*Finalise the draft contingency planning guidelines.* Water Corporation has finalised the draft of its Contingency Planning Guideline and it has been communicated to the main process users within the business.	April 2013	No further action required.

B. Resolved during current review period				
50/2013	**Contingency Planning** Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks. The previous review report noted the following: ▪ The NW Region has put in extensive efforts to producing a contingency spreadsheet that currently sits in isolation from the rest of the Organisation.	*The concept behind the NW region spreadsheet should be integrated with the corporate system such that it becomes accessible to all personnel responsible for repairing operational failures.* Water Corporation has used the concept and information used in the North West Region contingency spreadsheet to support the scope definition for development of the new SCM/ARA Contingency Planning Module. Refer to 49/2013.	July 2014	No further action required.
51/2013	**Contingency Planning** Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks. The previous review report noted the following: ▪ There is an apparent confusion within WaterCorp to the meaning and application of incident management, emergency management and contingency planning. The need for improved understanding of Water Corporation's contingency planning processes is understood and supported. ▪ Work is progressing and the requirement for additional support/focus across the asset management and service delivery should be explored.	*The naming convention for Contingency planning needs to be clarified and defined to Water Corporation personnel with the view to eliminating confusion between the terms incident management, emergency management and contingency planning.* Water Corporation has completed the initial communication of the Operational Contingency Planning Guideline, including clarification of terms and responsibilities, to the main process users - Asset Managers and Capability Managers. Additional general communication to a wider audience, that includes all relevant areas of the business with a focus on the strategy to support Service Delivery Groups, has been also been undertaken	April 2013	No further action required.
52/2013	**Review of the Asset Management System** A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current. The previous review report noted the following: ▪ The Strategic Asset Management Plan (SAMP) contains recommendations for improvement for each group within the AM Branch. Recent reviews such as this review and the WSAA benchmarking project have identified additional improvements.	*As a result of this review and the WSAA benchmarking, the SAMP should be updated to include the recommendations compiled in this review that are relevant for each group in the AM Branch.* *This consolidation would allow the internal and external recommendations to be captured in the one improvement register.* Water Corporation develops its SAMP every two years and it is reviewed and updated where required annually.	May 2013	No further action required

B. Resolved during current review period				
		Water Corporation has updated its Asset Strategy Development Priorities and Strategic Asset Management Plan since the previous asset management review. The recommendations from the AMSER 2012 report and WSAA Asset Management Performance Improvement project undertaken in 2012 were incorporated in the updated documents.		
Newman Report	**Newman Report – Additional Requirements: Fire Hydrants**	*Hydrants requiring repair and replacement* Previously Water Corporation has installed hydrants for water supply systems even if it was not the asset owner. Although it also maintained and replaced the fire hydrants, as the Corporation was not the asset owner, they were not inspected as part of an asset condition assessment program and no operability or performance testing of the assets was carried out by the Corporation. Water Corporation has a maintenance standard for its fire hydrants. A review of gaps in its coverage has previously been completed and the Corporation has developed a replacement program for this asset type. For the replacement of the old, US style, above ground fire hydrants located in Newman, Water Corporation has completed the replacements for the four assets that required immediate change out. The work replaced the above ground fire hydrants with below ground assets that conform to the Corporation's asset standard. The four hydrants that have been replaced were confirmed during the Newman site visit. A further 57 replacements have been identified but these are not high priority replacements. These remaining hydrants are included in the Corporations' replacement program. Although there is a replacement program, the Corporation is continuing to monitor the above-ground hydrants in Newman to identify any that can be reactively replaced due to leaks or operational issues.	May 2013	No further action required Water Corporation has replaced the hydrants considered high risk. The remaining hydrants will be assessed as part of Water Corporation's overall replacement strategy

B. Resolved during current review period				
Newman Report	**Newman Report – Additional Requirements: PVC Water Mains**	*Managing leaks in Newman.* Water Corporation has an active leakage management program and although water loss through leakage was not considered to be significant in Newman, leak repairs and investigations for minor leaks that were not visible from ground level were included as part of the program. The Corporation completed a meter leak detection survey in 2013 and carried out repairs and replacements where these were identified. An assessment of the water losses in terms of litres per minute was used to prioritise the work. Water Corporation provided this analysis as evidence during the site visit and we confirmed that repair work has been completed on a prioritised basis. Customer-side leaks on the service pipe are the responsibility of the property owner. However, as approximately 90% of the residential properties in Newman are owned by BHP, Water Corporation provided BHP with details of customer-side leaks, where appropriate. If the property was identified as being vacant, the meter was capped in order to stop water being lost.	June 2013	No further action required
Newman Report	**Newman Report – Additional Requirements: Access Chamber Lids**	*Asset Condition Assessment on AC lids* Prior to the 2015 asset management system review, Water Corporation identified that it had incorrectly reported its progress against a 2012 asset management system review recommendation for replacing access chambers in Newman. A site visit to Newman during the 2012 asset management system review and inspection of sewer access chamber lids indicated a number of lids popping as a result of gas build-up in the sewer main. Where this was observed, the concrete in the lids was either cracking or breaking-up as a result of the upwards pressure. The survey completed in 2013 identified 20 high-risk access chambers for replacement, with a	November 2015	No further action required

B. Resolved during current review period

		further 162 moderate and low priority replacements included as part of Water Corporation's asset renewals planning program. Water Corporation had reported to the ERA in January 2014 that all the high risk lids had been repaired and that operational funding was in place to address the remaining lids using a risk-based approach, with a contract in place for carrying out the works. Completion of the action was also reported to the ERA in August 2014 and 2015. However, in October 2015, Water Corporation identified that only 10 of the 20 high priority access chamber lids had been replaced. A further 55 moderate and low priority access chamber lids have also been replaced using available funding. Therefore, although Water Corporation has previously communicated to the ERA that all 20 high priority access chamber lids had been successfully replaced, together with the 162 moderate and low priority lids funded and contracted to be replaced during 2013/14, this was identified as not being correct. Originally Water Corporation had looked to fund the renewals through capital funding. However, capitalising the access chamber lids was not accepted by the Business. As a result, the funding of the replacements was addressed as an operational expense, with funding from the operational budget sought to replace 50% of the lids requiring replacement, including the 20 identified as being high priority. However, due to issues with access to some of the identified access chambers, the predicted costs were more than was covered by the sourced funding. Therefore, Water Corporation revised its approach to complete lids that were easier to access. The replacement of the remaining lids is expected to be completed by November 2015. Water Corporation provided the purchase order it issued to the contractor undertaking the work as evidence that the work will be completed by the revised timeline. The miscommunication to the ERA occurred at the point where capital funding was rejected by the

B. Resolved during current review period

		Business, and operational funding became the source of money to complete the work. The work to complete the action was considered closed as the Region was assumed to be addressing the issue and undertaking a risk-based approach to prioritise the replacements. A failure in the monitoring and control of the improvement actions and inadequate validation of the completion of the actual works on the ground has been identified by the Corporation as one of the main reasons behind the incorrect reporting of progress to the ERA. As a result of this issue, Water Corporation has looked to strengthen its monitoring of response to improvement actions for operational or maintenance matters, including requiring documented evidence to be provided to show that funds have been requested and approved, that work activities have been loaded into SAP and are validated when closed. At times, photographic evidence may also be required to show the completed work. At the time of the Newman site visit, Water Corporation still had 117 of the 182 access chamber lids to replace. The Regional office is providing weekly email updates and examples of these were observed. Site inspections confirmed the high priority access chamber lid replacements that the Corporation has completed to date. The replacement project has a briefing scope. The access chambers do not have a Functional Location ID, meaning that the work is not managed through SAP to an individual asset but is recorded in the system to a high-level pipe length asset ID. SAP work orders completed by the operators located in Newman are reported back to Port Headland, with Port Headland reporting back to the Karratha head office for Water Corporation's North West Region. Daily meeting are held between Port Headland and Newman to discuss and confirm the work plan for each day. We note that Water Corporation's sewer access chamber covers are not capitalised assets. This policy differentiates from numerous other Australian water businesses, where the covers are considered

B. Resolved during current review period				
		to be capital expenditure items. We also note that some of the work to replace the lids has involved construction work to alter the size of the chamber due to it being covered and needing to be raised back to ground level. We recommend that Water Corporation reviews its capitalisation policy to confirm whether the access chamber lids should be treated as capital assets.		
Newman Report	**Newman Report – Additional Requirements: Jabbarup Crescent Main Failure**	*Improvement to the Incident Management System* With regard to the Jabbarup Crescent failure, Water Corporation has implemented an incident management process to ensure that major failures can be analysed, further investigated and escalated, if required. The Corporation uses a system called Sentinel as its hazard and incident register. Events are recorded and the system allows repeat failures to be identified and escalated for investigation. As a result, there is now a clear link from events occurring in the Regions back to the central system. In addition, the Corporation completed measle mapping of water main breaks in the local area around Jebbarup Crescent. This analysis, which was provided during the review, has shown no issues regarding repeat failures on the same asset or a concentration of failures on nearby assets, with water main failures widely spread out in the scheme. Water Corporation has concluded that the failure was likely to be the result of ground movement due to the heat. The water main in Jabbarup Crescent has now been diverted away from the affected property to ensure that repeat failures are avoided. The re-routing of the water main was confirmed during the site visit. The Corporation has also sought advice from BHP, the owner of the property regarding the future of the property affected by the subsidence, with the property being vacant for the last three years. However, the Corporation has not received any response back from BHP regarding future occupation of the property or compensation for the event, with the property likely to not be considered	June 2014	No further action required

B. Resolved during current review period				
		a high priority for BHP. The site is currently controlled with fencing.		

C. Unresolved at end of current review period				
Reference (no./year)	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)**	**Auditor's recommendation or action undertaken**	**Date resolved**	**Further action required (Yes/No/Not applicable) & details of further action required including current recommendation reference if applicable**
4/2013	**Asset Planning** Asset management plan covers key requirements. The previous review report noted the following: ▪ The AM Branch is replacing Asset Class Plans with Strategic Statements.	*Complete the remaining 17 Strategic Statements.* WC has completed asset class strategies for its most critical asset base and due to resource constraints has suspended any further work on the strategies until post restructure of the Assets Planning Group.	Partially resolved	Water Corporation to complete the remaining Asset Class Strategies that it has not yet addressed. No date for completing the remaining Asset Class Strategies has been set by Water Corporation.
7/2013	**Asset Planning** Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning. The previous review report noted the following: ▪ Good quality data for strategic planning is not currently available.	*There needs to be a joint effort by the central group and regions to improve quality and accuracy of data.* Water Corporation has completed a number of actions related to this recommendation. As part of its work to develop its data quality strategy, Water Corporation has implemented a data quality dashboard that can be accessed through the intranet reporting portal. This report works by comparing the data recorded on completed work orders logged back into SAP with a number of specific business rules in order to identify missing or incorrect field data collection. The report summarise the number of work orders with missing locations/options, missing pipe sizes, mis-matched information and were an incorrect asset/sub-program has been selected. The summary report can be	Partially resolved	Water Corporation to review and address the actions related to this 2013 recommendation that have been put on hold pending completion of the current corporate 'Refresh" system platform review. At the current time, not date has been set for completion of the action.

C. Unresolved at end of current review period				
		drilled down to individual work orders to allow them to be followed up and corrected or completed. Water Corporation has also identified a number of actions related to this 2013 recommendation that are currently on hold and will be reviewed and completed once the current business restructure has been finalised. These actions include: 1. Implementing the detailed data needs for the planning processes, including data integrity requirements and source system. Implementing system changes and changes to collection Processes where required.		
8/2013	**Asset Planning** Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning. The previous review report noted the following: ▪ Good quality data for strategic planning is not currently available.	*The data collection KPIs process needs to be re-initiated to ensure the collection of the data is undertaken in a timely manner.* Refer to 7/2013	Refer to 7/2013	Refer to 7/2013
17/2013	**Asset Operations** Staff resources are adequate and staff receive training commensurate with their responsibilities. The previous review report noted the following: ▪ While operational data is being captured good quality data is not being captured to support operations. Additional training required in the field for system users to input and Asset Managers to use the data accessible through the current systems.	*Extend current training to provide operators in the field with the importance of data collection, the role they play in asset management and how their job is important to the greater business outcomes.* The Water Corporation has documented the date requirements for Operations. These requirements have been embedded into procedures and IT systems. As part of its work to develop its data quality strategy, Water Corporation has implemented a data quality dashboard that can be accessed through the intranet reporting portal. This report works by comparing the data recorded on completed work orders logged back into SAP with a number of specific business rules in order to identify missing or incorrect field data collection. The report summarise the number of work orders with missing locations/options, missing pipe sizes, mis-matched information and were an incorrect	Partially resolved	Water Corporation to complete the extended training by December 2015. Water Corporation to complete review of the detailed data needs for Operations, including data integrity requirements and source system. The revised date for Water Corporation to complete this action is yet to be confirmed.

C. Unresolved at end of current review period

		asset/sub-program has been selected. The summary report can be drilled down to individual work orders to allow them to be followed up and corrected or completed. Water Corporation has extended its current training to provide operators in the field with the importance of data collection, the role they play in asset management and how their job is important to the greater business outcomes. This work is not expected to be completed until December 2015, with the date amended from the initial December 2013 date. In addition, Water Corporation's review of the detailed data needs for Operations, including data integrity requirements and source system has been put on hold pending completion of the corporate "Refresh" system platform review. The revised date for Water Corporation to complete this action is yet to be confirmed.		
18/2013	**Asset Operations** Operational policies and procedures are documented and linked to service levels required. The previous review report noted the following: ▪ Good quality data is not being captured to support operations. Based on the review, gaps in the asset and asset attributes currently exist. Also the maintenance data being recorded in the region reviewed is inconsistent and difficult to interpret.	*Asset related data capture should be embedded into normal operational activities.* As indicated in response to Recommendation 17 data requirements have been embedded into operational procedures and IT systems. Current efforts are focused on education/training to achieve more consistent compliance with these procedural requirements. Aroona has an initiative to improve collection of asset condition data from the field, capturing condition data as part of routine maintenance activities at Beenyup WWTP. Condition data capture rates are up to 85%. Another trial commenced early in 2015 based on tagging equipment with its Functional location (FL). Over half the assets have now been physically tagged. Further actions will be dependent on trial outcomes.	Partially resolved	The Aroona Alliance is expected to complete the action to improve the collection of asset condition data by December 2015
20/2013	**Asset Operations** Operational policies and procedures are documented and linked to service levels required.	*Develop a plan on how to utilise SCADA data for all asset classes, e.g. Data to be used, what purpose and what asset class. Incorporate use of Data Historian within the plan.*	Partially resolved	Water Corporation to implement the SCADA Data Standards into its business processes

C. Unresolved at end of current review period				
	The previous review report noted the following: ▪ SCADA data is collected, however a plan is needed that guides the use of this data for planning purposes.	Water Corporation has updated its Dynamic Data Standards to include SCADA sourced information. However, the implementation of the Data Standards into its business processes is currently on hold pending the outcome of the corporate 'Refresh" system platform review.		pending the outcome of the corporate 'Refresh" system platform review. The revised date for Water Corporation to complete this action is yet to be confirmed.
21/2013	**Asset Maintenance** Maintenance policies and procedures are documented and linked to service levels required. The previous review report noted the following: ▪ The current documentation process needs to be completed.	*Continue to review and complete process documentation including maintenance standards and procedures.* Although reported as being completed in July 2013, the process documentation, including maintenance standards and procedures, that were identified in the previous review as needing to be completed, have been impacted by the current business changes and restructure. The maintenance standards were intended to be developed for generic asset types although there are some assets that Water Corporation did not intend to develop maintenance standards for, e.g. large pumping stations, membrane filtration plants at specific locations, and instead standards for these non-generic assets have been developed using a risk-based approach. We confirmed that the Corporation's maintenance standards are stored in its CorDocs document management system.	Partially resolved	Water Corporation to complete the maintenance standards and procedures once the current business changes and restructure have been completed.
22/2013	**Asset Maintenance** Maintenance policies and procedures are documented and linked to service levels required. The previous review report noted the following: ▪ The maintenance standards are stored in a library (spreadsheet) and incorporated in SAP for new assets. 83% of the asset base is covered by the new generation maintenance standards. ▪ The current maintenance standards need to be completed.	*Complete the maintenance standards for the asset base.* Refer to 21/2013 Water Corporation has Maintenance Standards for all priority Asset Classes. Maintenance Standards are under continuous development and have recently been redeveloped for 83% of the Asset Base. Water Corporation has developed a schedule of work for completing the maintenance standards	Partially resolved.	Water Corporation to complete the maintenance standards and procedures once the current business changes and restructure have been completed.

C. Unresolved at end of current review period				
		Continuing redevelopment of the remaining Maintenance standards will completed on a priority basis. Additional "Equipment Level Standards" will be developed concurrently on priority basis.		
26/2013	**Asset Maintenance** Failures are analysed and operational / maintenance plans adjusted where necessary. The previous review report noted the following: ▪ Fault mode analysis is being applied inconsistently. ▪ WaterCorp's current systems have been built to capture and feedback this data – Analysis of that data is Asset Management accountability.	*Formalise fault mode analysis and develop guidelines for data requirements and analysis.* Although Water Corporation's fault and Position Code specification is sound, user ability to select appropriate equipment has been flagged as an issue. Water Corporation has identified an action to undertake an end-to-end review of the information flow to identify process and system pinch points is to be undertaken. This will result in fault mode analysis being formalised and the development of guidelines for data requirements and analysis.	Not resolved.	Water Corporation have proposed an amended date for completing the formalisation of the fault mode analysis and the development of guidelines for data requirements and analysis of December 2015.
27/2013	**Asset Maintenance** Regular inspections are undertaken of asset performance and condition. The previous review report noted the following: ▪ Data is entered into the maintenance management system inconsistently resulting in poor quality supporting data. WaterCorp's current systems have been built to capture and feedback this data – Analysis of that data is an Asset Management accountability.	*Improve the quality of data being fed back into the work orders by providing documented direction and support for maintenance personnel.* Data requirements for the maintenance process has been defined and embedded into Water Corporation's SAP and Mobile Computing Systems. Data quality issues are being encountered when analysing the data and the Corporation is undertaking a program of work to improve data integrity. The actions that Water Corporation has developed for completing this recommendation are: 1. Review the detailed data needs for the maintenance process, including data integrity requirements and source system. 2. Implement system changes and changes to collection processes where required. 3. Develop reports to review and validate the data and to KPI's monitor process compliance. 4. Monitor data on a regular basis and feedback KPI's and non-compliance to Field Users.	Not resolved	Water Corporation has amended the original dates for completing each of the four actions to the following dates: 1. December 2015 2. January 2016 3. March 2016 4. June 2016

C. Unresolved at end of current review period				
28/2013	**Asset Maintenance** Regular inspections are undertaken of asset performance and condition. The previous review report noted the following: ▪ Good quality data is not being captured to support asset information and analysis.	*Incorporate the data capture as part of planned maintenance and/or inspections as part of normal operations.* Water Corporation is capturing Fault Cause and Position Data for Corrective Maintenance. Class Feedback for Planned Maintenance is also being captured and mandatory as specified in 2000 when SAP was implemented. Water Corporation will review additional feedback requirements following the actions included in 27/2013. The Corporation also needs to formulate an approach to field capture of data and what system/ process changes are required. Water Corporation has identified that this will be worked on with progressive improvements over time. The highest benefit areas will be targeted first but more minor areas of improvement are also expected.	Partially resolved	Although Water Corporation has completed most of the actions associated with this recommendation, it will need to review additional feedback requirements following the actions included in 27/2013.
35/2013	**Risk Management** Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system. The previous review report noted the following: ▪ Application of Asset Risk Assessment in the regions can be greatly improved.	*Improve the application of the Asset Risk Assessment in the regions*. Refer to 33/2013.	Partially resolved	Our review found that there is still opportunity to improve use of the asset risk assessment tool. We recommend that this recommendation be superseded by recommendations R1/2015 and R2/2015 of this review.
49/2013	**Contingency Planning** Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks. The previous review report noted the following: ▪ A formal and prioritised approach to contingency planning is required.	*In addition to the current update frequencies prioritise the update of contingency plans based on risk should be considered, e.g. use the ARA process to identify high risk assets and then update the associated contingency plan. The relationship between ARA and Contingency plans is currently being scoped.* Water Corporation commenced definition work in July 2014 and agreed the conceptual needs related to developing a formal and prioritised approach to contingency planning.	Partially resolved.	Water Corporation to complete the remaining actions it has identified to develop a formal and prioritised approach to its contingency planning. Recommendation R5/2015 of this Review complements this recommendation

C. Unresolved at end of current review period

However, the further detailed definition that was necessary to complete the application programming scoping phase of the work was delayed due to other higher branch priorities such as Management Operating System (MOS) activities and other System development priorities.

As a result of this delay, the scoping was not completed until early 2015.

Due to the current activities surrounding the Business Review, all 'new' work was halted by Water Corporation and this has had a direct impact on the development work that had been proposed for this project.

The budget for the development of Contingency Planning Module was sourced for 2014/15 and a number of milestones included in the overall actions related to the project have been achieved by Water Corporation. These include:

- Confirmation of the general context of requirements with Supervising Engineer Renewals Planning –
- Consulting with the developer/programmer to clarify and confirm scope detail
- Confirmation of the detailed scope with Supervising Engineer Renewals Planning
- Seeking preliminary quotation from the developer/programmer
- Confirming acceptance for the project to proceed.

The timeframe for the remaining milestones has not yet been confirmed:

- Commencement of development work
- Competition of ARA Operational Contingency Planning Module development. This work is estimated to take three months to complete.
- Testing “new” ARA Operational Contingency Planning Module. Testing of the new application is expected to take one month.

C. Unresolved at end of current review period

- Implementation of ARA Operational Contingency Planning Module.

Following implementation of the ARA Operational Contingency Planning Module, Water Corporation will need to train users. The actions that it has developed for this process include:

- Arranging awareness sessions for relevant managers and leaders.
- Arranging training sessions for relevant regional and metro staff.
- Completing awareness sessions for relevant managers and leaders.
- Commencing training sessions for relevant regional and metro staff
- Completing training sessions for relevant regional and metro staff

Achievement of these actions is completely dependent on the completion of the development work. Water Corporation has proposed the training of users to commence in March 2016 and be completed by June 2016

4 Performance Summary

4.1 Assessment Rating Scales

In accordance with the Audit Guidelines, the asset management system effectiveness of Water Corporation was assessed using the rating scales in Table 4-1 and Table 4-2.

Table 4-1 Asset Management Process and Policy Definition Adequacy Rating

Rating	Description	Criteria
A	Adequately defined	▪ Processes and policies are documented. ▪ Processes and policies adequately document the required performance of the assets. ▪ Processes and policies are subject to regular reviews, and updated where necessary. ▪ The asset management information system(s) are adequate in relation to the assets that are being managed.
B	Requires some improvement	▪ Process and policy documentation requires improvement. ▪ Processes and policies do not adequately document the required performance of the assets. ▪ Reviews of processes and policies are not conducted regularly enough. ▪ The asset management information system(s) require minor improvements (taking into consideration the assets that are being managed).
C	Requires significant improvement	▪ Process and policy documentation is incomplete or requires significant improvement. ▪ Processes and policies do not document the required performance of the assets. ▪ Processes and policies are significantly out of date. ▪ The asset management information system(s) require significant improvements (taking into consideration the assets that are being managed).
D	Inadequate	▪ Processes and policies are not documented. ▪ The asset management information system(s) is not fit for purpose (taking into consideration the assets that are being managed).

Table 4-2 Asset Management Performance Ratings

Rating	Description	Criteria
1	Performing effectively	▪ The performance of the process meets or exceeds the required levels of performance. ▪ Process effectiveness is regularly assessed, and corrective action taken where necessary.
2	Opportunity for improvement	▪ The performance of the process requires some improvement to meet the required level. ▪ Process effectiveness reviews are not performed regularly enough. ▪ Process improvement opportunities are not actioned.
3	Corrective action required	▪ The performance of the process requires significant improvement to meet the required level. ▪ Process effectiveness reviews are performed irregularly, or not at all. ▪ Process improvement opportunities are not actioned.

Rating	Description	Criteria
4	Serious action required	▪ Process is not performed, or the performance is so poor that the process is considered to be ineffective.

4.2 Asset Management Review Effectiveness Summary

The asset management system review assessed the effectiveness of the asset management system in delivering the services as required under the operating licence.

The review was conducted utilising the asset management adequacy and performance ratings as outlined in the Audit Guidelines. A summary of the outcomes of the review is provided in Table 4-3.

Based on our asset management system review observations and findings, we consider that the adequacy and performance of the licensee's system meets a level appropriate for the licensee, given the size, asset base and risks associated with the services that it is licenced to provide. The gradings awarded reflect that Water Corporation generally has well developed asset management practices which in some areas are leading amongst Australian water utilities.

Table 4-3 Asset Management Review Effectiveness Summary

Asset Management System Component	Asset management process and policy definition adequacy rating	Asset management performance rating
Asset planning	**A**	**1**
▪ Asset management plan covers key requirements	A	1
▪ Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning	A	1
▪ Service levels are defined	A	1
▪ Non-asset options (e.g. demand management) are considered	A	1
▪ Lifecycle costs of owning and operating assets are assessed	A	1
▪ Funding options are evaluated	A	1
▪ Costs are justified and cost drivers identified	A	1
▪ Likelihood and consequences of asset failure are predicted	A	1
▪ Plans are regularly reviewed and updated	A	1
Asset creation/acquisition	**A**	**1**
▪ Full project evaluations are undertaken for new assets	A	1
▪ Evaluations include all life-cycle costs	A	1

Asset Management System Component	Asset management process and policy definition adequacy rating	Asset management performance rating
▪ Projects reflect sound engineering and business decisions	A	1
▪ Commissioning tests are documented and completed	A	1
▪ Ongoing legal / environmental / safety obligations of the asset owner are assigned and understood	A	1
Asset disposal	**A**	**1**
▪ Under-utilised and under-performing assets are identified as part of a regular systematic review process	A	1
▪ The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken	A	1
▪ Disposal alternatives are evaluated	A	1
▪ There is a replacement strategy for assets	A	1
Environmental analysis	**A**	**1**
▪ Opportunities and threats in the system environment are assessed	A	1
▪ Performance standards (availability of service, capacity, continuity, emergency response, etc.) are measured and achieved	A	1
▪ Compliance with statutory and regulatory requirements	A	1
▪ Achievement of customer service levels	A	1
Asset operations	**A**	**1**
▪ Operational policies and procedures are documented and linked to service levels required	A	2
▪ Risk management is applied to prioritise operations tasks	A	1
▪ 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	A	1

Asset Management System Component	Asset management process and policy definition adequacy rating	Asset management performance rating
▪ Operational costs are measured and monitored	A	1
▪ Staff resources are adequate and staff receive training commensurate with their responsibilities	A	1
Asset maintenance	**A**	**1**
▪ Maintenance policies and procedures are documented and linked to service levels required	A	1
▪ Regular inspections are undertaken of asset performance and condition	A	1
▪ Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule	A	1
▪ Failures are analysed and operational / maintenance plans adjusted where necessary	A	1
▪ Risk management is applied to prioritise maintenance tasks	A	1
▪ Maintenance costs are measured and monitored	A	1
Asset management information system	**A**	**1**
▪ Adequate system documentation for users and IT operators	A	1
▪ Input controls include appropriate verification and validation of data entered into the system	A	1
▪ Logical security access controls appear adequate, such as passwords	A	1
▪ Physical security access controls appear adequate	A	1
▪ Data backup procedures appear adequate and backups are tested	A	1
▪ Key computations related to licensee performance reporting are materially accurate	A	1
▪ Management reports appear adequate for the licensee to monitor licence obligations	A	1

Asset Management System Component	Asset management process and policy definition adequacy rating	Asset management performance rating
Risk management	**A**	**2**
▪ Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system	A	1
▪ Risks are documented in a risk register and treatment plans are actioned and monitored	A	1
▪ The probability and consequence of risk failure are regularly assessed	B	2
Contingency planning	**B**	**3**
▪ Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks	B	3
Financial planning	**A**	**1**
▪ The financial plan states the financial objectives and strategies and actions to achieve the objectives	A	1
▪ The financial plan identifies the source of funds for capital expenditure and recurrent costs	A	1
▪ The financial plan provides projections of operating statements (profit and loss) and statement of financial position (balance sheets)	A	1
▪ The financial plan provide firm predictions on income for the next five years and reasonable indicative predictions beyond this period	A	1
▪ The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services	A	1
▪ Significant variances in actual / budget income and expenses are identified and corrective action taken where necessary	A	1
Capital expenditure planning	**A**	**1**
▪ There is a capital expenditure plan that covers issues to be addressed, actions proposed, responsibilities and dates	A	1

Asset Management System Component	Asset management process and policy definition adequacy rating	Asset management performance rating
▪ The plan provides reasons for capital expenditure and timing of expenditure	A	1
▪ The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan	A	1
▪ There is an adequate process to ensure that the capital expenditure plan is regularly updated and actioned	A	1
Review of AMS	**A**	**1**
▪ A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current	A	1
▪ Independent reviews (e.g., internal audit) are performed of the asset management system	A	1

5 Asset Management System Review Observations and Recommendations

The following tables provide detailed commentary based on the findings observed during the audit process.

Table 5-1 Asset Management System Review Observations for Asset Planning

Effectiveness Criteria	Observations	Evidence reviewed
Asset Planning		
▪ Asset management plan covers key requirements	**Overview of Water Corporation's Asset Planning** ▪ Essentially Water Corporation has three levels of planning: strategic planning, scheme planning and short-term planning. ▪ Water Corporation's asset planning is aligned to its five year Strategic Development Plan (a draft Plan has been prepared for the 2016-2017 to 2020-2021period), and annual Statement of Corporate Intent and Corporate Risk Report. ▪ The organisation's Water Forever document (October 2009) forms the over-arching long-term 50 year plan for management of its water sources and delivery of water services to Perth, Mandurah and surrounding communities. This also drives the long-term wastewater planning for these areas. The Water Forever plan assesses growth predictions in the areas and looks at the impact of climate change on the supply demand water balance and the different water sources used for supply, using information provided by CSIRO (Commonwealth Scientific and Industrial Research Organisation). ▪ Long-term strategic planning has also been completed for the Southwest and Great Southern areas. Long-term strategic planning for the northern and northwest regions was carried out during 2007-2014 as a result of the mining boom in these areas. ▪ Water Corporation also has a Water Forever - Whatever the Weather plan that addresses a 10-year plan for Western Australia which outlines the current state of its water supplies and wastewater systems, and the drivers of future demand in each region. It also discusses options for future new sources. ▪ Water Corporation's scheme planning looks at a 15 – 20 year horizon and is used to assess specific schemes within the regions and management of the source, distribution and reticulation assets. The water supply demand balance is analysed in greater detail in conjunction with the operation and management of the scheme's assets. This includes development of capital and operating expenditure, with capex projects being considered for inclusion in the Business's capital program. Water Corporation has completed scheme planning for each of its schemes. ▪ Water Corporation completes short-term planning assessments in the lead up to work starting on the identified capital projects to confirm that they are still required, that the growth predictions are still correct, that the option is still the optimal solution, and that the forecast sizing of the assets remains appropriate.	▪ PM-#13643834-Draft Strategic Development Plan 2016-2017 to 2020-2021 SDP ▪ PM-#12694037-2015 Corporate Risk Report - Final Copy ▪ Statement of Corporate Intent, Aquadoc #13643797 ▪ Strategic Asset Management Plan 2012/13 – 2032/33 PM# 5756948. ▪ Asset Management Strategy 2015-2025 PM# 12949347. ▪ Gravity Sewers Asset Class Strategy, PM# 6900493, dated November 2012. ▪ Wastewater Pressure Mains, Pump Stations and Vacuum Sewer Systems Asset Class Strategy, PM# 9364160, dated April 2014. ▪ Araluen Pumpback Station Source Value [Development Plan], aquaDOC# 9227263, endorsed on 21/08/2013. ▪ Frankland Rocky Gully Planning Review [Development Plan], aquaDOC# 12581839, dated March 2015. ▪ Woodman Point Potable Reuse Options [Development Plan], aquaDOC# 12203559, dated June 2015. ▪ Yanchep Water Supply Scheme 2013 Short Term Source Planning [Development Plan], aquaDOC# 8634106, dated July 2013. ▪ Asset Risk Assessment (ARA) Business Rules guidance document, version 2, dated 7/2/14.

Effectiveness Criteria	Observations	Evidence reviewed
	▪ Water Corporation has a 'Plan Assets' guidance document, DocID# 9236611, dated 01/07/13. This guidance note describes the planning process from the appointment of the Planning Director and Planning Manager and activation of the planning project, to the completion of the agreed scope. It applies to all water source, water supply, wastewater and drainage planning projects. The detail of how it is applied is mapped out in greater detail in the relevant water, wastewater or drainage guidelines. **Asset Planning Process Overview Information & Guidance** ▪ The Plan Assets' guidance document provides a high-level overview of the four main steps in Water Corporation's planning process, namely: – Scoping – Conceptual Options – Detailed Analysis – Documentation and Endorsement ▪ Water Corporation has an 'Infrastructure Planning Process Manual', aquaDOC# 3623527, version 10 dated March 2012. This Manual describes Water Corporation's infrastructure planning process, including the responsibilities of Water Corporation stakeholders that implement infrastructure plans. The Manual is designed to be a reference for people involved in the planning process and a portal to the tools and templates used in the process. The Manual includes detailed sections on: – Introduction – Background – Management Planning Program – Planning Process Overview – Initiate Planning Project – Develop Conceptual Options – Analysis and Investigation – Planning Endorsement and Acceptance ▪ Water Corporation provided us with a 'WWT&D Section Guidelines, Volume 1', aquaDOC# 10726992, dated February 2015. The Corporation also provided 'WWT&D Section Guidelines, Volume 2', aquaDOC# 10726901, dated February 2015. These two guidelines are examples of guidance used by Water Corporation to assist in planning activities related to specific asset types, in this case for planning its wastewater treatment and discharge systems to meet its commitments to customers and regulators.	▪ ARA Overview – Asset Risk Assessment Quick Reference Sheet, DocID ARA-QRS-001, issue date 25 October 2013. ▪ S469 Condition Assessment Strategy, version 2, dated 17/6/13. ▪ Plan Assets guidance document, DocID# 9236611, dated 01/07/13. ▪ Infrastructure Planning Process Manual, aquaDOC# 3623527, version 10 dated March 2012 ▪ WWT&D Section Guidelines, Volume 1, aquaDOC# 10726992, dated February 2015. ▪ WWT&D Section Guidelines, Volume 2, aquaDOC# 10726901, dated February 2015. ▪ Bullsbrook Wastewater Treatment and Treated Wastewater Management business case, aquaDOC# 5583522, planning approval date 6/12/11. ▪ Byford SD – Wastewater discharge point for Lot 1 Abernethy Rd and Whitby developments, file number JT1 2006 12359 V01, dated 20/02/2014. ▪ Dardanup WWTP and TWWM business case, aquaDOC# 9093890, planning approval date 26/6/2013. ▪ Derby WWTP and TWWM Planning business case, aquaDOC# 12895162, planning approval date 30/06/15. ▪ East Rockingham SD – Latitude 32 conveyance to Kwinana WWTP business case, file number JT1 2012 08549 V01, dated 11/06/2014. ▪ Geraldton Water Supply System – 2013/14 Infrastructure Planning Report, aquaDOC# 10132795, dated October 2014. ▪ Halls Creek Wastewater Scheme – Wastewater Treatment and Treated Wastewater Management, aquaDOC# 9781021, dated January 2015.

Effectiveness Criteria	Observations	Evidence reviewed
	Infrastructure Asset Management Policy ▪ Water Corporation has a Policy 'PCY223 Infrastructure Asset Management', Doc ID 364852, dated 09/07/2012. ▪ The aim of this policy is to "Provide the framework for the development and implementation of the corporate policies, strategies, objectives, asset performance targets, standards, processes, asset information systems, competencies, plans and work programs, that will ensure the Corporation's infrastructure assets are managed in a manner that meets all customer, regulatory and Corporation requirements and that is economically, environmentally and socially sustainable." ▪ The document includes sections that provide the Purpose, Scope, Definitions, Compliance Implications, Background, Principles, Application and References. ▪ The Application section provides the actions and accountabilities for implementing the policy. **Asset Management Strategy** ▪ Water Corporation has an 'Asset Management Strategy 2015-2025' PM# 12949347. ▪ Water Corporation's Asset Management Strategy is based on current and future state and provides a ten year view for the way in which assets will be managed by the Corporation. The strategy is targeted at all levels of asset management decision making in the Business. The Capital Investment Management Committee is responsible for oversight and governance of the Asset Management Strategy. ▪ The Asset Management Strategy sets out the governance and document Hierarchy, the regulatory framework, and the Corporation's over-arching asset management principles. The Corporation's asset management framework is described covering assessing demand and the capability of assets related to identifying new assets, and renewals and maintenance related to existing assets. ▪ The Strategy also provides a high-level overview of the Corporation's risks, challenges, opportunities and objectives, including SWOT analysis. ▪ Asset information and performance data is set out for the Corporation's water, wastewater, and drainage assets and identifies poor performing geographic areas and risks associated with each asset class. These sources of asset information are used to provide a gap analysis for each asset type and strategies to manage these gaps. This has resulted in a Plan to Implement and Monitor the Strategy which includes each strategy, the drivers, whether investment has been committed, the start and end timeframes for each action and the Branches within the Corporation responsible for completing the strategy. **Strategic Asset Management Plan** ▪ Water Corporation has a 'Strategic Asset Management Plan 2012/13 – 2032/33' PM# 5756948. The SAMP provides a framework for the way in which assets will be managed by Water Corporation over a twenty year period. The SAMP is targeted at the Executive, Branch	▪ Jandakot Groundwater Scheme – Long Term Planning – IWSS Source Planning, PM# 8068975, dated 21/2/14. ▪ Assess Asset Capability guideline, DocID 1164951, dated 12 Dec 2013. ▪ Management of Project Deferral guideline, DocID 3284897, dated 14 Dec 2014. ▪ Optioneering – Workshop Guide & Checklist, document #7607012-v1, no date. ▪ System Capability Forecasting (SCF) user manual, Doc ID 5754454, dated 25/04/2012.

Effectiveness Criteria	Observations	Evidence reviewed

Managers, Asset Managers and other staff responsible for performing asset management activities including those who develop and approve capital and operating budgets.

- The SAMP is influenced by Water Corporation's Strategic Direction which is set out in the Corporation's Statement of Strategy.
- The SAMP used to inform the capital investment process by identifying early in the annual planning cycle the drivers for asset acquisition and also signals the impacts on the Corporation's operating budgets.
- The outcomes of the SAMP ultimately flow through to Group Business Plans and are measured through individual Performance Agreements.
- The SAMP influences the development of the Asset Class Plans and Strategic Investment Business Cases by providing guidance on corporate risk appetite, impacts of strategic issues e.g. emerging technologies, growth patterns, funding and investment constraints. We note that Page 2 of the Strategic Asset Management Plan 2012/13 – 2032/33, PM#5756948 indicates that the document is to be reviewed annually. However, the approval date is shown as February 2012 i.e. this document is out of date. Water Corporation confirmed that the review and update of a number of its key asset management documents has been delayed as a result of the business restructure that is currently being completed.

Asset Class Strategies

- Water Corporation has developed a series of Asset Class Strategies with the intention of providing direction on the philosophy and approach to asset management for each asset class. The strategies also serve as a communication tool for this class of assets for all Water Corporation employees.
- According to the 'Governance and Document Hierarchy in Asset Management Strategy 2015-2025 PM# 12949347, the Water Corporation has created 15 Asset Class Strategies, including:
  - 'Gravity Sewers Asset Class Strategy', PM# 6900493, dated November 2012.
  - 'Wastewater Pressure Mains, Pump Stations and Vacuum Sewer Systems Asset Class Strategy', PM# 9364160, dated April 2014.
- The screenshot provided by Water Corporation entitled 'Asset Management Branch.pdf' shows only 14 Asset Class Strategies and there is therefore a discrepancy between this and the Governance and Document Hierarchy in Asset Management Strategy 2015-2025 PM# 12949347.
- However, Water Corporation confirmed that it has completed its Asset Class Strategies for its high risk asset classes. Due to resource constraints, Water Corporation has suspended any further work on the strategies until post restructure of the Assets Planning Group.
- Creation of new "Drainage and Waterways" Section within Asset Planning Group, with remit to develop and deliver on a drainage strategy.
- These strategy documents sit under the SAMP in Water Corporation's documentation hierarchy and focus on the management of existing assets, looking at maintenance and condition assessment strategies as well as renewal strategies for existing assets.

Effectiveness Criteria	Observations	Evidence reviewed

- New assets required for growth or changes in standards are dealt with through other processes such as System Risk and System Capability Forecasting tools, and system planning work. Collectively the Asset Class Strategies and the growth/standards tools can be used to form broader asset management plans. The Corporation is currently reviewing the option of assimilating the remaining asset classes that have not yet been completed into the existing strategies.
- Recommendations from the gap analysis completed for each Asset Class strategy are reported on an annual basis to the relevant business area as potential improvement opportunities and fed into the overall business planning. Water Corporation has a well-defined process for taking recommendations forward and by March each year every branch has a developed business plan for the next financial year.

Development Plans, Technical Advice Forms and Business Cases

- Water Corporation provided a number of specific Development Plans, including:
  - 'Araluen Pumpback Station Source Value', aquaDOC# 9227263, endorsed on 21/08/2013.
  - 'Frankland Rocky Gully Planning Review', aquaDOC# 12581839, dated March 2015.
  - 'Woodman Point Potable Reuse Options', aquaDOC# 12203559, dated June 2015.
  - 'Yanchep Water Supply Scheme 2013 Short Term Source Planning', aquaDOC# 8634106, dated July 2013.
- These documents provide more detailed planning information, including project background, drivers, need, scope, objectives, planning considerations, options analysis, cost analysis and recommendations. Each planning report includes sign-off and approval for the project to be escalated to the next planning stage, with the project option ultimately being approved for inclusion in the Corporation's capital program
- Water Corporation also provided us with an example of its planning reports, including:
  - 'Bullsbrook Wastewater Treatment and Treated Wastewater Management' business case, aquaDOC# 5583522, planning approval date 6/12/11.
  - 'Byford SD – Wastewater discharge point for Lot 1 Abernethy Rd and Whitby developments', file number JT1 2006 12359 V01, dated 20/02/2014.
  - 'Dardanup WWTP and TWWM' business case, aquaDOC# 9093890, planning approval date 26/6/2013.
  - 'Derby WWTP and TWWM Planning' business case, aquaDOC# 12895162, planning approval date 30/06/15.
  - 'East Rockingham SD – Latitude 32 conveyance to Kwinana WWTP' business case, file number JT1 2012 08549 V01, dated 11/06/2014.
  - 'Geraldton Water Supply System – 2013/14 Infrastructure Planning Report', aquaDOC# 10132795, dated October 2014.

Effectiveness Criteria	Observations	Evidence reviewed
	– 'Halls Creek Wastewater Scheme – Wastewater Treatment and Treated Wastewater Management', aquaDOC# 9781021, dated January 2015. – 'Jandakot Groundwater Scheme – Long Term Planning – IWSS Source Planning', PM# 8068975, dated 21/2/14. ▪ These example include different Business Cases and Technical Advice Forms for a sample of projects. Each document includes the necessary sign-off and endorsement of the project required for the project to move forwards.	
▪ Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning	**Asset Planning Responsibilities** ▪ Asset planning is a centralised service within Water Corporation, with asset O&M data recorded in the Regions rolled up and used be Head Office in their planning activities. The Regions check the data provided to ensure that it is correct and complete and this allows decisions to be made centrally taking into account the needs of the entire business. ▪ The Corporation's asset planning was previously heavily focused on meeting growth but with the slowdown in mining across the state, and as a result of aging assets, this focus is now changing to asset planning for renewals purposes. ▪ Water Corporation's planning activities are carried out by the Infrastructure Planning Branch, which currently has in the region of 100 staff. The branch is centralised from the Perth office and undertakes all the planning for the regions and for Water Corporation's alliances. ▪ The Planning and Capability Group assesses and reports against scheme and asset triggers and targets to identify deficiencies and the need for new/upgraded assets. ▪ The Asset Management Branch is responsible for the development of the Corporation's asset strategies. ▪ The Corporation's new organisational structure was implemented from 1 July 2015, with the structure of the branches changing from 28 October 2015. This brings the Asset Investment Planning, Asset Strategy, Asset Investment and Development Services groups under the overall Asset Planning branch. ▪ As a result of the business restructure the responsibility to manage Water Corporation's drainage assets now sits with the Asset Investment Planning Branch Metropolitan. ▪ Responsibilities for implementing and monitoring the Asset Management Strategy are defined on page 8 of Asset Management Strategy 2015-2025 PM# 12949347. ▪ Custodians (responsibilities) are defined in column 1 of the table spanning pages 2-5 in both the following Asset Class Strategies examples provided by Water Corporation. **Stakeholder Engagement in Asset Planning** ▪ Planning process and objectives appear to reflect the needs of all stakeholders, and appears to be integrated with business planning. ▪ Population projections are detailed on page 44 in Strategic Asset Management Plan 2012/13 – 2032/33 PM# 5756948.	▪ Asset Management Strategy 2015-2025 PM# 12949347. ▪ Gravity Sewers Asset Class Strategy, PM# 6900493, dated November 2012. ▪ Wastewater Pressure Mains, Pump Stations and Vacuum Sewer Systems Asset Class Strategy, PM# 9364160, dated April 2014. ▪ Bullsbrook Wastewater Treatment and Treated Wastewater Management business case, aquaDOC# 5583522, planning approval date 6/12/11. ▪ Derby WWTP and TWWM Planning business case, aquaDOC# 12895162, planning approval date 30/06/15. ▪ Halls Creek Wastewater Scheme – Wastewater Treatment and Treated Wastewater Management, aquaDOC# 9781021, dated January 2015. ▪ Jandakot Groundwater Scheme – Long Term Planning – IWSS Source Planning, PM# 8068975, dated 21/2/14. ▪ East Rockingham SD – Latitude 32 conveyance to Kwinana WWTP business case, file number JT1 2012 08549 V01, dated 11/06/2014.

Effectiveness Criteria	Observations	Evidence reviewed
	▪ Stakeholders are identified in the following documents: – Asset Management Strategy 2015-2025 PM# 12949347. – Gravity Sewers Asset Class Strategy, PM# 6900493, dated November 2012. – Wastewater Pressure Mains, Pump Stations and Vacuum Sewer Systems Asset Class Strategy, PM# 9364160, dated April 2014. ▪ Examples of stakeholders being specifically identified can be found in the following planning reports: – Bullsbrook Wastewater Treatment and Treated Wastewater Management business case, aquaDOC# 5583522, planning approval date 6/12/11. – Dardanup WWTP and TWWM business case, aquaDOC# 9093890, planning approval date 26/6/2013. – Derby WWTP and TWWM Planning business case, aquaDOC# 12895162, planning approval date 30/06/15. – Geraldton Water Supply System – 2013/14 Infrastructure Planning Report, aquaDOC# 10132795, dated October 2014. – Halls Creek Wastewater Scheme – Wastewater Treatment and Treated Wastewater Management, aquaDOC# 9781021, dated January 2015. – Jandakot Groundwater Scheme – Long Term Planning – IWSS Source Planning, PM# 8068975, dated 21/2/14. ▪ We observed that stakeholders have not been identified in the East Rockingham SD – Latitude 32 conveyance to Kwinana WWTP business case, file number JT1 2012 08549 V01, dated 11/06/2014. ▪ Water Corporation has a 'Management of Project Deferral' guideline, DocID 3284897, dated 14 Dec 2014, next review 1 Dec 2017. The purpose of this guideline is to ensure that stakeholders in the can deal effectively with the impacts of capital project deferral, comprising contingent projects, operational budget changes and any other risk management actions.	
▪ Service levels are defined	**Service Levels** ▪ Criteria for defining levels of service can be found on page 18 of Strategic Asset Management Plan 2012/13 – 2032/33 PM# 5756948. ▪ Levels of service are defined in the two Asset Class Strategies provided: – Gravity Sewers Asset Class Strategy. – Wastewater Pressure Mains, Pump Stations and Vacuum Sewer Systems Asset Class Strategy. ▪ Water Corporation has a document 'What you can expect as a Water Corporation customer' ISBN: 1 74043 847, dated 7 August 2014.	▪ Strategic Asset Management Plan 2012/13 – 2032/33 PM# 5756948. ▪ Gravity Sewers Asset Class Strategy, PM# 6900493, dated November 2012. ▪ Wastewater Pressure Mains, Pump Stations and Vacuum Sewer Systems Asset Class Strategy, PM# 9364160, dated April 2014.

Effectiveness Criteria	Observations	Evidence reviewed
	Asset Condition and Performance ▪ Asset performance and condition data is collected by the Corporation and used for renewals planning. Water Corporation has triggers for renewals built into its systems, e.g. three water main fails in one section of pipe within a certain time flags up the section of pipe as a potential renewals project. Further investigations are completed to confirm whether the pipe should be renewed. Water Corporation has a separate improvement plan related to the quality of data, e.g. to improve work order feedback. **System Capability Forecasting** ▪ Water Corporation has a 'System Capability Forecasting (SCF)' user manual, Doc ID 5754454, dated 25/04/2012. The SCF utilises existing corporate information sources, to provide the ability for Water Corporation to review and monitor asset performance trends, against identified triggers, to then enable better decision making in regards to planning and solution implementation timings. The manual sets out the relationship of the SCF with Water Corporation's other corporate systems (e.g. PI Data Historian, ARA, SRA, AMOSS, SCM, etc). The manual covers accessing and using the SCF tool and provides screenshots to assist Water Corporate staff in identifying when triggers have been reached for systems/assets that then initiate forward planning actions to address.	
▪ Non-asset options (e.g. demand management) are considered	**Optioneering** ▪ The Corporation uses a process termed 'Optioneering' which is a business case development stage where a range of options (including operational, capital, challenging of standards etc) are considered and evaluated to ensure that the most cost effective whole of life solution is being adopted. ▪ Water Corporation considers that previously the Optioneering process was more informal and had a high focus on capital expenditure but that it has now moved towards considering all potential project options. The process allows the Corporation to provide substance around the prudency and efficiency for each of its projects. ▪ Water Corporation has an 'Optioneering – Workshop Guide & Checklist', document #7607012-v1, no date. The Optioneering Workshop is used to identify cost effective options for progression to the capital program and the guide and subsequent checklists are used by Water Corporation to assist in the preparation and facilitation of this workshop. **Non-Asset Options** ▪ The use of water carting is one example of where Water Corporation utilises a non-asset solution option. This has always been considered as a potential option in the past but is now considered an acceptable long-term viable option so long as there are no issues regarding the water quality or meeting demand. A recent example of water carting being used instead of a constructed asset solution has been the water supply option for Cranbrook, where the project assessment identified carting as a more cost effective option than an $18M capital project for a new pipeline to supply the town. The water carting meets the Corporation's requirements for	▪ Yanchep Water Supply Scheme 2013 Short Term Source Planning [Development Plan], aquaDOC# 8634106, dated July 2013.

Effectiveness Criteria	Observations	Evidence reviewed
	levels of service related to water quality and meeting demand, with no need to construct a new pipeline to be able to provide the services to the customers. ▪ An additional example of a non-asset option provided by Water Corporation in the supporting documentation is that of improving water efficiency through residential behaviour changes. An option for installing water efficient showerheads and tap aerators and fixing leaking taps, is included in Section 3.6 in Yanchep Water Supply Scheme 2013 Short Term Source Planning [Development Plan], aquaDOC# 8634106, dated July 2013.	
▪ Lifecycle costs of owning and operating assets are assessed	▪ Lifecycle costs of owning and operating assets are assessed throughout Water Corporation's asset planning activities. The detail of the cost assessments increases as the planning process progresses. ▪ One example of lifecycle cost compared to potential yield was confirmed in the Araluen Pumpback Station Source Value [Development Plan], aquaDOC# 9227263, endorsed on 21/08/2013. This document sets out to determine whether it is cost effective to bring back on line a pump station previously damaged by fire. ▪ The option analysis included in the Frankland Rocky Gully Planning Review includes Net Present Values (NPV) Analysis of the capital and operating expenditure estimates, including the impact of the scheme's operating subsidy, for each of the five options included to determine the recommendation for the preferred option (in this example dependant on receiving Royalties for Regions funding).	▪ Araluen Pumpback Station Source Value [Development Plan], aquaDOC# 9227263, endorsed on 21/08/2013. ▪ Frankland Rocky Gully Planning Review [Development Plan], aquaDOC# 12581839, dated March 2015. Utilizing 'Royalties for Regions' funding is suggested.
▪ Funding options are evaluated	▪ Water Corporation's capital and operating budgets are largely defined by the State government. ▪ Water Corporation has a variety of funding options available to finance its capital and operational projects. The funding sources include potential for growth funding, regional funding sources, contributions from Shire Councils and private funding opportunities. The identification of funding options is dependent on the drivers for the specific project requiring funding. ▪ At the current time, Water Corporation considers that it can be problematic to trade off capital expenditure against operating expenditure but anticipates that improved trade off will be an outcome from the re-structure of the Corporation that is taking place at the time of this review. ▪ One example of evaluation of funding options can be found in Frankland Rocky Gully Planning Review [Development Plan], aquaDOC# 12581839, dated March 2015. Utilizing 'Royalties for Regions' funding is suggested.	▪ Frankland Rocky Gully Planning Review [Development Plan], aquaDOC# 12581839, dated March 2015. Utilizing 'Royalties for Regions' funding is suggested.
▪ Costs are justified and cost drivers identified	▪ All four development plans provided by Water Corporation for review displayed adequate cost justification and identification of cost drivers, namely: – Araluen Pumpback Station Source Value [Development Plan], aquaDOC# 9227263, endorsed on 21/08/2013. – Frankland Rocky Gully Planning Review [Development Plan], aquaDOC# 12581839, dated March 2015.	▪ Araluen Pumpback Station Source Value [Development Plan], aquaDOC# 9227263, endorsed on 21/08/2013. ▪ Frankland Rocky Gully Planning Review [Development Plan], aquaDOC# 12581839, dated March 2015.

Effectiveness Criteria	Observations	Evidence reviewed
	– Woodman Point Potable Reuse Options [Development Plan], aquaDOC# 12203559, dated June 2015. – Yanchep Water Supply Scheme 2013 Short Term Source Planning [Development Plan], aquaDOC# 8634106, dated July 2013.	▪ Woodman Point Potable Reuse Options [Development Plan], aquaDOC# 12203559, dated June 2015. ▪ Yanchep Water Supply Scheme 2013 Short Term Source Planning [Development Plan], aquaDOC# 8634106, dated July 2013.
▪ Likelihood and consequences of asset failure are predicted	▪ The six Regions are responsible for developing the risk assessments for the schemes and assets in their respective areas. The assessments are then reviewed, approved and endorsed by the Asset Management branch to confirm that the assessment has been completed in accordance with the Corporation's requirements. Although Water Corporation has established requirements and rules for completing the risk assessments, it recognises that it can be difficult to be subjective when developing a risk assessment. ▪ Water Corporation has an 'Assess Asset Capability' guideline, DocID 1164951, dated 12 Dec 2013, next review 14 July 2016. The 'Assess Asset Capability' process analyses all relevant asset performance, condition and risk information, assesses options and initiates actions in time to ensure Water Corporations' assets can meet future performance requirements and deliver the required levels of service. ▪ The System Capability Matrix (SCM) is a visual report for the information collected during the System Risk Assessment. Each report generates a risk score to allow comparisons to be made between different schemes/systems. The report is accessed through the Corporation's WaterNet intranet reporting portal area and provides links back to the SRA information, to any planning documents, project solutions and options that have been developed and to the investment module for projects included in SAP. If an asset risk assessment has been completed for specific assets within the system/scheme, this can also be directly accessed from the SCM report. Water Corporation has developed reporting capabilities within WaterNet to return the systems with the highest risks. ▪ The risk assessments do not consider implementation of a solution and this is re-assessed after the initial assessment has been completed. Water Corporation uses the Optioneering process to ensure that the risk mitigation provides the best value for money solution when options are assessed. Risk assessments are provided to the Capital Works Committee every three months. ▪ We consider that the process for undertaking risk assessments appears to be adequately covered in: – Asset Risk Assessment (ARA) Business Rules guidance document, version 2, dated 7/2/14. – ARA Overview – Asset Risk Assessment Quick Reference Sheet, DocID ARA-QRS-001, issue date 25 October 2013. ▪ The 'Asset Risk Assessment (ARA) Business Rules' guidance document provides guidance on appropriate and effective use of the Asset Risk Assessment tool as part of Water Corporation's asset renewals process. The ARA provides Water Corporation with a consistent approach to assessing the risk of an asset failure.	▪ Asset Risk Assessment (ARA) Business Rules guidance document, version 2, dated 7/2/14. ▪ ARA Overview – Asset Risk Assessment Quick Reference Sheet, DocID ARA-QRS-001, issue date 25 October 2013. ▪ S469 Condition Assessment Strategy, version 2, dated 17/6/13. ▪ SRA for the Albany – Sewer Distribution Project

Effectiveness Criteria	Observations	Evidence reviewed
	▪ The 'ARA Overview – Asset Risk Assessment Quick Reference Sheet' provides a high-level quick reference sheet to explain the ARA. ▪ Water Corporation has a strategy 'S469 Condition Assessment Strategy', version 2, dated 17/6/13. This strategy document is an over-arching strategy that Water Corporation applies to all asset classes listed as applicable to this strategy in the ACA Business Rules. For each asset class listed, an individual condition assessment methodology is developed to inform the specifics relating to that particular asset class. ▪ The strategy for undertaking condition assessment and hence predicting the life of an asset, appears to be adequately covered in S469 Condition Assessment Strategy, version 2, dated 17/6/13. ▪ The Optioneering process is reliant on good quality data to confirm the project triggers and risks. Triggers for service level, capacity, demand etc are derived from operational data recorded in SAP, SCADA and from manual readings (recorded in the ODDS system). The data is used to support the project risk assessments. Water Corporation undertakes assessments for the corporate and system risk for the assets within a system and also for the asset risk, which addresses the individual assets. ▪ The System Risk Assessment (SRA), which is aligned to growth and capacity issues currently has in the region of 9,000 assessments and includes assessments for the irrigation, drainage and alliance schemes in addition to the water and wastewater schemes. The Asset Risk Assessment is used by Water Corporation to look at the risks from more of an asset condition view in order to report them to the governance and risk committee and to support the capex and opex needs. ▪ During the review we viewed the SRA for the Albany – Sewer Distribution 129 project associated with sewer odour issues and confirmed that the assessment looks at the risks over a 15 year period.	
▪ Plans are regularly reviewed and updated	▪ During our initial review of the asset planning documentation provided to us by Water Corporation, we observed that a number of documents had not been reviewed in accordance with the document's requirements or did not contain any version control information. – The Strategic Asset Management Plan 2012/13 – 2032/33 PM# 5756948 should be reviewed annually but page 2 of the version of the document originally provided to us showed that it has not been updated since the last amendment dated 14 February 2012. Water Corporation provide a refreshed 2014 version of the SAMP during the onsite interviews. – Asset Management Strategy 2015-2025 PM# 12949347 that was originally provided by Water Corporation did not have any date or version number displayed, suggesting that it is not being regularly reviewed. The Corporation provided a draft version of the updated strategy during the onsite interviews. – PCY223 Infrastructure Asset Management, Doc ID 364852, dated 09/07/2012, has a next review date of 09/07/2015 i.e. is out of date. Water Corporation confirmed that PCY 223 will be reviewed post restructure of the Assets Planning Group.	▪ Strategic Asset Management Plan 2012/13 – 2032/33 PM# 5756948. ▪ Asset Management Strategy 2015-2025 PM# 12949347. ▪ PCY223 Infrastructure Asset Management, Doc ID 364852, dated 09/07/2012. ▪ Asset Risk Assessment (ARA) Business Rules guidance document, no document number. ▪ Plan Assets guidance document, Doc ID# 9236611, dated 01/07/13. ▪ Optioneering – Workshop Guide & Checklist, document #7607012-v1, no date. ▪ System Capability Forecasting (SCF) user manual, Doc ID 5754454, dated 25/04/2012.

Effectiveness Criteria	Observations	Evidence reviewed
	– Page 2 of the Strategic Asset Management Plan 2012/13 – 2032/33, PM#5756948 indicates that the document is to be reviewed annually. However, the approval date is shown as February 2012 i.e. this document is out of date. – Asset Risk Assessment (ARA) Business Rules guidance document does not have a document number, suggesting that it is not being regularly reviewed. – Plan Assets guidance document, Doc ID# 9236611, dated 01/07/13, has a next review date of 01/07/14 i.e. is out of date. – Optioneering – Workshop Guide & Checklist, document #7607012-v1, does not have a date, suggesting that it is not being regularly reviewed. – System Capability Forecasting (SCF) user manual, Doc ID 5754454, dated 25/04/2012, has a next review date of 01/07/2014 i.e. it is out of date. ▪ As noted above, Water Corporation has held off on the 2015 reviews and updates of its documents as a result of the changes to the business that are currently being carried out. Once the restructure of the organisation has been completed, Water Corporation intends to complete these late reviews of its documents in order to better allocate ownership of the documents and align them with the new structure. ▪ Water Corporation is working towards alignment with ISO 55001, the requirements specification for an integrated, effective management system for asset management, including asset planning processes.	

Table 5-2 Asset Management System Review Observations for Asset Creation and Acquisition

Effectiveness Criteria	Observations	Evidence reviewed
Asset Creation and Acquisition		
▪ Full project evaluations are undertaken for new assets	▪ Water Corporation has in place Project Management Guidelines which sets out processes and milestones where full project evaluations are undertaken. ▪ An Acquire Infrastructure Assets Roles and Responsibilities Map for the asset acquisition processes is also in place. ▪ Water Corporation also has an Asset Acquisition Guidelines document for project evaluations for new assets in different phases. ▪ Water Corporation's full project evaluations are conducted in project phases and milestones: Approval to Scope (ATS) for scoping business case, Approval to Delivery (ATD) for delivery business case, Project summary confirmation (PSC) for contact, Project Practical Completion (PPC) for compliance with design specification and Asset Transfer (ATR) for asset handover. ▪ We believe Water Corporations has adequate policies and procedures in place to undertake full project evaluations for new assets. ▪ We requested Water Corporation to provide example documentation to demonstrate implementation of its policies and procedures relating to project evaluation. We requested the following documentation for one network asset and one non-network asset that was accepted to Practical Completion in the review period: – Appropriation Request – Scoping Business Case – Project Delivery Business Case – Procurement Summary Confirmation – Project Practical Completion report We were provided with and reviewed documentation for the Karratha – Balmoral Road Wastewater Pump Station (WWPS) 2 pressure main and gravity sewer (Project Number: CS01705) and My Water Stage 2 (Project Number: CC00488). ▪ The **Project Scoping Business Case** for the WWPS 2 pressure main and the associated gravity sewer in Karratha comprises of: – a standard form containing: ▪ overall project details (e.g. Project Title, applicable Group / Branch / Region), ▪ forecast estimated costs by year, ▪ identification of capital drivers and Strategic Investment Group, and ▪ an outline of milestones and relevant dates, – a sign-off sheet, – a Capital Investment Branch (CIB) process checklist (e.g. a checkbox for "SAP data updated, AQUA link added"),	▪ Acquire Infrastructure Assets Roles and Responsibilities Map ▪ Infrastructure Planning Phase Process PM4539206 version 4 last updated date 29/06/2012 ▪ Renewals Planning Phase Process PM4539210 version 5 last updated date 09/04/2014 ▪ Select Phase PM4539217 version 5 last updated date 24/04/2014 ▪ Activation Phase PM4539231 version6 last updated 31/03/2014 ▪ Deliver Phase PM4539246 version 5 last updated date 31/03/2014 ▪ Handover and Closeout Phase PM4539248 version 5 last updated date 21/08/2013 ▪ Fit for Purpose Review Phase PM539256 version 4 last updated 02/07/2012 ▪ Post Delivery Review Phase PM4539262 version 5 last updated date 31/03/2014 ▪ Asset Acquisition Definitions Doc 4605691 last updated 29/03/2011 ▪ PM-#1376931-v20-PMB_Website_Document_-_Project_Management_Guidelines_-_Guideline_252 version 02 July 2015 ▪ PM-#2367933-v12-Asset_Acquisition_Guidelines version 4 December 2012 ▪ Karratha – Balmoral Road Wastewater Pump Station (WWPS) 2 pressure main and gravity sewer (Project Number: CS01705): "Project / Appropriation Request Summary Report" (PM#-13686819) (Date: 30/09/2015) ▪ Karratha – Balmoral Road Wastewater Pump Station (WWPS) 2 pressure main and gravity sewer (Project Number: CS01705): "Project

Effectiveness Criteria	Observations	Evidence reviewed
	– identification of business need (Section 1), including the results of a system risk assessment (SRA), – identification of planning options (Section 2), – triple-bottom-line and residual risk evaluation of the recommended planning option (Section 3), – an Approved Requirements Baseline (Section 4 and Attachment 5), – a summary of the Design Alternatives Review (DAR) and Design Management Plan (Section 5), – summaries of the project objectives and scope (Section 6), – a summary of significant issues/constraints impacting project delivery (Section 7), – a concise recommendation (Section 8), and – other attachments (locality plan, scoping level financial impact statement (FIS), capital cost estimate, project schedule and a table of major approvals). ▪ The Project Scoping Business Case was fully signed by 19 September 2011 (the actual milestone date), which is after the "Basic Fixed" ATS milestone date of 31 August 2011. The date at which the business case was fully signed is the same as the Actual Date recorded in the Project / Appropriation Request Summary Report. ▪ The **Project Delivery Business Case** for the WWPS 2 pressure main and the associated gravity sewer in Karratha comprises of: – a standard form containing: ▪ overall project details (e.g. Project Title, applicable Group / Branch / Region), ▪ forecast estimated costs by year, ▪ identification of capital drivers and Strategic Investment Group, and ▪ an outline of milestones and relevant dates, ▪ a sign-off sheet, ▪ a CIB process checklist. – a summary of the identified business need, including an outline of the approved option from the Scoping Phase (Section 1), – summaries of the project objectives, scope and design alternatives (Section 2), – cost estimates and identification of financial and business impacts (Section 3 and Attachments 3 and 4), – project delivery information, including the project schedule, risks to project delivery, stakeholder issues and approvals and delivery and commissioning and handover strategies (Section 4 and Attachments 5 and 6), – a concise recommendation (Section 5), and	Scoping Business Case" (PM#-5778747) (Version Date: 16/09/2010) ▪ Karratha – Balmoral Road Wastewater Pump Station (WWPS) 2 pressure main and gravity sewer (Project Number: CS01705): "Project Delivery Business Case – Major Project" (PM#-9633511) (Version Date: 6/02/2013) ▪ Karratha – Balmoral Road Wastewater Pump Station (WWPS) 2 pressure main and gravity sewer (Project Number: CS01705): "Project Practical Completion Certificate" (PM#-12441549) (PPC Actual Date: 14/01/2015) ▪ Karratha – Balmoral Road Wastewater Pump Station (WWPS) 2 pressure main and gravity sewer (Project Number: CS01705): "Asset Transfer Certificate" (PM#-12584130) (Asset Transfer Date: 14/03/2015) ▪ Karratha – Balmoral Road Wastewater Pump Station (WWPS) 2 pressure main and gravity sewer (Project Number: CS01705): "Project Closeout Report" (PM#-12337103) (Date: 24 February 2015) ▪ My Water Stage 2 (Project Number: CC00488): "Project / Appropriation Request Summary Report" (PM#-13686823) (Date: 29/09/2015) ▪ My Water Stage 2 (Project Number: CC00488): "Program Planning Business Case" (PM#-1815569) (Version Date: 27/11/2008) ▪ My Water Stage 2 (Project Number: CC00488): "Project Delivery Business Case & Budget Release: Minor Projects (Cat D) & Pre-Approved Major Projects" (PM#-10102702) (Version Date: 15/09/2010) ▪ My Water Stage 2 (Project Number: CC00488): "Service Provider Completion Statement" (PM#-12604445) (Last signature obtained on 27/03/15) ▪ My Water Stage 2 (Project Number: CC00488): "Project Closeout Report" (PM#-12478939) (Date: 20/03/2015)

Effectiveness Criteria	Observations	Evidence reviewed

- other attachments (locality and site plans, Approved Requirements Baseline and Notification of Asset Retirements (Asset Write-offs) Form.

- The **Project Practical Completion (PPC) and Asset Transfer Certificates** were completed for the WWPS 2 pressure main and the associated gravity sewer in Karratha. The last sign-off date on the Project Practical Completion Certificate (15 January 2015) is loaded on to the Project / Appropriation Request Summary Report as the Actual Date for the PPC milestone.
- The **Project Closeout Report** for the WWPS 2 pressure main and the associated gravity sewer in Karratha outlines the following:
  - Project scope
  - Delivery strategy
  - Financial performance
  - Time performance
  - Approved scope changes
  - Performance against key objectives
  - Community and stakeholder issues
  - Highlights and innovations
  - Outstanding project completion actions
  - Comments by internal stakeholders
  - Lessons learned action items (including person(s) responsible)
- The **Project Delivery Business Case** for My Water Stage 2 comprises of:
  - a standard form containing:
    - overall project details (e.g. Project Title, applicable Group / Branch / Region),
    - forecast estimated costs by year,
    - identification of capital drivers and Strategic Investment Group, and
    - required and forecast PPC dates,
  - a sign-off sheet,
  - a CIB process checklist,
  - identification of business need, the consequences of deferral or not proceeding and risk mitigation option(s) in the case of deferral or non-approval,
  - an outline of the project scope and deliverables,
  - identification of financial impact, including NPV,
  - identification of other options considered,
  - identification of risks to delivery,

Effectiveness Criteria	Observations	Evidence reviewed
	– description of planning compatibility and contracting strategy, and – identification of required critical approvals, external funding, written-off assets (none in this case). ▪ The **Project Closeout Report** for My Water Stage 2 has the same structure as the Project Closeout Report for the WWPS 2 pressure main and the associated gravity sewer in Karratha, with the exception that responsible person(s) have not been explicitly allocated to the lessons learned action items. However, this does not require an action as one report covered an infrastructure asset and the other an IT project that have slightly different processes but within the same overall context. ▪ For the two example projects reviewed, Water Corporation has applied its project evaluation processes generally as described. ▪ Water Corporation has provided the Asset Investment Program from 2015/16 to 2019/20 that was submitted to the board in November 2014. It outlines the recommended and target capital budgets for this five-year period, and describes the methodology and constraints through which this budget was conceived.	
▪ Evaluations include all life-cycle costs	▪ Whole-of-life cost is defined in Asset Acquisition Definitions Doc 4605691, last updated 29/03/2011, with reference to value for money assessment. The definitions document states that the all life-cycle costs must be considered on an NPV basis when considering value for money. ▪ The Asset Acquisition Guidelines (v12 version dated 4 December 2012) refer to the Asset Cost Estimating System (ACE) and the document Cost Estimating for Infrastructure Planning (365453). ▪ Water Corporation's overall cost estimation process for asset acquisition is documented in "Cost Estimating for Infrastructure Planning" (PM#-365453) (Version Date: 18/06/2014). In this document, the "Estimating Classification Matrix" is established and the different cost estimation stages and associated accuracies are defined. ▪ "S066 Financial – Investment Analysis" (PM#-367574) (Version Date: 25/01/2013) is the standard by which Water Corporation's financial investment decisions are made. This standard prescribes that "all investments (including staged options) shall be subject to financial analysis using the Discounted Cash Flow methodology". ▪ The financial analysis examples supplied by Water Corporation all provide net present value (NPV) estimates of whole-of-life costs. ▪ We consider that Water Corporation has in place appropriate processes to ensure that project evaluations include all life-cycle costs and the examples we reviewed show that it has implemented these processes.	▪ Asset_Acquisition_Guidelines PM-#2367933-v12- version dated 4 December 2012 ▪ Acquire Infrastructure Assets Roles and Responsibilities Map ▪ Infrastructure Planning Phase Process PM4539206 version 4 last updated date 29/06/2012 ▪ Renewals Planning Phase Process PM4539210 version 5 last updated date 09/04/2014 ▪ Select Phase PM4539217 version 5 last updated date 24/04/2014 ▪ Asset Acquisition Definitions Doc 4605691 last updated 29/03/2011 ▪ PM-#1376931-v20-PMB_Website_Document_-_Project_Management_Guidelines_-_Guideline_252 version 02 July 2015 ▪ Asset Cost Estimating system (ACE) to provide planning project cost estimating. ▪ Further information is in aquaDOC #365453; ▪ Cost Estimating for Infrastructure Planning (PM#-365453) (Version Date: 18/06/2014) (Next Review Date: 18/06/2016)

Effectiveness Criteria	Observations	Evidence reviewed
		▪ S066 Financial – Investment Analysis (PM#-367574) (Version Date: 25/01/2013) (Next Review Date: 25/01/2016) ▪ Meter Replacement Program Financial Analysis Memorandum (PM#-11529445) (Date: 3 October 2014) ▪ Carnarvon Borefield Pipeline Replacement Analysis (PM#-12051993) (Date: 18 December 2014) ▪ Carnarvon Borefield Pipeline Replacement Analysis Update (PM#-12295318) (Date: 29 January 2015) ▪ GWAMCO Sensitivity Analysis Memorandum (PM#-10250649) (Date: 05 February 2014) ▪ GWAMCO Investment Analysis (PM#-9374824) (no date)
▪ Projects reflect sound engineering and business decisions	▪ The Asset Acquisition Guidelines (PM-#2367933-v12, version dated 4 December 2012) provide the framework for sound decisions to be made. ▪ Water Corporation's Procurement Policy operationalises the requirement that under the Water Corporation Act 1995, the business's procurement processes and procedures must be consistent with sound commercial practice. ▪ An important process for enabling sound engineering decisions is the design alternative review (DAR) which is documented in the Engineering Design Manual (Aquadoc #1074204 Revision 06/05/2015) ▪ In particular, the processes focus on establishing the need for investment and ensuring that options are assessed against financial and non-financial criteria. ▪ Water Corporation has provided two Design Alternative Reviews (DAR). These are for the following asset acquisitions: – Duplicate Caddadup 42 ML Tank and Rechlorination Facilities – Derby WTP Fluoridation Upgrade ▪ Each DAR outlines the alternative options for the project (e.g. pipe material, level of fluoridation), the "pros" and "cons" of each option, additional comments and justification and the option(s) selected for further investigation.	▪ Asset Acquisition Guidelines ▪ Engineering Design Manual ▪ Drawings Handover Guideline ▪ Job Management and Execution Process Map ▪ PCY216 Procurement of Goods and Services Policy ▪ Guidelines for procurement ▪ Design Alternative Review documentation for: ▪ Caddadup 42 ML Tank ▪ Derby WTP Fluoridation Upgrade
▪ Commissioning tests are documented and completed	▪ Water Corporation has in place an Asset Commissioning Guideline (PM457191, version 21 October 2013) detailing the requirements for commissioning tests. This comprehensive document details roles and responsibilities for commissioning, typical commissioning activities and requirements for commissioning plans and documentation. ▪ There is also in place an Asset Data Handover Guideline (PM589709, version 19 November 2013)	▪ Asset Commissioning Guideline PM457191 version 21 October 2013 ▪ Drawings Handover Guideline PM589734 version 21 October 2013 ▪ Asset Data Handover Guideline PM589709 version 19 November 2013

Effectiveness Criteria	Observations	Evidence reviewed
	▪ We requested Water Corporation to provide example commissioning documentation so that we could test the application of these policies and procedures. ▪ Water Corporation has provided Commissioning Plans, Commissioning Verification Reports, Commissioning Activities and Master Equipment Lists (CAMEL) and Commissioning Reports for the following asset acquisitions: – Balannup WWPS B No. 175-03 – Balfour St Type 180 (Project Number: CS01240) – Geraldton Brown Lane Water Storage Tank, Connecting Pipework, Pressure Reducing Valve and Surge Vessel (Project Number: CW-00287) ▪ These documents: – set out the required commissioning and pre-commissioning tests and inspections (as part of the Commissioning Plans, CAMEL templates and linked documents) – measure compliance against these checks (which is recorded / referenced in the Commissioning Verification Reports and completed CAMELs) – report on the overall findings of the commissioning tests and inspections (through the Commissioning Report). ▪ While the Commissioning Plan outlines the project-specific members of the Commissioning Team and their roles and responsibilities, it does not explicitly state who signed-off on what tests/inspections. ▪ The completed CAMEL for the Geraldton Brown Lane assets specifies the dates of completion for a majority of the commissioning checks performed on mechanical assets. However, the majority of electrical and instrumentation installations do not have commissioning check completion dates recorded. ▪ Water Corporation has not provided a completed CAMEL for Balannup WWPS. ▪ We consider that there is an opportunity for Water Corporation to improve the completeness of its commissioning documentation.	▪ Asset Handover Checklist, Doc ID 606059 (Ref PM #7065974.v2B), version 4 version date 22 October 2013. ▪ Asset Handover Maintenance Guideline PM589721 version 11 November 2013 ▪ Ops and Maintenance Manual Handover Guideline PM589723 version 12 November 2013 ▪ Defects and Warranty Management Guideline PM589718 version date 11 November 2013 ▪ Drawings Handover Guideline PM589734 version date 21 October 2013 ▪ Ops and Maintenance Manual Handover Guideline PM589723 version 12 November 2013 ▪ OSH Handover Guideline PM 589724 version 19 November 2013 ▪ SCADA Handover Guideline PM589733 version 1 February 2013 ▪ Security and Fire Process Guideline PM589731 version 22 October 2013 ▪ Spare Parts Handover Guideline PM589725 version 21 October 2013 ▪ Training Requirements Guideline PM589727 version 29 October 2016 ▪ Balannup WWPS B No. 175-03 – Balfour St Type 180 (Project Number: CS01240): Commissioning Plan ▪ Balannup WWPS B No. 175-03 – Balfour St Type 180 (Project Number: CS01240): Commissioning Verification Report ▪ Balannup WWPS B No. 175-03 – Balfour St Type 180 (Project Number: CS01240): Commissioning Report ▪ Geraldton Brown Lane Water Storage Tank, Connecting Pipework, Pressure Reducing Valve and Surge Vessel (Project Number: CW-00287): Commissioning Plan

Effectiveness Criteria	Observations	Evidence reviewed
		▪ Geraldton Brown Lane Water Storage Tank, Connecting Pipework, Pressure Reducing Valve and Surge Vessel (Project Number: CW-00287): Commissioning Verification Report ▪ Geraldton Brown Lane Water Storage Tank, Connecting Pipework, Pressure Reducing Valve and Surge Vessel (Project Number: CW-00287): Commissioning Report ▪ Geraldton Brown Lane Water Storage Tank, Connecting Pipework, Pressure Reducing Valve and Surge Vessel (Project Number: CW-00287): Commissioning Activity Master Equipment List (CAMEL)
▪ Ongoing legal / environmental / safety obligations of the asset owner are assigned and understood	▪ Water Corporation has prepared handover guidelines to assist in ensuring that ongoing obligations relating to newly acquired assets are understood and incorporated into business as usual practices. Handover guidelines are in place for: – Occupational Health and Safety – Operations and Maintenance Manuals – SCADA – Security and Fire – Drawings – Spare parts – Training ▪ Water Corporation has provided two examples of Occupational Safety and Health (OSH) Handover Reports. These are for the following acquisitions: – "Karratha WWPS 6 Pressure Main to WWPS1" (Project Number: CS01384) – "Karratha Searipple Rd SPS1 Type 180 PS & GRP Pressure Main" (Project Number: CS01990) These reports identify site, operation and maintenance (O&M) risks, associated mitigation actions undertaken and the residual risks. Risks to both personnel and the public are considered. Non-standard documentation (e.g. O&M manuals) and other information are also referenced within the reports. ▪ During our site visit to Karratha we visited a sewage pumping station which had been constructed and was operational but was still in the handover period to Water Corporation's operations and had yet to be accepted as meeting the required standards. While we were on site a pump test was being performed. We spoke with the engineer responsible for handover	▪ Defects and Warranty Management Guideline PM589718 version date 11 November 2013 ▪ Drawings Handover Guideline PM589734 version date 21 October 2013 ▪ Operating Resources Guideline PM589722 version 18 June 2013 ▪ Ops and Maintenance Manual Handover Guideline PM589723 version 12 November 2013 ▪ OSH Handover Guideline PM 589724 version 19 November 2013 ▪ SCADA Handover Guideline PM589733 version 1 February 2013 ▪ Security and Fire Process Guideline PM589731 version 22 October 2013 ▪ Spare Parts Handover Guideline PM589725 version 21 October 2013 ▪ Training Requirements Guideline PM589727 version 29 October 2016 ▪ CS01384 Karratha Falcon OSH Handover report #12241823 ▪ CS01990 Karratha Searipple Road SPS1 OSH Handover Report #12974765

Effectiveness Criteria	Observations	Evidence reviewed
	who demonstrated a good understanding of the process for acceptance and the criteria that needed to be met. Water Corporation had yet to accept the pump station due to design flowrates not having been achieved. This helps demonstrate that Water Corporation places appropriate rigour over its ongoing responsibilities relating to new assets.	▪ CS01732 Derby WWPS No2 Operations and Maintenance Manual #9758064 (Hard copies provided) ▪ Baldivis South Wastewater Pumping Station 156-08 and Pressure Main Operations and Maintenance Manual #9801571 (Hard copies provided)

Table 5-3 Asset Management System Review Observations for Asset Disposal

Effectiveness Criteria	Observations	Evidence reviewed
Asset Disposal		
▪ Under-utilised and under-performing assets are identified as part of a regular systematic review process	▪ Water Corporation has a 'Decommission and Disposal of Infrastructure Assets' Policy, PCY 342, version 13 December 2013. Water Corporation had initially also provided an out of date (2002) policy but advised that this Policy was no longer current. ▪ Procedures in relation to asset disposal of under-performing assets are documented in Decommission Assets Process S087, Disposal Standard and Decommission & Dispose Assets Guideline. All these documents are current. ▪ Water Corporation explained that under-utilised and under-performing assets are identified as business as usual processes. These processes are identified in the Guideline and include: – Normal operational activities – Individual asset planning, monitoring and assessment – Capability management and Asset Risk Assessments – State Wide Planning Program to meet growth requirements – Maintaining assets. ▪ Each of the business-as-usual processes are the responsibility of different areas of the business and are, therefore, complementary to help ensure that the right assets for disposal are identified. ▪ These business-as-usual processes are regular and systematic. ▪ Water Corporation previously had a proactive program to dispose of assets surplus to its service delivery requirements. However, this program has now been suspended as it was considered that the benefits of the program were diminished below its costs. ▪ We were provided with and reviewed a list of assets disposed of during 2014/15, including the written down value and accumulated depreciation for each asset at the time of disposal. We discussed with Water Corporation the reasons for disposal of the major expenditure items.	▪ Policy (PCY342) Decommission and Disposal of Infrastructure Assets (Doc ID: 3955810 Version Date 13 December 2013, Next Review 16 December 2016) ▪ S087 Disposals Standard ▪ Intranet screenshot of *Decommission and Dispose Assets* process area including links to relevant documents ▪ Decommission & Dispose Assets Guideline ▪ Notification of Asset Retirement (Write-Offs) Form ▪ Live demonstration of System Capability Forecasting tool with particular reference to asset performance and utilisation ▪ Live demonstration of Asset Risk Assessment system
▪ The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken	▪ The reasons for under-utilisation or poor performance will first be critically examined as part of the business-as-usual process where the issue was first identified. Capability planning through the System Capability Forecasting tool is the most comprehensive place where asset performance is considered and the reasons for any under performance is considered. This assessment will make use of data sources including monitoring data, operational input and service demand forecasts. ▪ In completing an asset disposal, the Guideline requires that the reasons for the asset disposal are assessed and documented on the associated paperwork. Depending on the nature of the disposal, the reasons will also be likely to identified in a planning report or feasibility study which makes the case for a new asset and hence (implicitly or explicitly), disposal of the existing asset.	▪ Decommission & Dispose Assets Guideline ▪ Examples of asset write-off forms ▪ Examples of accelerated depreciation forms

Effectiveness Criteria	Observations	Evidence reviewed
▪ Disposal alternatives are evaluated	▪ The Disposal Standard states that alternatives should be evaluated to maximize the financial return to the business: *The primary aim of disposing of surplus goods or materials is to achieve the best net return or outcome for the Water Corporation. Although the most cost-effective method to dispose of goods is often by public auction, this is not always the case. A range of disposal options need to be considered before deciding which is the most appropriate.* ▪ Internal transfer are also required to be considered under the Standard.	▪ S087 Disposals Standard
▪ There is a replacement strategy for assets	▪ Asset replacement falls under the wider consideration of sustaining service delivery. Water Corporation identifies appropriate asset and non-asset solutions when assets reach the end of their lives. Asset solutions may include replacement but also renewal and refurbishment. We discuss Water Corporation's asset planning strategies more fully under the Asset Acquisition and Capital Expenditure Planning elements. ▪ Water Corporation provided a selection of renewals strategies for various asset classes.	▪ Asset renewals planning Guideline ▪ Pressure Mains, Pump Stations and Vacuum Sewer System Asset Class Strategy ▪ Renewals Water Production and Storage Strategic Investment Business Case ▪ Renewals Water Mains Strategic Investment Business Case

Table 5-4 Asset Management System Review Observations for Environmental Analysis

Effectiveness Criteria	Observations	Evidence reviewed
Environmental Analysis		
▪ Opportunities and threats in the system environment are assessed	▪ Water Corporation has a "From Strategy to Action" planning process (Roadmap) which it considers to be the main means through which opportunities and threats in the its wider system environment are assessed. This planning process has the following features: – 18 month process from December of financial year (FY) 1 to July of FY3, with the following scheduled milestones: ▪ FY1: December – "Start Strategic Thinking" ▪ FY1: March – "Start Capital Budgeting & "Planning" ▪ FY2: August – "Start Pricing" ▪ FY2: September – "Start Operational Budgeting" ▪ FY2: February – "Start Business Planning" ▪ FY2: April – "Advise our Owner" ▪ FY2: May – "Start Performance Agreements" – Integration with the state budget and Annual and Financial Reports, down to the Branch/Region Business Plans and employee performance plans. – Informed by the environment scan – Involves the updating of the Corporate Risk Report ▪ We consider that this is important to the asset management system as it provides a wide perspective of the operating environment and allows input from internal and external stakeholders to be gathered and for the objectives and constraints of asset management to be determined. ▪ Water Corporation also has the two following systems to assist in identifying opportunities/ threats: – System Risk Assessment – Asset Risk Assessment ▪ These two systems are described in the Risk Assessment section of this report. Both tools provide complementary means for Water Corporation to identify opportunities and threats. The System Risk Assessment makes use of corporate data sets (e.g. billing volume data, SCADA trends etc.) and compares these with trigger points which enables system planners to identify possible areas where service delivery may be impacted. The Asset Risk Assessment tool enables responsible staff across the business to register and assess risks against assets. There is a workflow such that risk assessments are to be endorsed and reviewed. ▪ We consider that the corporate level "strategy to Action" planning process and the System Risk Assessment and Asset Risk Assessment systems provide for the adequate assessment of opportunities and threats in the system environment.	▪ From Strategy to Action Roadmap, Version Date: 24 September 2015 ▪ Live demonstration of the Asset Risk Assessment system ▪ Live demonstration of the System Risk Assessment system ▪ Statement of Corporate Intent 2014/2015 ▪ Environmental Scan, News Scan – Insights, 24 July 2015 ▪ Environmental Scan, News Scan – Insights 17 August 2015

Effectiveness Criteria	Observations	Evidence reviewed
▪ Performance standards (availability of service, capacity, continuity, emergency response, etc) are measured and achieved	▪ For the period covered by this review, Water Corporation's performance standards are set out in the following documentation: – Schedule 4 of Version OL9 of Water Corporation's operating licence ("Water Services Operating Licence") (dated 24 January 2011) – Schedule 3 of Version 13 of Water Corporation's operating licence (dated 13 February 2014) – Water Services Code of Conduct (Customer Service Standards) 2013 (dated 18 November 2013) Version 13 of Water Corporation's operating licence outlines performance standards for the services of potable water supply, drainage, irrigation and water systems in farmlands areas. ▪ In the 2014/2015 financial year, Water Corporation achieved its performance standards with the exception of the percentage of customer complaints resolved within 15 business days, which was reported as 99.6% (below the target of 100%). ▪ Performance is measured and subsequently reported through the provision of the following information to the Authority on an annual basis: – Performance reporting datasheets – Information on drought response, services provided by agreement and drainage – Information for Minor Towns benchmarking ▪ For its internal purposes, Water Corporation has in place a "Business Performance Reporting" system. This is a business intelligence tool that draws relevant data from various corporate systems and data sets and is the single point of truth for performance monitoring and reporting. ▪ The Business Performance Reporting system covers multiple business areas and each user is provided with access to the performance data related to their role and level of authority. The performance reporting rolls up through organisational level to provide Board level reports which provide relevant summaries of the same data that staff at lower levels also monitor and report on. In this way, Water Corporation is able to achieve a consistent approach to performance monitoring. ▪ Most indicators are reported monthly with responsible managers required to identify the reasons for observed variances ▪ We consider that Water Corporation has in place effective systems to measure and monitor relevant performance standards be they external obligations or internal performance metrics. We observed that the Business reviews monitoring data through its monthly reporting process and this helps it to achieve its performance standards through timely implementation of corrective actions or mitigation measures.	▪ Live demonstration of Business Performance Reporting system ▪ Customer Charter, What you can expect as a Water Corporation customer, 7 August 2014 ▪ Board Performance Reporting packs for October 2013, March 2015, September 2015 ▪ Performance reporting data submissions from Water Corporation to ERA for 2011/12, 2012/13, 2013/14 and 2014/15 including emails, covering letters and data spreadsheets ▪ PM-#11424707-v2 Water Loss Performance Summary 2013/ 2014 ▪ Water Services Operating Licence: Water Corporation, Licence No 32, Version: OL9, Version Date: 24 January 2011 ▪ Water Services Operating Licence: Water Corporation, WL32, Version 13, Version Date: 13 February 2014 ▪ Water Services Code of Conduct (Customer Service Standards) 2013, Version 00-b0-03, as at 18 Nov 2013
▪ Compliance with statutory and regulatory requirements	▪ Water Corporation has an online register of relevant legislation which assigns an owner to legislation. During the review, we viewed the online register and saw that the content had been updated at 30 September 2015. This is outside the review period but demonstrates that Water Corporation maintains the currency of this register.	▪ Live demonstration of the online legislation register

Effectiveness Criteria	Observations	Evidence reviewed
	▪ Water Corporation operates around 90 prescribed sites under the *Environmental Protection Act* which require it to report annually to the Department of Environment Regulation. Annual Audit Compliance Reports are submitted for the calendar year for each site. ▪ We requested the Annual Audit Compliance Reports for the Subiaco WWTP and the Southern Seawater Desalination plant for 2014. Each site had recorded non-compliances as follows: – At Subiaco WWTP data on plant effluent flow rate was not available because although there was a flowmeter present, the flowmeter was not connected to SCADA until June 2015. This meant that Water Corporation has reported effluent flow and contaminant loadings based on inflow data. The Annual Audit Report states that Water Corporation informed Department of Environment and Conservation (now Department of Environment Regulation) in October 2013, before the non-compliance occurred. The non-compliance is no longer relevant because the licence has been superseded. Water Corporation states in its Annual Audit Report that the Department of Environment and Conservation did not take any action. – At the Southern Seawater Desalination Plant, the licence condition that desalination effluent should only be discharged through the outfall diffuser within the Low Ecological Protection Area was contravened on 1 September 2014. Around 250kL of high pH effluent was discharged from the Reverse Osmosis Clean In Place effluent sump. The effluent was discharged to a drainage swale and infiltrated the soil. Water Corporation notified the Department on 2 September 2014 and a Departmental officer conducted an inspection on 5 September 2014. Water Corporation was issued with a Letter of Warning for Contravention of the Environmental Protection Act on 22 October 2014. ▪ The non-compliance at the Southern Seawater Desalination Plant is concerning with regard to the effectiveness of Water Corporation's training and oversight of operations. The overflow occurred from a bunded area. Bunded areas are designed to have multiple barriers to prevent discharge – the first being that the size should be adequate to contain a reasonable flow and the second being the presence of level sensors and alarms. The Annual Audit Compliance Report states that the overflow was caused by flushing, meaning that flow continued to be sent to the bund after high levels had been reached. This suggests that operations staff firstly were not aware of the implications of the continual flushing and secondly either not aware of the alarm or not aware of what to do on hearing the alarm. We conclude that Water Corporation's effectiveness for rating for the criteria *Operational policies and procedures are documented and linked to service levels required* should be rated as "2". ▪ We note, however, that the Annual Audit Compliance Reports reviewed suggest that Water Corporation has effective systems in place for identifying and reporting regulatory non-compliances. ▪ Water Corporation also provided Annual Water Monitoring Review Reports for water schemes. These reports are required to be prepared for the Department of Water under the Water Resource Management Strategy for each scheme. The Review Reports note some non-compliances with monitoring levels and quality parameters at multiple schemes. Some of the non-compliances are due to unavoidable circumstances such as sources being off-line.	▪ Review of Section 72 (sewer overflows) reporting systems at audit ▪ Annual Audit Compliance Reports for Subiaco WWTP and Southern Seawater Desalination Plant ▪ Annual Water Monitoring Review Reports for Broome, Esperance, Exmouth, Kununurra, Exmouth, Marble Bar and Warren Blackwood ▪ Water loss performance summary for 2013/14 ▪

Effectiveness Criteria	Observations	Evidence reviewed
	However, some non-compliances were within Water Corporation's control such as staff absence and oversight of monitoring events. This suggests, as above, that Water Corporation has opportunities to improve on its operational activities to ensure that its compliance activities undertaken. ▪ At audit we also reviewed Water Corporation's reporting under Section 72 of the *Environmental Protection Act* which relates to sewer overflows. We reviewed the reporting criteria and found that Water Corporation staff were able to communicate them clearly and had a good awareness of the reporting protocols. ▪ We conclude that Water Corporation has in place effective systems for monitoring and reporting compliance with statutory and regulatory requirements. These systems include internal reporting (as discussed in the effectiveness criterion above) and external reporting to relevant regulators including the ERA, the Department of Environment Regulation, Department of Water and Department of Health. The monitoring and reporting systems identified a number of non-compliances in the reporting year including a contravention of the Environmental Protection Act following a discharge at the Southern Sea Water Desalination Plant in September 2014.	
▪ Achievement of customer service levels	▪ Water Corporation's customer service levels are jointly defined in its operating licence and customer charter ("What you can expect as a Water Corporation customer"), which was last revised in August 2014. ▪ Within the customer charter, quantitative and qualitative service levels for the following service areas are defined: – Water (provision of a water service) – Water quality – Pressure and flow – Wastewater (provision of a wastewater service) – Wastewater odours – Billing – Maintenance (including response to planned and unplanned interruptions) – Response to customer contact – Complaints and resolution ▪ Water Corporation has also aggregated the following customer survey results and perceptions of performance areas: – Overall Performance as a Utility – Customer Confidence in Water Corporation – Image – Trustworthy – Media Index	▪ Customer Charter, What you can expect as a Water Corporation customer ▪ Customer and Stakeholder Intelligence, WaterNet ▪ PCY 225 Customer Complaints Version Date, 4 December 2013, (revision history 19 February 2014), Next Review Date, 10 February 2017 ▪ Board Performance Reporting packs for October 2013, March 2015, September 2015

Effectiveness Criteria	Observations	Evidence reviewed
	– Corporate Telephone Excellence – Perception of Value Score – Field Services Customer Contact Follow-up Survey – Initial Customer Contact Survey ▪ Water Corporation reports on the following customer indicators at Board level: – Customer complaints – Phone ‘13’ first call resolution – Debt recovery – My Water Take-up	

Table 5-5 Asset Management System Review Observations for Asset Operations

Effectiveness Criteria	Observations	Evidence reviewed
Asset Operations		
▪ Operational policies and procedures are documented and linked to service levels required	**Overview of Water Corporation's Operations** ▪ Water Corporation differentiates between scheme operations and asset operations. Scheme operations relates to the operations of the overall scheme, whereas asset operations relates to the individual assets and has regard to O&M standards. Water Corporation considers that whereas most of the Regions have a scheme-based view to operations, the Perth Metropolitan area has more of an asset-based focus with regard to operations management. ▪ There is not an overall document that is applicable to all schemes and Water Corporation has created individual documents for each scheme. Some of the larger schemes, such as the GSTWS, have an overall document with individual documents for the sub-schemes. ▪ The Regions are responsible for the operations in their designated areas. However, the operation of some critical schemes, where there may be specific licence constraints related to how the system is operated, has been transferred to the centralised Service Centre based in Perth. An example of this is the Exmouth water supply scheme, where, as a result of abstraction licence issues caused by the local operators looking to maintain supplies in the scheme's storage assets, the operations of the scheme were transferred to the Service Centre. The Service Centre is able to remotely monitor and operate these schemes. ▪ At the current time, not all of the critical schemes in the Regions have been transferred to the Service Centre but Water Corporation is undertaking a program to prioritise this transfer of responsibility. ▪ The Aroona Alliance, an integrated alliance of Water Corporation, SUEZ and its partner Transfield Services, are responsible for the operations and maintenance of the water production and treatment assets in the Perth Metropolitan area, excluding the desalination plants and the Mundaring Water Treatment Plant. However, Water Corporation is the owner and ultimately responsible for the operations of these assets. ▪ Aroona is an alliance which employs a mix of Water Corporation and contractor staff, with shared performance incentives. Water Corporation contributes the highest proportion of staff, with approximately 60% of the alliance's staff being Water Corporation employees. ▪ Overall, the Aroona Alliance manages and operates six groundwater treatment plants, 14 wastewater treatment plants and two advanced water recycling plants, as well as 13 dams, 190 boreholes and 520 km trunk mains to deliver services to Water Corporations customers. The population that Aroona serves is approximately 1.9M residents. The contract began on July 1, 2012, and has an initial term of 10 years (with a possible extension of a further 5 years). Prior to the formation of the Aroona Alliance, the operations of the Perth Metro schemes was carried out in-house, with the maintenance carried out by the Corporation in partnership with a maintenance contractor. ▪ The Aroona alliance operations do not extend to the reticulation mains or sewers or any of the drainage assets. These are managed by Water Corporation through its Perth Regional group. ▪ Water Corporation's two metropolitan desalination plants are operated by two other alliance partnerships. The Perth Seawater Desalination Plant is managed by an alliance consisting of	▪ PCY340 Scheme and Asset Operations (Doc ID: 3955868, Version Date: 13 June 2013, Next Review Date: 13 June 2016. ▪ Scheme Operations Plans Index. (PDF print-out of PM-# 4567044-v2-Scheme_Operations_Plans_Index.XLS, generated on 28/08/2015) ▪ System Capability Matrix home page. (PDF print-out of http://scm.watercorporation.com.au/, generated on 26/08/2015) ▪ Geraldton Regional Water Supply Scheme Operating Plan 2011 – 2012 Part A (Version 6) ▪ Geraldton Regional Water Supply Scheme Operating Plan 2011 – 2012 Part B (Version 6) ▪ Esperance Water Supply Scheme Operating Plan. (Version 1, published on 26/08/2015) ▪ Lower Great Southern Water Supply Scheme Operating Plan. (Version 2B, published on 26/08/2015) ▪ Work Planning and Scheduling: RCSG – Procedure for Planning. (Doc ID: 9032486, Version Date: 25 March 2015, Next Review Date: 25 March 2016. Document History has not been updated to reflect the 2015 revision) ▪ Work Planning and Scheduling Procedure for Commitment. (Doc ID: 9050583, Version Date: 13 June 2013, Next Review Date: 13 June 2015. Document is out-of-date as the review was due on 13 June 2015) ▪ Work Planning and Scheduling Procedure for Scheduling.

Effectiveness Criteria	Observations	Evidence reviewed
	Water Corporation, SUEZ and Multiplex. The Southern Seawater Desalination has an alliance that comprises Tecnicas Reunidas, Valoriza Agua, AJ Lucas, WorleyParsons and the Water Corporation. ▪ The Mundaring Water Treatment Plant is a Private Partnership (PPP) that supplies treated water to the Goldfields and Agricultural Water Supply (G&AWS). The PPP contract comprises the design, construction, financing, operation, and maintenance of a new 160 to 240 ML/d expandable raw water pump station and water treatment plant. Commissioning of the plant started in September 2013 and was completed, including Performance Testing in December 2013. ▪ The Mundaring Water Treatment Plant has been designed, constructed, financed and is operated and maintained by Helena Water, a consortium of the Royal Bank of Scotland, Acciona Agua, United Utilities and Brookfield Multiplex. The contract for the WTP runs for 35 years, at which point the plant will be handed back to the Water Corporation in full operating condition under the conditions of the contract. ▪ In June 2011, the Governor provided for an exemption – (*The Water Services Licensing (Mundaring Water Treatment Plant*) *Exemption Order 2011*) exempting, under specified conditions, Helena Water and Acciona Trility Joint Venture (herewith referred to as Helena Water) from the requirement to hold a water licence under the *Water Services Licensing Act 1995*. ▪ As a result, the water assets managed by Helena Water (including the Mundaring Water Treatment Plant) are not included in the scope of Water Corporation's 2015 Review. **Operating Policies** ▪ The more strategic aspects of asset operational are the responsibility of the Asset Management Branch at the current time. ▪ PCY340 Scheme and Asset Operations is the overarching policy for the operation of the Corporation's water and wastewater schemes and supporting assets. **Operating Plans & Strategies** ▪ Weekly operational plans are developed for the regional schemes which set out the operating parameters (e.g. what bores to utilise, what assets to run, etc). The operational plans are also reviewed each week to identify any alarms in the previous week and to set chlorine levels to maintain water quality in the system. ▪ A similar process is employed in for the Perth metro areas, with a Total Water Plan developed on a weekly basis. For the metropolitan systems, the Service Centre reviews the demand forecasting for the upcoming week and provides this information to Aroona to undertake the operations to provide the service. Aroona has a centralised team within its alliance to operate the treatment plants and bores. ▪ Aroona's framework for operating the Water Corporation treatment plants it operates and maintains is based on the licensing compliance requirements for each site. The operating licences provide the performance parameter outputs for running the treatment processes with	(Doc ID: 9072160, Version Date: 14 June 2013, Next Review Date: 14 June 2015. ▪ Work Management Using ZW05: Plant Maintenance – Quick Reference Sheet. (Doc ID: SAP-QRS-PM-018, Issue Date: 31 July 2015) ▪ Managing PM04 Work Orders in the Planning Table Using ZW05a: Plant Maintenance – Quick Reference Sheet. (Doc ID: SAP-QRS-PM-046, Issue Date: 17 November 2014) ▪ Draft Organisational Structure - 1 September 2015 (PM #13035416) ▪ SCADA Infrastructure Plan. (PM # 7796020, version 3, last updated in September 2012. Version dates have not been recorded against the respective revisions) ▪ Gravity Sewers Asset Class Strategy. (PM #6900493, published in November 2012) ▪ Wastewater Pressure Mains, Pump Stations and Vacuum Sewer Systems Asset Class Strategy (PM # 9364160, published in April 2014.) ▪ Customer Charter. (Published on 9 June 2012) ▪ PM-#3655044-Plan Asset Operations Process and Guideline ▪ PM-#9032486 Work Planning and Scheduling - RCSG - Procedure for Planning ▪ PM-#9072160 Work Planning and Scheduling - Procedure for Scheduling ▪ PM-#9050583 Work Planning and Scheduling - Procedure for Commitment ▪ PM-#13257022 Operations Group Weekly Flash Report - Regional Manager to General Manager - Region: Mid-West

Effectiveness Criteria	Observations	Evidence reviewed

the site. Aroona also maintains a close relationship with Water Corporation, with the operating and maintenance data fed into Water Corporation's systems and regular reporting on performance and activities submitted.

- Water Corporation uses a number of different measures to measure the performance of the Aroona alliance with regard to operations of the assets it is responsible for. These include requirements for Aroona to:
  - Have an Asset Management Plan that is endorsed by the Corporation
  - Meet minimum conditions of satisfaction, one of which is 'does not breach the Operating Licence'
  - Deliver against the Service objectives, one of these being Asset Management, which includes requirements around asset condition assessment, asset capability, maintenance and asset acquisition
  - Report performance against Service Objectives, which are measured by a Balanced Scorecard with specific Asset Management Performance measures
  - Maintain Certification for Quality, OSH and Environment, and the Corporation does conduct internal reviews and spot checks and can if required conduct external reviews / audits
- The regional systems that are not under central control also follow the same process for developing weekly operational plans. These systems are not monitored by the Operational Centre in Perth and the plans are not as detailed as those for the systems that have been identified as being critical systems.
- A list of Scheme Operations Plans is contained in the Scheme Operations Plans Index. Although this document was generated on 28/08/2015, we note that "Under review for 2011/12" is typed repeatedly in the "Current" column of the spreadsheet print-out. This, in conjunction with only two plans having a preparation/revision year of later than 2011/12, suggests that either the Scheme Operations Plans Index is out-of-date or the practice of regularly reviewing and updating Scheme Operations Plans has ceased.
- According to the Scheme Operations Plans Index, Scheme Operations Plans (Parts A and B) are available in the System Capability Matrix (SCM). The SCM is an intranet information portal maintained by the Capability Assessment Section.
- We have been provided with examples of Water Corporation's Scheme Operations Plans:
  - Geraldton Regional Water Supply Scheme (GRWSS) Operating Plan 2011 – 2012 Parts A and B.
  - Esperance Water Supply Scheme Operating Plan.
  - Lower Great Southern Water Supply Scheme Operating Plan.
- During the review we sighted PM#11161839 LGSTWS – Operational Strategy 2014-15 for the Lower Great Southern Water Supply Scheme. We observed that the strategy document includes a model of predicted water consumption for the whole year. For each week in the year, Water Corporation reports how it will meet the demand using the bores that it has available to provide the supply. The Corporation is able to monitor and operate the scheme

Effectiveness Criteria	Observations	Evidence reviewed

remotely from the Service Centre located in its Leederville main office. If there are any issues with the bores or other assets, the Service Centre contacts the local operators to investigate and undertake any maintenance work.

- GRWSS Operating Plan 2011 – 2012 Part A documents the following:
  - Scheme overview (including an outline of the scheme structure, scheme operating strategy and brief summaries of contamination risks, drought management and flood impacts)
  - Operating schematic
  - Scheme constraints
  - Reference documents (e.g. information contained in the SCM)
- We note that a number of the statements in GRWSS Operating Plan 2011 – 2012 Part A are either out-of-date or were written almost four years ago and may no longer be applicable. These include:
  - "The water allocation licences… stipulate water draw… for the period from 1 January 2008 to 31 December 2012."
  - "This operation [the boosting of flows by Walkaway Booster Pump Station] shall commence in November 2011."
  - "The lime dosing for preservation of pipeline cement is currently off line."
- For its wastewater treatment plants, Water Corporation utilises Process Control Tables. Process tables have been developed for each treatment plant to set out how they are to be operated. Aroona use Process Control Tables for the wastewater treatment plants that the alliance operate and maintain.
- The more complex WWTPs in the regions and the metropolitan areas are then operated in accordance with the parameters set out in the Process Control Tables. During the review we were provided with the Narngulu Wastewater Treatment Plant Process Control Table and confirmed that it provides the parameters for the operation of each treatment process stream within the facility. These are set by the design criteria and the operator measures, with monthly and annual reporting used to review the operating data and allow for changes to be made to the Process Control Tables if required. The monthly reports to the governance committee includes information of any wastewater and water quality alerts and alarms that have occurred or any exceedances that have been recorded.
- We also observed the Subiaco WWTP – Odour Control Facility Process Control Table during the site visit. We confirmed that that has been signed off and endorsed by both Aroona and Water Corporation. The Process Control Table sets out the:
  - Asset
  - Monitoring Point
  - Functional Location Parameter
  - Sample Group

Effectiveness Criteria	Observations	Evidence reviewed
	– Frequency of Sampling – Operational Target – SCADA Settings – Corrective Actions – Notes ▪ We confirmed that operational targets included in the Process Control Tables are well within the DER operating licence limit requirements. ▪ Water Corporation's wastewater pumping stations are operated locally, with local operational staff attending any alarms that occur. Some of the pumping stations are able to be operated remotely from the Operational Centre in Perth. Generally the capacity at the pumping stations makes management of these assets type less problematic and less urgent should any operational issues occur. Water Corporation's wastewater treatment plants generally have limited capacity to transfer flows, meaning that there is limited scope for the pumping stations to divert flows to different treatment plants. Water Corporation has a current capital program to install SCADA on pumping stations in the Perth metro area. ▪ Water Corporation uses AMOSS (Asset Management and Operation Support System) to report on pump station flows, allowing trends in flow and capacity to be assessed and managed. AMOSS was initially developed to identify overflow issues at the pumping stations. The system has a database for each site that includes information on alarm levels, motor sizes and test history. The system was implemented in the Perth Metro area as a result of the number of pumping stations operated in the area and is not used to the same extent in the regions due to there being less pumping stations on each system to manage. ▪ Although AMOSS was developed before SAP was implemented within the Corporation, the information recorded in AMOSS is also recorded in SAP. However, AMOSS is a standalone system that can be used without needing to access any other systems for contingency purposes. ▪ Water Corporation's drainage assets are managed through an interface with local government and under a Memorandum of Understanding. Generally the Corporation manages the larger drains, with the Councils managing the smaller drains in their area. Water Corporation is currently undertaking a review related to its ownership of these assets. ▪ Management of the drainage assets is the responsibility of the Asset Investment Planning Metro group under the Corporation's new organisational structure. Under its operating licence, Water Corporation also own and manage some rural drainage assets. The overall requirement for these assets is to clear a rainfall event within 72 hours. ▪ The Corporation is progressively installing flow monitoring on its drainage assets in order to use the collected data to trigger planning studies. As the drainages systems are generally designed for the ultimate flow, there is expected to be sufficient time to undertake any upgrading of the assets. Operating activities for the assets is minimal. Any operation of the assets is undertaken locally but with the involvement of the relevant environmental organisation as the emphasis is on the environmental impacts resulting from drainage and flooding.	

Effectiveness Criteria	Observations	Evidence reviewed

Maintenance of the drainage assets is completed using the same systems and processes used for other assets within Water Corporation's asset portfolio.

Operational / Maintenance Procedures and Tasks

- Water Corporation has well established processes for operating its assets. Aroona has an Asset Management and a Deliver Services Management Plan which has been endorsed by the Water Corporation which outlines how it undertakes their responsibilities.
- For each team within each district of the Customer Services Group that have installed a Management Operating System, work activities are planned on a rolling six-week basis. This is to take place at a weekly Planning Meeting and be performed in accordance with Work Planning and Scheduling: RCSG – Procedure for Planning.
- The operational checklists that provide a six week forecast of all the work required for each system/scheme are downloaded from SAP every Monday. This is used to schedule and plan work for the following week but also allows a longer-term view to be taken for the six week period to optimise resources. Changes to the details in the work plan are manually changed by the Regional Work Planner and then updated in SAP.
- The items in the District Team Leader Planning Meeting Agenda are aligned with the actions outlined in Section 5.2 ("Procedure – Team Leader Review and Planning Meeting") of Work Planning and Scheduling: RCSG – Procedure for Planning.
- Following the Planning Meetings, all Team Leaders in the respective districts are to meet with each other and the Operations Manager for that district for a weekly Commitment Meeting. The commitment meetings take place every Thursday afternoon in the different operational areas to confirm the work plans for the following week and these are confirmed in SAP every Friday. The Commitment Meeting is to be undertaken as specified in the Work Planning and Scheduling Procedure for Commitment.
- The items in the District Committee Meeting Agenda are aligned with the actions outlined in Section 5 ("Procedure – Commitment") of the Work Planning and Scheduling Procedure for Commitment.
- The output from the Commitment Meeting, along with the Weekly View Sheet from the Planning and Commitment Tool and the SAP PM (Plant Maintenance) ZW05 transaction, are utilised in the work scheduling process. Work scheduling is to be executed as per the Work Planning and Scheduling Procedure for Scheduling.
- A daily review meeting is also conducted in each of the Regions and Metro areas to confirm that workload for the day and to address any work orders from the previous day that were not completed. A similar process is used by Aroona to the assets they manage, with the exception of the commitment phase.
- Users are to refer to the Work Management Using ZW05: Plant Maintenance – Quick Reference Sheet and Managing PM04 Work Orders in the Planning Table Using ZW05a: Plant Maintenance – Quick Reference Sheet for guidance to using SAP PM transactions ZW05 and ZW05a.

Effectiveness Criteria	Observations	Evidence reviewed

- We note that the Regional Customer Services Group is no longer explicitly mentioned in the Corporation's Draft Organisational Structure (as of 1 September 2015). When the organisational structure is finalised, the terminology in the Procedures should be reviewed/updated to reflect this change.
- The Corporation has also developed a SCADA Infrastructure Plan. This Plan "presents a model for planning SCADA for the Corporation's water and wastewater schemes and assets" and is aimed at parties such as project managers, infrastructure planners, designers, providers, maintainers and consultants. We recommend that version dates are recorded against the respective document revisions.
- Water Corporation has functional forums within the organisation that looks at the operational procedures and identifies any issues or improvement opportunities.
- Examples of Water Corporation's Planning and Scheduling tools were assessed during the site visits, with operational and maintenance tasks audited back to the original work orders in SAP to confirm that the tasks had been completed.

Linkage to Levels of Service

- Levels of service measures and objectives are defined in the two Asset Class Strategies provided:
  - Gravity Sewers Asset Class Strategy.
  - Wastewater Pressure Mains, Pump Stations and Vacuum Sewer Systems Asset Class Strategy.
- In these documents, reference is made to the Corporation's Operating Licence and Customer Charter.
- PCY340 Scheme and Asset Operations recognises that "either a loss of the required level of service or inefficient operations" will result if "the operating strategy is not implemented".
- GRWSS Operating Plan 2011 – 2012 Part A, as an example, indirectly refers to the Corporation's levels of service by stating that the scheme operating philosophy is to "stay within the abstractions agreed with the Department of Water, whilst meeting the obligations of the… Operating License and the Customer Charter".

Operational Performance for Newman

- The ERA set out a number of areas of special focus for this current review arising from the previous review. These areas of special focus included a review of the performance of the water and sewerage assets during the period covered by the 2015 Review.
- We reviewed the performance of the Newman assets in terms of the number of water main leaks/bursts and sewer blockages that have been attended since the time of the last asset management system review in 2012.
- The data reported for the number of water main bursts and leaks in Newman was confirmed as follows:

Effectiveness Criteria	Observations	Evidence reviewed
	– 2012/2013 – 38 bursts/leaks per 100km of water main – 2013/2014 – 21 bursts/leaks per 100km of water main – 2014/2015 – 21 bursts/leaks per 100km of water main ▪ The performance shows a decrease in the number of bursts and leaks over the course of the last three years. ▪ For wastewater blockages experienced in Newman, the main issue is intrusions into the sewer pipes. Water Corporation has a proactive maintenance plan that is managed and reported through SAP. ▪ The data reported for the number of sewer blockages attended to in Newman was confirmed as follows: – 2012/2013 – 43 sewer blockages per 100km of sewer main – 2012/2014 – 36 sewer blockages per 100km of sewer main – 2014/2015 – 28 sewer blockages per 100km of sewer main ▪ Water Corporation's internal target is <40 sewer blockages per 100km of sewer main, meaning that this has been achieved in the Newman sewer reticulation scheme for two of the last three years. There has been a decrease in the number of sewer blockages between 2013 and 2015.	
▪ Risk management is applied to prioritise operations tasks	▪ One of the underlying asset operations principles detailed in PCY340 Scheme and Asset Operations is the timely capture of knowledge about the Corporation's high-risk schemes. ▪ PCY340 also states that operating plans for the most critical schemes are developed by an expert group under the direction of the Manager of the Operational Asset Management Branch. ▪ SAP has a maintenance plan prioritisation set up with the system. Water Corporation uses Discretionary Priority Codes on the work order and the ZW05AD planning table for prioritising its O&M activities. Work orders can be set up with the priority although the work orders do not show the criticality of the scheme/system being worked on. Water Corporation is currently developing a critical assets framework in conjunction with Aecom to be included as part of its asset management risk framework. ▪ The Aroona Alliance identify critical assets and prioritise work orders to undertake O&M activities on these assets. Aroona submits a balanced scorecard report to Water Corporation as part of its contractual obligations and work orders completed for critical assets is one of the key performance indicators reported. The criticality framework that the Aroona Alliance works under is a plan based on the criticality of the individual assets as well as at an overall scheme/system level. ▪ The System Capability Matrix (SCM) is also used as the tool for establishing the criticality of the schemes in the Regions. ▪ Water Corporation is currently developing a Criticality Assessment Framework and the document is currently out for comment. A copy of the draft was provided as part of this review. ▪ Critical Assets Framework (CAF) and assessment methodology provides Water Corporation with a consistent understanding and approach across the business for establishing the relative importance of assets across a number of asset hierarchical levels and across asset classes.	▪ PCY340 Scheme and Asset Operations ▪ #13780761 Critical Assets Framework & Assessment Methodology

Effectiveness Criteria	Observations	Evidence reviewed
	The assessment process defines use of the ranking of critical assets across the corporation to inform decision making. ▪ Water Corporation's Operational Centre, located at its Leederville office receives critical alarms from treatment plants during out-of-hours times. The Subiaco WWTP that was visited during the review is staffed between 7am and 4pm Monday to Friday. One member of staff is on operations standby, with one electrical engineer, one mechanical engineer and one Trade Assistant on call during these times and able to be attend if required. ▪ The Operational Centre filters the alarms based on criteria which sets out how they should be reacted to. The criteria is based on the time that the alarm is received. Some alarms are disabled and attended to after 7am, when the plant's working hours start, while more critical alarms are forwarded to the on call staff to attend as a matter of urgency. The Operational Centre creates work orders in SAP with details of the alarms for the onsite staff to address. ▪ The non-compliance at the Southern Seawater Desalination Plant is concerning with regard to the effectiveness of Water Corporation's training and oversight of operations. The overflow occurred from a bunded area. Bunded areas are designed to have multiple barriers to prevent discharge – the first being that the size should be adequate to contain a reasonable flow and the second being the presence of level sensors and alarms. The Annual Audit Compliance Report states that the overflow was caused by flushing meaning that flow continued to be sent to the bund after high levels had been reached. This suggests that operations staff firstly were not aware of the implications of the continual flushing and secondly either not aware of the alarm or not aware of what to do on hearing the alarm.	
▪ 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	▪ PCY208 Identification of Engineering Assets outlines the three systems/registers through which all of the Corporation's assets, including those operated and maintained by Aroona, are recorded. These are the: – Functional Location and Equipment Register (FLER), – Facilities Mapping System (FMS), and – Financial Asset Register (FAR). ▪ The FLER is part of SAP and, according to PCY208, is "a structured listing of Corporation assets that reflects their functional relationships and provides the framework for reporting", although this is noted to be an incomplete definition. ▪ The SAP functional location tree within the FLER consists of a maximum of 10 functional location levels. As an example, the remote terminal unit (RTU) at the Thelma St West Pump Station is represented through nine levels: 1. **HEADER_DESCRIPTION:** WASTEWATER ASSETS PERTH REGION 2. **SUB_REGION:** WASTEWATER ASSETS PERTH REGION SOUTH 3. **S_SCHEME:** SCHEME WWTP WOODMAN PT 4. **S_SUB_SCHEME:** SUB SCHEME VICTORIA PARK	▪ PCY208 Identification of Engineering Assets. (Doc ID: 2180054, Version Date: 26 Nov 2009, Next Review Date: 26 Nov 2012. ▪ PM-#13527030-v1-Wasterwater_Assets_Representation_of_Thelma_St_West_Pump_Station_AMSSER.XLSX [sic]. (Incorporates Functional Location Hierarchy extract, SAP Functional Location screenshot, myWorld screenshot and SAP Maintenance Plan screenshot.) ▪ PM-#13522493-v1-Functional_Locations_Decommisioned_in_2014_15_.pdf. (PDF print-out generated on 28/08/2015.) ▪ PM-#3395233 FLER Asset Classes and Definitions and Class Characteristic Values ▪ PM-#8944573 S469 Condition Assessment Strategy

Effectiveness Criteria	Observations	Evidence reviewed
	5. **HEADER_DESCRIPTION:** VICTORIA PARK WW CONVEYANCE 6. **HEADER_DESCRIPTION:** VICTORIA PARK PUMP STATION GROUP 7. **S_PUMP_STATION:** SPS THELMA ST WEST COMO 8. **SITE_SCADA:** SCADA SPS THELMA ST WEST COMO 9. **RTU:** RTU SPS THELMA ST WEST COMO ▪ Some of the asset information documented in the FLER is as follows: – Functional Location – Description – Class Type (numeric) – P/S Design Name – Power Meter Number and Power Tariff – Alarm Phone Number – Station ID – Overflow Storage (Yes/No) – Total Emergency Storage (quantity and unit) – Overflows To (e.g. “River”) ▪ Functional locations decommissioned in the 2014-15 financial year are documented in PM-#13522493-v1-Functional_Locations_Decommisioned_in_2014_15_.pdf. ▪ The Corporation’s second means of storing asset information, its Facilities Mapping System, is based on the Smallworld geographic information system (GIS) suite of products. ▪ Assets are also depicted spatially in the web-based GIS, myWorld. The following asset information is documented in myWorld: – Functional Location (linkage with FLER) – SAP Name – Date Installed – Status – Type – Name – Number	▪ PM-#11573252Condition Assessment Methodology - Concrete Structures

Effectiveness Criteria	Observations	Evidence reviewed
	– Owner – Private (ownership) Indicator – Planset Number – CAR Asset Id (Corporate Asset Register?) ▪ PCY208 states that the FAR is a "register of all assets recorded purely for financial (non-operational) purposes, incorporating both physical and non-physical assets". The FAR is part of the Financial Accounting module in SAP. ▪ Condition Reports for individual assets is stored in AquaDoc and linked to the functional location in the ACA system in Cascade (Manage Assets). Information is stored in asset class databases and these were demonstrated during the onsite interviews.	
▪ Operational costs are measured and monitored	▪ Operational costs are reported through Activity Based Planning (ABP) Reports. The reports interrogate the data recorded in SAP and are able to present the data in the number of different ways, e.g. by business area or MAT code. ▪ The ABP reports include the cost information for the alliances as well as for Water Corporation's metro area and the Regions. The alliances use the ABP reports more than they used to, when the SAP-FICO module was the primary system used for the cost data associated with operating the alliance-managed schemes. ▪ The data included in the ABP reports is analysed monthly and used to update the operational plans. We reviewed an example of the Mid-West ABP and confirmed that budget and actual costs are included report. ▪ Water Corporation uses a number of different measures to measure the performance of the Aroona alliance, including budget compliance, a balanced scorecard system which includes operational indicators such Water Production Chemical Efficiency ($/ML treated) and Energy Efficiency) and achievement of minimum conditions of satisfaction, which looks at regulatory compliance requirements and compliance against standards (e.g., Drinking Water Quality Guidelines or Water Corporation Maintenance Standards). ▪ Examples of operational costs in SAP and reported in the ABP Reports were confirmed during the onsite interviews.	▪ Examples of Activity Based Planning (ABP) Reports.
▪ Staff resources are adequate and staff receive training commensurate with their responsibilities	▪ PCY328 Corporate People Development and Training Policy is stated to be in draft form. It outlines the following learning and development systems in use at the Corporation: – **Corporate Learning Directory** "One stop shop" for information about all Corporate Learning and Development options within the Corporation. It also enables Line Managers to determine course target audiences and align courses and development opportunities to employees. – **Corporate Learning Management System (LMS)** "Platform for the delivery and recording of [the] completion of e-learning products." It is integrated with SAP and also manages the Corporate Training Profiles and Corporate Training Registers.	▪ Draft - PCY328 Corporate People Development and Training Policy. (Doc ID: 1991393, Version Date: 9 September 2013, Next Review Date: 9 September 2016. Last date in the Document Revision History (10 September 2013) is slightly different to the Version Date (9 September 2013).)

Effectiveness Criteria	Observations	Evidence reviewed

- **Corporate Training/Learning Profiles**
  Displayed within the LMS for every Corporation employee. These profiles are "representative of the training required for an employee's specific job role".

- Each member of Water Corporation has a specific learning management profile. Training needs are reviewed with managers as part of the Corporation's annual staff review process. The annual review process is linked to the performance agreement contract. Some of the training is mandatory (e.g. safety management) while other training is job-specific and provided as required.
- The Corporation has recently implemented an asset management training e-learning module through AMCL (Asset Management Consulting Limited), an external provider. The Asset Management Branch is implementing an asset management competency framework to identify the skills and knowledge that the Corporation will need going forwards.
- The Aroona Alliance utilises Water Corporation's learning management although it also has its own systems and processes. Monthly training reports are provided to the Corporation as part of the contractual requirements.
- Water Corporation has completed all of the recommendations included in the 2012 asset management review that relate to training.
- The Corporation used to have an active Resourcing Strategy but is working on a replacement strategy at the current time to align with the new organisational structure and the business changes that are currently being carried out.
- Water Corporation uses a Master Schedule (viewed during the review) based on the history of work orders to calculate how much work is being completed each year, and adds in the time allocated to training, holidays and other work activities. The Master Schedule is used to calculate how many FTEs the Corporation needs and this is compared against the labour included in the operating budget to identify whether the Corporation has adequate resources. Similarly, the Aroona Alliance assesses the hours of operations needed to operate and maintain the assets it manages under its contract with Water Corporation and matches this up with the staff resources that it has available or uses this to identify where additional staff resources may be required.

Table 5-6 Asset Management System Review Observations for Asset Maintenance

Effectiveness Criteria	Observations	Evidence reviewed
Asset maintenance		
▪ Maintenance policies and procedures are documented and linked to service levels required	**Maintenance Policy** ▪ PCY341 Asset Maintenance is the overarching policy for the maintenance of the Corporation's water and wastewater schemes and supporting assets. **Maintenance Process** ▪ Water Corporation's asset maintenance policy is supported by its Plan Asset Maintenance Process. The process covers the preparation of maintenance plans for Corrective, Planned Preventive, Condition Monitoring, Non Asset Condition Assessment-based and Asset Condition Assessment O&M Gap Treatment maintenance. In addition, some selected, cyclic Asset Operations activities are included. The processes include adjustments to budgets based on maintenance activities and an ongoing process of refinement of the maintenance strategies. **Maintenance Standards** ▪ Water Corporation has Maintenance Standards for different asset types. The maintenance standards specify the maintenance strategy for the specific asset ▪ The Maintenance Standards take into account Strategic considerations, business drivers, business constraints, operating licences, statutes, regulations, by laws standards, industry best practice, and operational constraints. The Maintenance standards are used to establish a "Best Practice" (as defined by Water Corporation) maintenance plan. The "Best Practice" maintenance plan reflects the intent of the business and is embedded into Water Corporation's Maintenance Management system. ▪ Aroona uses Water Corporation maintenance standards to ensure that assets are maintained to provide the required licence targets and service levels. For non-standard assets, the supplier's manuals and recommendations are used to develop appropriate maintenance standards. The maintenance regimes for non-standard assets are developed within Water Corporation, with the criticality of the asset taken into consideration. For non-standard assets operated and maintained by Water Corporation's alliance partners, these are also linked into the balance score cards that the alliance report against as part of their contractual requirements. **Maintenance Planning** ▪ For each team within each district of the Operations Group that have installed a Management Operating System, work activities are planned on a rolling six-week basis. This is to take place at a weekly Planning Meeting and be performed in accordance with Work Planning and Scheduling: Operations Group – Procedure for Planning.	▪ PCY341 Asset Maintenance. (Doc ID: 4126906, Version Date: 13 June 2013, Next Review Date: 13 June 2016. ▪ PM-#3844201 Plan Asset Maintenance Process and Guideline ▪ Water Corporation Maintenance Standards Library Spreadsheet ▪ AQUA #314599 S415 Maintenance Standard Wastewater Reticulation ▪ Generic Work Instruction Register ▪ AquaDoc #778650 Generic Work Instruction - Wastewater Reticulation Clear blockage ▪ Work Planning and Scheduling: RCSG – Procedure for Planning. (Doc ID: 9032486, Version Date: 25 March 2015, Next Review Date: 25 March 2016. ▪ Work Planning and Scheduling Procedure for Commitment. (Doc ID: 9050583, Version Date: 13 June 2013, Next Review Date: 13 June 2015. ▪ Work Planning and Scheduling Procedure for Scheduling. (Doc ID: 9072160, Version Date: 14 June 2013, Next Review Date: 14 June 2015. ▪ Work Management Using ZW05: Plant Maintenance – Quick Reference Sheet. (Doc ID: SAP-QRS-PM-018, Issue Date: 31 July 2015.) ▪ Managing PM04 Work Orders in the Planning Table Using ZW05a: Plant Maintenance – Quick Reference Sheet. (Doc ID: SAP-QRS-PM-046, Issue Date: 17 November 2014.) ▪ Draft Organisational Structure - 1 September 2015. (PM #13035416.)

Effectiveness Criteria	Observations	Evidence reviewed
	▪ The items in the District Team Leader Planning Meeting Agenda are aligned with the actions outlined in Section 5.2 ("Procedure – Team Leader Review and Planning Meeting") of Work Planning and Scheduling: RCSG – Procedure for Planning. ▪ Following the Planning Meetings, all Team Leaders in the respective districts are to meet with each other and the Operations Manager for that district for a weekly Commitment Meeting. The Commitment Meeting is to be undertaken as specified in the Work Planning and Scheduling Procedure for Commitment. The items in the District Committee Meeting Agenda are aligned with the actions outlined in Section 5 ("Procedure – Commitment") of the Work Planning and Scheduling Procedure for Commitment. ▪ The output from the Commitment Meeting, along with the Weekly View Sheet from the Planning and Commitment Tool and the SAP PM (Plant Maintenance) ZW05 transaction, are utilised in the work scheduling process. Work scheduling is to be executed as per the Work Planning and Scheduling Procedure for Scheduling. Users are to refer to the Work Management Using ZW05: Plant Maintenance – Quick Reference Sheet and Managing PM04 Work Orders in the Planning Table Using ZW05a: Plant Maintenance – Quick Reference Sheet for guidance in using SAP PM transactions ZW05 and ZW05a. ▪ We note that the Regional Customer Services Group is no longer explicitly mentioned in the Corporation's Draft Organisational Structure (as of 1 September 2015). When the organisational structure is finalised, the terminology in the Procedures should be reviewed/updated to reflect this change. ▪ During the Subiaco WWTP site visit, we viewed the PM#13556774 Weekly Planning and Scheduling Tool for the facility. This records all work orders for the site for a six week period to allow the future workload to be managed. The spreadsheet tool can be filtered to show the work orders in each week and also to show backlog work orders that were not completed on time. The work order information includes the functional location, description, suburb, frequency cycle, time estimate to complete the task, the due week and who the job has been assigned to. ▪ Cancelled work orders at the metro treatment plants are generally a result of demand requirements that mean an asset is unavailable to be taken out of service at the scheduled time to complete the maintenance task. ▪ The output from SAP is integrated with the spreadsheet tool, allowing updated information input into the spreadsheet to automatically update the work order back in SAP. Work orders are dispatched from SAP to the work crews via the mobile computing devices. Safe work instructions are also sent to work crews to allow the task to be completed. ▪ We reviewed examples of Water Corporation's Safe Work Instructions and confirmed that they include step-by-step instructions for carrying out work tasks. Safe Work Instructions are also recorded with the drivers that are applicable to the particular asset being worked on, e.g. environmental, quality, etc.	▪ Gravity Sewers Asset Class Strategy. (PM #6900493, published in November 2012.) ▪ Wastewater Pressure Mains, Pump Stations and Vacuum Sewer Systems Asset Class Strategy. (PM # 9364160, published in April 2014.) ▪ Customer Charter. (Published on 9 June 2012.)

Effectiveness Criteria	Observations	Evidence reviewed
	Maintenance Tasks ▪ Water Corporation has a library of Generic Work Instructions for completing different tasks in the field. ▪ The Generic Work Instructions list the job steps that are required to complete the task but do not describe how to carry out the work. Work tasks are required to be completed according to Water Corporation's standards, policies and guidelines and according to Regulatory requirements. **Monitoring and Reporting of Maintenance Activities** ▪ Water Corporation's mobile computing system is set up with mandatory data requirements for specific job types to ensure that all the data required to be collected is recorded in the field. This prevents the work orders from being progressed in the field if the required data has not been recorded. The mobile computing system interface uses drop down menus where applicable to minimise the capture of incorrect data. ▪ Water Corporation uses an OPI (Operating Performance Index) Report to report on key weekly maintenance items, in particular those that have regulatory or statutory implications or relate to critical assets, and to review that the maintenance activities have been completed on time. The data feeds into the Corporation's target reward system that results in annual bonus payments being made for success against the targets to staff on performance award contracts. Water Corporation sets different operating performance indicator targets for the minimum performance, the target level and for the stretch target. This information is reported monthly and Water Corporation is currently looking to convert the report to an automatic report that can be accessed at any time through Business Objects. ▪ The Aroona Alliance has a slightly different report for its maintenance tasks but it also reports on reactive and planned maintenance activities. ▪ We reviewed PM#12413579 Aroona O&M SAP PM Planning Compliance Report, an example of the compliance report that is used twice a day to show what work order tasks have been planned for the day and those that have been completed. Supervisors receive a more detailed compliance report that shows details of the job time to allow them to view the time being booked to a specific job. ▪ We reviewed Aroona's Balanced Scorecard and confirmed the contractual level of reporting completed by Aroona to Water Corporation. The scorecard includes asset management service obligations, including planned maintenance completed on critical assets. ▪ Aroona also completes a Greenboard, an asset management summary report with additional metrics for each site it operates and maintains for Water Corporation, including the percentage of work orders completed on time, for planned work orders, non-compliant work orders and where costs have not been allocated. The summary report can be drilled down to provide greater detail and specific work orders. ▪ The Business Performance Report is reported to the Board monthly and includes the performance of the metro and regional areas as well as for the alliances, e.g. number of scheduled work orders, number of completed scheduled work orders, number of unplanned work	

Effectiveness Criteria	Observations	Evidence reviewed
	orders. The reports can be accessed through the Corporation's intranet reporting portal dashboard. The report uses a rolling 12 month timeframe. **Linkage to Levels of Service** ▪ Levels of service measures and objectives are defined in the two Asset Class Strategies provided: – Gravity Sewers Asset Class Strategy. – Wastewater Pressure Mains, Pump Stations and Vacuum Sewer Systems Asset Class Strategy. Reference is made in these documents to the Corporation's Operating Licence and Customer Charter. ▪ In PCY341 Asset Maintenance, the concept of level of service is first indirectly introduced in the Policy Statement, where it is stated that asset maintenance shall be planned and undertaken by the Corporation such that the assets "reliably deliver [the Corporation's] service commitments to [its] customers". ▪ Level of service is then explicitly referred to in the Purpose section of the Policy, where one of the document purposes is described as "ensur[ing] [the Corporation's] assets deliver the level of service expected for [its] customers". ▪ Further mention of level of service is made in the "Justification", "Compliance Implications" and "Principles" sections of the Policy. Sustaining current levels of service is also listed as a driver for "more detailed asset management", and "higher community expectations" are recognised as an emerging constraint in maintenance management.	
▪ Regular inspections are undertaken of asset performance and condition	▪ S469 Condition Assessment Strategy states that assets are targeted for condition assessment through risk-based prioritisation. ▪ Water Corporation has an ongoing program of asset condition assessments. Level 1 inspections are completed as part of normal maintenance inspections and can be used to record any issues. Level 1 inspections can result in rectification works although this is more expected from the Level 2 inspections. Level 2 inspections are risk-driven and only carried out on high risk assets by suitably qualified staff or specialist contractors. ▪ Water Corporation has a Business Rules document for the Asset Condition Assessment which defines the process. The document also clarifies the responsibilities and accountabilities of stakeholders to ensure the program of works is delivered when expected and to the required specification. ▪ Water Corporation also completes condition assessments are part of other maintenance programs where appropriate, e.g. inspection of emptied storage tanks during scheduled tank cleaning maintenance activities. ▪ We confirmed that Water Corporation has a water mains inspection program for the current year. We reviewed the close out report from the 2013-14 inspection program that covers all assets types (water mains, gravity sewer mains, WWTPs and pumping, water production and storage.	▪ S469 Condition Assessment Strategy. (Doc ID: 8944573, Version Date: 27 June 2013, Next Review Date: 27 June 2016. ▪ PM #11573252 Condition Assessment Methodology – Concrete Structures ▪ PM #8768916 Condition Assessment Methodology – Water Mains ▪ Water Main Trunk and Distribution Inspection Program 2015-2016 ▪ Close Out Report 2013/14 Asset Condition Assessment Program, January 2015 ▪ PM#8717283 - Business Rules - Asset Condition Assessment (ACA)

Effectiveness Criteria	Observations	Evidence reviewed
	Water Corporation spent only 76% of the budget for its inspections during 2013/14 and we confirmed that the report includes reasons for the differences between budgets and actuals for each asset type. Savings were made due to actual inspections being less than the forecast cost, although some inspections could not be carried out due to asset availability. These inspections were included in the 2014/15 program. ▪ Some low level asset condition inspections are included in Water Corporation's maintenance standards as part of the maintenance work to be completed in the field. ▪ Water Corporation's mobile computing system allows asset condition to be recorded in the field during normal maintenance activities. ▪ An asset deficiency report is used in the Regions and can this can be completed in the field. ▪ The Aroona Alliance has an annual schedule of asset inspections driven by the criticality of the asset, the age and the availability of previous data for the asset. During the review we were provided with the Aroona Condition Assessment Program and observed that it includes information on the project, cost, drivers and details of the Asset Risk Assessment if this has been completed for the asset. ▪ The outputs from the condition assessment program are fed into Water Corporation's capex program, if a capital project is identified as being required, or into its opex budget, if the solution is a change to the operating or maintenance activities. The Aroona program is agreed between the Alliance and Water Corporation. ▪ Collected asset condition information is recorded in an Access database, with the records linked to the asset's functional location ID. The Corporation also maintains a spreadsheet that it uses to track the completed asset condition assessments. As its asset condition assessment recording systems are bespoke standalone systems, Water Corporation is looking to move these to a corporate system as part of its current "Refresh" change management program. Water Corporation previously utilised SAP for recording asset condition information but has turned off the SAP module as it was overloaded by the volume of data included in work orders being recorded in the system. ▪ Water Corporation has a series of defined methodologies for undertaking condition assessments of its assets. This includes methodologies for concrete and steel tanks. ▪ Asset conditions inspections in the Regions are agreed between the head office and the regional office, with a work order created in SAP to schedule the work. The majority of these inspections re completed by either technical consultants or specifically qualified staff rather than the local field staff using SAP for their daily workload. ▪ During the site visit to Water Corporation's Leederville office, we were provided with the Laverton SPI Condition Assessment Report as an example of a completed assessment. ▪ We reviewed the Corporations' Concrete Tanks Inspection database that it uses to record asset condition and, based on this data, calculate the asset's remaining life. The frequency of the inspections are based on the tank cleaning frequency. Water Corporation has similar inspection databases for its steel tank assets and sewer pumping stations.	

Effectiveness Criteria	Observations	Evidence reviewed
▪ Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule	▪ Refer to the Maintenance Planning section above. ▪ Examples of Water Corporation's Planning and Scheduling tools were assessed during the site visits, with operational and maintenance tasks audited back to the original work orders in SAP to confirm that the tasks had been completed. ▪ Water Corporation uses Maintenance Planners to plan the tasks included in the six week Operational Plan for each system and Maintenance Schedulers are used to organise and dispatch the work load to the field crews. ▪ Examples of the OPI reports that can be used to show the planned/unplanned maintenance tasks completed/uncompleted for each region were also provided during the interviews. ▪ We observed that the Regions have experienced issues related to completing maintenance work orders on time, achieving a much lower level of performance than Water Corporation achieves in its metropolitan areas and is achieved by its alliances. Water Corporation has identified that in some cases the regional maintenance contractors are completing lower priority maintenance tasks quicker than some of the high priority tasks. In some cases, these work orders are being cancelled and rescheduled. This is not considered by Water Corporation to be an issue related to staff resources or specific specialism but predominantly due to either staff completing preferred work tasks or the extensive travel time to some locations meaning that maintenance tasks needing to be completed are maximised in order to make the most of the time on site. ▪ Water Corporation has a planning register that it uses to record cancelled work orders, work orders are incomplete with regard to the information needing to be recorded or work orders that have been modified. These work orders are reviewed in the weekly commitment meetings that take place in each Region. In addition, a Planning & Commitment Report is also completed at a district level to allow work orders to be reviewed. ▪ Aroona has a Planning and Scheduling tool which records work orders to be cancelled, work orders requiring feedback and any required work order modification. This information is reviewed and endorsed by the Service Delivery Planner with relevant information loaded back into SAP on a weekly basis. ▪ We viewed SAP at numerous times during the onsite interviews and were able to track back both completed and incomplete work orders to the information in SAP. ▪ During the Subiaco WWTP site visit, a facility managed by Aroona, we viewed the Citrix/SCADA system for the facility. We review a 10 day period for the odour scrubber asset to confirm any operating performance peaks and alarms and confirmed the reactive maintenance that was carried out to rectify the issue.	▪ PM#13556774 Weekly Planning and Scheduling Tool for the Subiaco WWTP ▪ Maintenance work orders in SAP ▪ Work Planning and Scheduling: RCSG – Procedure for Planning. (Doc ID: 9032486, Version Date: 25 March 2015, Next Review Date: 25 March 2016. ▪ Work Planning and Scheduling Procedure for Commitment. (Doc ID: 9050583, Version Date: 13 June 2013, Next Review Date: 13 June 2015. ▪ Work Planning and Scheduling Procedure for Scheduling. (Doc ID: 9072160, Version Date: 14 June 2013, Next Review Date: 14 June 2015. ▪ Work Management Using ZW05: Plant Maintenance – Quick Reference Sheet. (Doc ID: SAP-QRS-PM-018, Issue Date: 31 July 2015.) ▪ Managing PM04 Work Orders in the Planning Table Using ZW05a: Plant Maintenance – Quick Reference Sheet. (Doc ID: SAP-QRS-PM-046, Issue Date: 17 November 2014.) ▪
▪ Failures are analysed and operational / maintenance plans adjusted where necessary	▪ Water Corporation completes Root Cause Analysis (RCA) investigation on major/repeat failures when necessary. A recent example of a root cause analysis of a pump failure was provided and we confirmed that the recommendations included changes to the operations, maintenance and design of the asset. ▪ Aroona undertakes a monthly review (by FL) of repeat/high cost fault orders. If an issue is identified, one of three actions are triggered:	▪ Aqua # 12890454 Bunbury WWTP Digester No.3 Aerator No.4 Pump Failure - Root Cause Analysis ▪ Examples of measle maps from NetMaps ▪ Alarm and asset failure data recorded in SAP

Effectiveness Criteria	Observations	Evidence reviewed
	1. The site may have already raised an ADR (Asset Deficiency Request) with Aroona Asset Management to investigate 2. The Maintenance Planning Group may identify a Maintenance Planning modification to rectify; or 3. The Maintenance Planning Group may place a formal request for Aroona Asset Management to undertake an investigation. ▪ Water Corporation utilises a number of tools and processes to analyse asset failures. ▪ Asset failure information recorded in SAP is assessed on a monthly basis to identify solutions. This failure information includes repeat alarms/faults, review of replacement programs for obsolete assets and multiple occasions of attendance to the same asset. The Operational Centre located in the Corporation's head office reports alarm data. ▪ A RCM Turbo Tool is used by maintenance staff to assess failures where there are known issues. ▪ Water Corporation also uses its GIS data for a reporting tool termed 'X marks the spot'. Work order asset and geo-spatial information is uploaded into the Corporation's NetMaps system to allow identification and analysis of multiple faults on the same assets or the same section of a liner asset. The location of the fault is identified by the field crews on their mobile devices. ▪ Measle maps are created to identify assets where a capital project may be required to rectify an issue and where it may be more cost effective to complete a renewal of an asset than to keep incurring repeat maintenance. For wastewater faults (e.g. blockages, overflows) the manhole location is used to identify the assets with multiple faults. ▪ Examples of measle maps were provided during the Newman site visit and during the interviews at Water Corporation's Leederville office for the Perth metropolitan area. ▪ In addition to failure analysis, Water Corporation also undertakes ongoing assessments of its maintenance regimes and looks to identify improvement opportunities that ultimately result in changes to operational and maintenance plans. Water Corporation provided an example of a Project Business Case from RCM Analysis related to packaged chlorine gas dosing Systems. ▪ The issue that had been identified was that the maintenance regime on this type of equipment was not based on a coordinated approach to monitoring the effectiveness of the maintenance. As a result, Water Corporation identified that it was incurring high costs associated with the number of planned maintenance visits to these sites. The analysis identified that that there was an opportunity to optimise these visits, reduce cost associated with maintaining this equipment and free resource for other activities. ▪ Water Corporation also provided the chlorinator trial plan and the presentation for the Maintenance Optimisation for ADWG Chlorination Plants resulting from this work.	▪ PM # 11257083 Project Business Case - RCM Analysis - Packaged Chlorine Gas dosing Systems ▪ Packaged ADWG Chlorinator Plant Trial – GS Region ▪ Maintenance Optimisation for ADWG Chlorination Plants presentation
▪ Risk management is applied to prioritise maintenance tasks	▪ Water Corporation prioritises its work orders by due date and by work priority. The highest priority is used for jobs related to statutory and legislative requirements. ▪ S469 Condition Assessment Strategy states that assets are targeted for condition assessment through risk-based prioritisation.	▪ S469 Condition Assessment Strategy. (Doc ID: 8944573, Version Date: 27 June 2013, Next Review Date: 27 June 2016. ▪ PCY340 Scheme and Asset Operations

Effectiveness Criteria	Observations	Evidence reviewed
	▪ One of the underlying principles detailed in PCY340 Scheme and Asset Operations is the timely capture of knowledge about the Corporation's high-risk schemes. ▪ SAP has a maintenance plan prioritisation set up with the system. Water Corporation uses the ZW05 planning table for prioritising its O&M activities. Work orders can be set up with the priority although the work orders do not show the criticality of the scheme/system being worked on. Water Corporation is currently developing a critical assets framework in conjunction with Aecom to be included as part of its asset management risk framework. ▪ The Aroona Alliance identify critical assets and prioritise work orders to undertake maintenance activities on these assets. Aroona add in a marker into the functional location field in the Planning and Scheduling Tool to denote critical assets. Water Corporation have priorities for work orders but don't use a specific flag to show whether the task relates to a critical asset. ▪ Aroona submits a balanced scorecard report to Water Corporation as part of its contractual obligations and work orders completed for critical assets is one of the key performance indicators reported. The criticality framework that the Aroona Alliance works under is a plan based on the criticality of the individual assets as well as at an overall scheme/system level. ▪ The System Capability Matrix (SCM) is also used as the tool for establishing the criticality of the schemes in the Regions. ▪ Water Corporation is currently developing a Criticality Assessment Framework and the document is currently out for comment. A copy of the draft was provided as part of this review. ▪ Critical Assets Framework (CAF) and assessment methodology provides Water Corporation with a consistent understanding and approach across the business for establishing the relative importance of assets across a number of asset hierarchical levels and across asset classes. The assessment process defines use of the ranking of critical assets across the corporation to inform decision making. ▪ Water Corporation carries out a Job Safety & Environment Analysis (JSEA) at the start of any job being carried out in the field. The process is used to identify high risk work, with mandatory risk assessment requirements for specific work activities, e.g. working at height, working near roads, etc. The risk matrix used for the JSEA assessment is the corporate risk matrix. If the residual risk remains high, after any mitigation actions have been taken into account, the JSEA requires supervisor review and sign-off. Completed JSEAs are stored for a period of seven years in accordance with the Corporations audit and information storage requirements.	▪ #13780761 Critical Assets Framework & Assessment Methodology ▪ Work priority of planned maintenance guideline ▪ Business Rules for Work Priority Number (WPN) Tool ▪ Work Priority Number Spreadsheet for developing priority rules ▪ RCD Risk Assessment Spreadsheet ▪ Work Priority Spreadsheet for Sewer Retic Tasks ▪
▪ Maintenance costs are measured and monitored	▪ Aroona and Perth Region Alliance both use the same systems as Water Corporation (e.g. SAP, Activity Based Planning (ABP) Reports). ▪ We confirmed that maintenance cost data is recorded in SAP for each work order. Cost data is used in preparing the following year's budgets. Budgets are prepared for the following financial year every April/May. ▪ Costs are reported through Activity Based Planning (ABP) Reports. The reports interrogate the data recorded in SAP and are able to present the data in the number of different ways, e.g. by business area or MAT code.	▪ Examples of ABP Reports for Operating Expenditure ▪ SAP Work Orders ▪ Asset Management dashboard within Water Corporation's web reporting portal

Effectiveness Criteria	Observations	Evidence reviewed
	▪ The ABP reports include the cost information for the alliances as well as for Water Corporation's metro area and the Regions. The alliances use the ABP reports more than they used to, when the SAP-FICO module was the primary system used for the cost data associated with operating the alliance-managed schemes. ▪ The data included in the ABP reports is analysed monthly and used to update the operational plans. ▪ Examples of maintenance costs in SAP and reported in the ABP Reports were confirmed during the onsite interviews and site visits. ▪ We viewed the actual against budget cost reports for the Perth Region Alliance (PRA) and Mid-West region and observed that the report template includes a column for Unit of Measure where the dollar value per specific task is calculated (e.g. cost to repair a service pipe leak, clear a sewer blockage). This allows the Corporation to benchmark maintenance costs against its own performance and to assist in developing future maintenance budgets. ▪ We viewed the Asset Management dashboard within the Corporation's web reporting portal which is used as an early warning system to identify systems/schemes were there are specific asset issues that may trigger a capex or opex solution. As an example, the dashboard reports on water main breaks and sewer blockages per 100km and the different systems/schemes can be compared against each other to identify the worst performing areas. The dashboard also reports against the number of sewer overflows and also information related to the split of work orders and costs between planned and reactive maintenance. The SAP data that is interrogated to provide the base data used in the Asset Management dashboard reports is updated every night. The data can be reported to show rolling months trending and also to provide a long-term 10 year trend of performance for each system/scheme. ▪ We noted during the site visit to Newman that Water Corporation's sewer access chamber covers are not capitalised assets. This policy differentiates from numerous other Australian water businesses, where the covers are considered to be capital expenditure items. We also note that some of the work to replace the lids has involved construction work to alter the size of the chamber due to it being covered and needing to be raised back to ground level. We recommend that Water Corporation reviews its capitalisation policy to confirm whether the access chamber lids should be treated as capital assets.	
▪ Transfer of Fire Hydrant Assets	Historically, the Department of Fire and Emergency Services (DFES) in designated fire areas, and Local Government in non-designated areas, were financially responsible for fire hydrant repairs and replacements. However, in response to the February 2011 Government of Western Australia review "A Shared Responsibility: the Report Perth Hills Bushfire", the ownership and financial responsibility for fire hydrants was transferred to the Water Corporation. This was effected by the passage of the Water Services Act 2012 by State Parliament. ▪ The number of hydrants currently identified in Water Corporation's GIS is 73,524 and about 90% of these are in designated DFES areas. The number of hydrants increases by approximately 800 hydrants per annum.	▪ Fire Hydrants Asset Class Strategy ▪ PM-#13799573-v1-Hydrants_report_-_all_regions_-_September_2015_pd ▪ SIBC Renewals Water State Wide ▪ hydrant inspection guide ▪ PM-#7523841-v11-Asset_Class_Strategy_-_Hydrants

Effectiveness Criteria	Observations	Evidence reviewed
	▪ Although there was a change in ownership, hydrants have always, and continue to be, constructed to Water Corporation standards. Even when hydrants were owned by DFES or Local Government, the installation of new hydrants or removal and relocation was done by: a) Water Corporation to Water Corporation standards; or by b) Developers to Water Corporation standards. ▪ The planning requirements for hydrants are outlined internally in Water Corporation's DS63 Water Reticulation Standard Design and Construction Requirements for Water Reticulation Systems up to DN250. ▪ Water Corporation has an Asset Class Strategy for its fire hydrants. This document outlines the Key Stakeholders, Levels of Service, Business Imperatives, Key Risks, Asset Information, Failure Modes and Key Issues, and the asset management philosophies and approaches. ▪ Water Corporation's documentation relating to the management of fire hydrants states that the State Engineering Works of Western Australia (SEW) manufactured and supplied hydrants to the Water Corporation and its predecessors, until the late 1980s when SEW ceased production and shut down in 1989. Although Water Corporation Stores' inventory shows the last such hydrant moved out of stores in 2003, there are an estimated 30,000 such hydrants in the current installed base. These hydrants have a greater potential for leakage and corrosion problems than the current hydrant standard due to their basic design. Most of the installed fleet are over 30 years old (expected hydrant life is 50 years) and the majority would have had no need to have been operated over their lifetime. This strongly implies that a total replacement is not required at this time. ▪ Water Corporation has a Memorandum of Understanding (MoU) with the DFES which provides the guiding principles related to installing and maintaining fire hydrants. The MOU provides a delineation of responsibility between Water Corporation and DFES, defines risk criteria and specifies response times to identified defects in line with different levels of risk. The current MoU is in effect for five years. ▪ The asset management strategy for fire hydrants is run to failure (as for other water reticulation assets). However, the risk of a failure not being detected in a reasonable timeframe is mitigated by the regular inspection program and the availability of proximate hydrants. ▪ As part of the MOU there are requirements for DFES to (following excerpt is from the MoU): a) Complete at least once every 18 months, an inspection program whereby all fire hydrants in Fire Districts are inspected to verify accessibility and an external review of the hydrant assembly is undertaken, in accordance with the requirements of the Water Corporation's Hydrant Maintenance Standard. b) Meet all costs associated with the identification and marking of all fire hydrants in Fire Districts such as lamp post markings and any other DFES approved fire hydrant indication method. c) Submit to the Corporation details of fire hydrant faults or coverage deficiencies it identifies and requests for repairs or installation in an agreed work request format (i.e. DFES online	▪ PM-#7628794-v18-S451_Maintenance_Standard_-_Water_Corporation_Fire_Hydrant_Valves ▪ PM-#9870416-v1-CW03007_-_Project_Specific_Mandatory_Documents_and_Folders_Locations ▪ PM-#10131720-v2-Hydrants_Fact_Sheet ▪ PM-#12480955-v7-Hydrant_MoU_Version_2__2015_Draft_ ▪ PM-#12539482-v1-Valves_&_Hydrants_Capitalisation_APPROVAL ▪ PM-#12805877-v8-Briefing_Note_-_Stage_1A_Complete_-_Budget_Announcement_-_Fire_Hydrant_Infill_Program ▪ PM-#12840802-v2-Hydrants_Governance_Mapping ▪ PM-#13039216-v2A-Water_Reticulation_Hydrant_and_Valve_Inventory_June_2015 ▪ PM-#13051533-v1-Hydrant_Work_Order_Flow_Chart_June_2015 ▪ PM-#13191517-v1-DFES_Requested_Operations_and_Maintenance_Hydrant_Management_Process

Effectiveness Criteria	Observations	Evidence reviewed

format). Such format will indicate what priority the work request is to be given, in accordance with clause 8 of this MoU.

d) Ensure reasonable availability of the DFES representative(s) or alternative proxy named in clause 15 of this MOU when resolving a service related incident or request.

e) Provide advice to the WA Planning Commission in relation to planning matters associated with hydrant coverage and adequacy in Fire Districts.

- Water Corporation advised that it managed work flow with DFES as follows:
  - *Where inspections identify issues, DFES generate an electronic work request which is transmitted to a dedicated work request outlook inbox. These work requests give details of the location, action required by the Corporation, the identifying officer along with any special comments.*
  - *Upon receipt of the work request from DFES, Perth Region's Scheduling Team creates work orders against functional locations to initiate the work. Each month Perth Region Alliance (PRA) produces a state-wide monthly report for DFES of work requests created in that particular month and their current status (i.e. whether they are completed and if so, the date of completion and completed task). Also contained in this report is any work orders still to be completed from previous months.*
  - *A second report is also generated each month for 'plugged hydrants'. The intent behind this report is to ensure that DFES can track hydrants that have been plugged in a particular month or have been plugged in previous months and the hydrant is yet to be replaced. Note that these hydrants are still operable, with the objective of the plugging to address temporary water loss through leakage.*
  - *Water Corporation is also responsible for operational performance reporting within the Corporation delivering reporting to support the achievement of targets contained within the MOU. Water Corporation further supports this process through regular reconciliation of work orders created in SAP with work requests registered on DFES' RMSS system.*
  - *In addition to hydrant asset maintenance, DFES work requests also include 'locate and tag' activities. These are designed to ensure that the Corporation's GIS mapping system is up-to-date. Regular exchange of mapping information occurs between DFES and the Corporation to ensure that the GIS information is synchronised across both organisations.*
  - *A bi-monthly meeting between PRA and DFES occurs to ensure that the processes outlined above are working effectively and that emerging issues are promptly addressed.*
  - *DFES notifies the Water Corporation of deficiencies in a report each month. There is also a five yearly cycle of hydrant inspections carried out by DFES, as per the Hydrant Maintenance Standard referenced in MoU, to 'show water', which is to ensure that valve winding mechanisms are operable and assembly pipework is clear.*

- Based on the information provided by Water Corporation, we make the following assessments as to whether the fire hydrants met the Corporation's standards in relation asset condition, asset records, asset performance, safety and reliability.

Effectiveness Criteria	Observations	Evidence reviewed
	Asset condition The hydrants were required to be constructed to Water Corporation standards before the transfer. The asset management strategy is fix on fail. Therefore, we consider that the transferred assets meet Water Corporation's standards with respect to asset condition. **Asset records** ▪ All water hydrants have been registered in SAP, with their own specific Functional Location. Also, for all new hydrants, SAP records attributes such as installation date, type and current operational status. ▪ However, the asset records relating to fire hydrants transferred to the Water Corporation require improvement to include information on current hydrant condition. Water Corporation also notes that information on hydrant type and operability needs improvement. Water Corporation states that this information will be progressively gained as DFES complete its inspection program. **Asset performance and reliability** ▪ DFES has responsibility for inspection and testing of the hydrants and reporting those that are defective/non-operational. Water Corporations states that there are very few instances where DFES has required use of a hydrant for emergency purposes and found it to be inoperable. The practice for leaking hydrants that have not yet been replaced is to provide a cap which can be removed if the hydrant needs to be operated. Where a major failure has occurred, such as broken lugs such that a standpipe cannot be connected, these a given high priority for renewal. **Safety** ▪ Safety is not a significant issue for hydrants. The typical mode of failure for hydrant is minor leaks which do not typically result in a safety hazard although larger leaks may. (Note that the safety of the asset is different to hazards caused by poor performance of the hydrant which is covered above).	

Table 5-7 Asset Management System Review Observations for Asset Management Information Systems

Effectiveness Criteria	Observations	Evidence reviewed
Asset management information system		
▪ Adequate system documentation for users and IT operators	**Overview of Asset Information Systems** ▪ The Asset Information Applications webpage outlines a number of other software systems in use at the Corporation. ▪ These systems are also listed on the Asset Data and Information Strategy webpage, where they are linked through a conceptual overview diagram. ▪ Water Corporation uses SAP as its primary information system and ERP (enterprise resource planning) tool. This was first implemented in the late 1990s and has been high configured to fulfil Water Corporation's business needs. ▪ However, as the Business has different datasets stored across different tools, many of which have been developed in-house, and as there has not been a major reconfiguration since SAP was first implemented, Water Corporation is looking to streamline its systems and tools to drive further efficiencies. This project is currently in the Board approval process and once this has been completed, Water Corporation will look for a partner for implementing the changes. ▪ Water Corporation uses SAP for its asset register, finance (SAP-FICO module), maintenance management system, maintenance planning (SAP-PM module) and HR activities. ▪ The SAP BW (Business Warehouse) module collects data from SAP (CMR (Corporate Management Report), Human Resources and SAP PM), FMS (GIS) and Grange (customer information and general utility statistics) for reporting purposes. ▪ SmallWorld is used for the GIS, with ESRI used as a spatial data analytical and reporting tool. SAP and the GIS are linked. This is a manual link rather than an automated link that updates the information in the two systems but it is considered robust. ▪ Grange is the Business's customer management system. This is not integrated with SAP and Water Corporation is currently looking to replace the system. ▪ Water Corporation uses a mobile computing system to record field data and this is integrated with SAP to allow asset information to be accessed and updated. ▪ SCADA is used for the monitoring of asset performance. PI (Process Information) is also used for extracting data for reporting and analytical purposes. ▪ Water Corporation has an Asset Risk Assessment tool that it uses for its risk management. It also utilises a System Capability Matrix (SCM) for its risk assessments. ▪ The System Capability Forecasting (SCF) Application is a tool used for capability planning. ▪ The organisation has a couple of tools that it uses for asset decision planning. PARMS is used for risk modelling of the Business's pipelines and SALVO is used for failure rate analysis. ▪ Asset Management Operations Support Software (AMOSS) and Operational Data Storage System (ODSS) are used as operational monitoring and storage systems.	▪ PCY208 Identification of Engineering Assets. (Doc ID: 2180054, Version Date: 26 Nov 2009, Next Review Date: 26 Nov 2012) ▪ Asset Information Applications webpage. (PDF print-out of http://waternet.watercorporation.com.au/a/amb/sections/data_and_information/html/asset_information_applications.cfm, generated on 26/08/2015.) ▪ SAP BW and BWIP Stage 2 webpage. (PDF print-out of http://waternet.watercorporation.com.au/a/amb/sections/data_and_information/html/sap_business_warehouse.cfm, generated on 26/08/2015.) ▪ Asset Data and Information Strategy webpage. (PDF print-out of http://waternet.watercorporation.com.au/a/AMB/Sections/Data_and_Information/Html/Asset_Data_and_Information_Strategy.cfm, generated on 26/08/2015.) ▪ Static Data Standard web page. (PDF print-out of http://waternet.watercorporation.com.au/a/amb/sections/data_and_information/html/data_standards/static_data_standards.cfm, generated on 26/08/2015.) ▪ Dynamic Data Standard web page. (PDF print-out of http://waternet.watercorporation.com.au/a/amb/sections/data_and_information/html/data_standards/dynamic_data_standards.cfm, generated on 26/08/2015.)

Effectiveness Criteria	Observations	Evidence reviewed
	▪ Water Corporation also has an Asset Management Planning System (AMPS). ▪ Water Corporation's alliance partners also have access to and utilise the Business's SAP system. Aroona's IT systems are predominantly those used by the Water Corporation. Perth Region also uses a Business Warehouse/Business Objects reporting system. ▪ PCY208 Identification of Engineering Assets outlines the three systems/registers through which the Corporation's assets are recorded. These are the: a) Functional Location and Equipment Register (FLER), b) Facilities Mapping System (FMS) – the geographic information system (GIS), and c) Financial Asset Register (FAR). **User Documentation** ▪ Static data (Date Commissioned, Material, Size etc.) standards are in the process of being prepared for each asset class/group of asset classes. Among other functions, these standards are said to provide data descriptions, dictate allowable values, describe information sources and specify primary corporate systems. Aquadoc links to the completed standards are provided on the Static Data Standard web page. ▪ The dynamic (temporal) data required to be collected for each functional group (e.g. borefield, wastewater treatment plant) is specified in the Dynamic Field Data Collection Schedule. This schedule, along with the accompanying standard (S209 Dynamic Field Data Collection Standard: Water and Wastewater) are linked through Aquadoc to the Dynamic Data Standard web page. ▪ Quick reference guides have been prepared for the ZW05 and ZW05a transactions in SAP PM. ▪ According to the Regional Customer Services Group Business Management System web page, 19 business work instructions (Business Rules) have been prepared for SAP PM. We have been provided with three examples: a) SAP PM Business Rule No. 1: Use of PM06 (Standing) Orders. b) SAP PM Business Rule No. 4: Allocating SAP PM Orders to Faults. c) SAP PM Business Rule No. 13: Application of Maintenance Activity Types (MAT's) in SAP PM.	▪ S209 Dynamic Field Data Collection Standard: Water and Wastewater. (Doc ID: 393539, Version Date: 17 October 2014, Next Review Date: 17 October 2017.) ▪ Dynamic Field Data Collection Schedule. (Copy of S209 Dynamic Field Data Collection Standard - Water and Wastewater - Schedule.pdf, no generation date.) ▪ Work Management Using ZW05: Plant Maintenance – Quick Reference Sheet. (Doc ID: SAP-QRS-PM-018, Issue Date: 31 July 2015.) ▪ Managing PM04 Work Orders in the Planning Table Using ZW05a: Plant Maintenance – Quick Reference Sheet. (Doc ID: SAP-QRS-PM-046, Issue Date: 17 November 2014.) ▪ Regional Customer Services Group Business Management System web page. (PDF print-out of http://waternet.watercorporation.com.au/qms/csd/bms_w.cfm, generated on 26/08/2015.) ▪ SAP PM Business Rule No. 1: Use of PM06 (Standing) Orders. (Doc ID: aquaDOC # 4235152, Version Date: 04 August 2014, Next Review Date: 04 August 2016.) ▪ SAP PM Business Rule No. 4: Allocating SAP PM Orders to Faults. (Doc ID: aquaDOC # 4260460, Version Date: 19 August 2013, Next Review Date: 19 August 2016. Last date in the Document Revision History (22/07/2015) is different to the Version Date (19 August 2013).) ▪ SAP PM Business Rule No. 13: Application of Maintenance Activity Types (MAT's) in SAP PM. (Doc ID: aquaDOC # 4260466, Version Date: 26 March 2014, Next Review Date: 26 March 2016.

Effectiveness Criteria	Observations	Evidence reviewed
▪ Input controls include appropriate verification and validation of data entered into the system	**Mobile Computing System** ▪ The mobile computing system used by Water Corporation to record field information and remotely update asset information recorded in SAP. The system uses Android as its operating system. Access requires authenticity to the Corporation's network and an APN configuration is used to block-out any non-Water Corporation end-user devices. The transmission from the mobile devices back into SAP is encrypted. ▪ As for the corporation's desktop computers, user names and passwords are required to log-on to the mobile devices. In addition, for local device authentication, the field crew identification is also required to log-on. Water Corporation has in the region of 700 – 800 mobile computing devices in operation at the present time. ▪ The mobile devices are set up with built-in logical inputs, with specific tasks requiring specific mandatory data inputs before the user can move onto the field or close the record in order to minimise incorrect or incomplete data capture. The system also ensures the minimisation of incorrect data being recorded by field staff by utilising drop down options for completing the fields. Free text can also be recorded to provide additional information for some fields. Back-end access to SAP for the drop down options and configuration is limited to specific System Developer staff within the Corporation. ▪ Word requests for attending customer complaints/investigation of alarms are set up in SAP. The dispatching of the work orders to field staff uses specific crew IDs to ensure that the work is dispatched to the correct device. As noted above, the field crews have specific user log-ons to be able to access the dispatched work order sent to them. ▪ Information recorded in the field on the mobile computing devices is updated live back into SAP if the work is being carried out in an area that has a Telstra 3G or 4G signal available. If the field crew is out of-range of signal, the updated information in the completed work order is cached on the device and sent later when a signal is available. Information related to the fault position and cause is recorded on the work order by the field crew. ▪ Some data collection requirements are mandatory for specific repairs that require KPI-driven feedback, e.g. testing flow/pressure for customer complaints related to these issues. Travel/Onsite times, as well as the time for completing work tasks is recorded. ▪ The system is able to record whether normal time or overtime is used to complete the tasks so that the accurate labour cost data can be recorded and reported. ▪ Cost information for materials is pre-determined with the system to a degree depending on what materials have been provided to the Regions (for field tasks completed in the non-metro areas) and what materials would be needed to undertake a specific repair. This information is subsequently used to replace stock in the field crew vehicles. **GIS Tools** ▪ Water Corporation's GIS management is provided centrally from the Leederville office.	▪ Static Data Standard web page. (PDF print-out of http://waternet.watercorporation.com.au/a/amb/sections/data_and_information/html/data_standards/static_data_standards.cfm, generated on 26/08/2015.) ▪ PM-#12242510 Static Data Standards – Implementation Business Case ▪ PM-#4794503 Spatial Capability Vision for the Water Corporation Plan (May 2011) ▪ PM-#10847609 Static Data Standard - Bores

Effectiveness Criteria	Observations	Evidence reviewed
	▪ Field crews use a form of the LiteSpacial tool on the mobile devices that updates the corporate GIS overnight with any changes made. Business rules are built-in to the GIS application that field crew are able to access on the Corporation's mobile devices. This ensures that only asset-appropriate information can be accessed via the drop down menus in the system and recorded against the asset, to ensure that the collection of erroneous data is minimised. ▪ Water Corporation's staff have limited access to creating new assets in the corporate GIS. Operations staff don't access the core GIS system, but use tools, including GE Smallworld software applications to interrogate the GIS and provide the relevant information. ▪ Smallworld allows operations and maintenance staff to view the geographic locations where work is being carried out so that customers calling in to report issues or faults can be informed if the Corporation is currently carrying out repairs or work tasks that may be impacting on the customers (e.g. unplanned interruptions). ▪ Smallworld is also used to identify what valves to turn off to carry out water main repairs and show the customers affected by a water supply interruption, including any vulnerable customers. Field crews need to have managerial approval before initiating a water supply interruption, and there are established communications protocols between the field crews and the Operational Centre. There are no plans for Water Corporation to allow field crews to have access to Smallworld and initiate interruptions without any approval. ▪ Raw geo special data is exported into ESRI for data analysis and reporting purposes. The data is also exported to the corporate data warehouse so that key asset information can be reported to the business (e.g. up-to-date pipe length data to be used in reporting water main bursts and sewer blockages per 100km of water/sewer main. ▪ As Constructed drawing information from developers and from capital projects are transposed into the GIS. The drawings are also scanned into the corporate drawing management system and linked to the asset information recorded in SAP. ▪ Water Corporation also uses its GIS data for a reporting tool termed 'X marks the spot'. Work order asset and geo-spatial information is uploaded into the Corporation's NetMaps system to allow identification and analysis of multiple faults on the same assets or the same section of a liner asset. The location of the fault is identified by the field crews on their mobile devices. Measle maps are created to identify assets where a capital project may be required to rectify an issue and where it may be more cost effective to complete a renewal of an asset than to keep incurring repeat maintenance. For wastewater faults (e.g. blockages, overflows) the manhole location is used to identify the assets with multiple faults. **Static Data Standards** ▪ Water Corporation has developed static data standards which are used to dictate allowable asset attributes and values recorded in SAP. We were provided with an examples of the data standards for bore assets and we confirmed that the Standard sets out the attribute requirements that include criteria related to: - Name,	

Effectiveness Criteria	Observations	Evidence reviewed

- Description
- Field Type
- Units
- Allowable Values
- Corporate Risk
- Originating Information Source
- Business Area Responsible for Data Entry
- Primary & Secondary Corporate Systems

- Water Corporation also provided its Static Asset Data Standards Implementation Business Case. This document details the plan for the implementation of static data standards for effective use within the Corporation and outlines 30 asset categories for which standards were to be developed (a total of 1,015 data fields), the methodology, prioritisation of the standards and estimations for the cost to implement. Standards have now been completed for 24 asset categories.
- Water Corporation also provided us with its Spatial Capability Vision for the Water Corporation Plan (May 2011). This document reviews the (then) current of the spatial architecture, and sets out the vision that will bring applications, data and systems together to realise Water Corporation's future business needs. An Implementation Plan is also included in the document.

Data Quality Strategy

- Water Corporation engaged a consultant in 2011 to develop a corporate data strategy that identified broad business areas to focus on. Although the 2012 Asset management Review included a number of recommendations related to improving data quality, these issues had already been identified by the Corporation and the actions were already being worked towards.
- The 2011 data strategy identified that in relation to asset management, improvements could be made by the Corporation related to the lack of end-to-end disparity and un-connected and unintegrated business systems resulting from the siloing between different groups and Branches within the Corporation.
- A key recommendation from the 2011 data strategy consultancy was the formation of the Information Management Competency Centre (IMCC), including a steering committee and an executive group to provide high-level management and direction. The review also identified major data strategy initiatives related to the HR activities performed by the Corporation in order to develop a data warehouse to bring together siloed human resources information.
- Previously asset data was considered to be integrated with corporate risks but as a result of the improvement recommendations that have been completed in the last few years, the Corporation now considers that data is embedded in the business risks. This process started with micro-level metrics, including the mark-up of linear assets. Reports were developed to follow-up areas where metrics were not being recorded, resulting in an improvement in the Corporations

Effectiveness Criteria	Observations	Evidence reviewed
	compliance with its own data requirements from approximately 60% to in the region of 80-90% at the present time. ▪ This analysis identified a number of different issues related to data quality in the Regions, including issues due to geography, training or using contractors and not being provided with the necessary information. The data quality issues were identified as being an issue with respect to Water Corporation's renewals planning as the Corporation did not have full sets of asset data to use in its planning processes, e.g. missing/not recorded location information on water main bursts and leaks that could be used to identify repeat issues on specific mains and identify them for replacement.	
▪ Logical security access controls appear adequate, such as passwords	▪ Water Corporation does not have any generic user accounts, each logins are named. Access to desktops is by username and password, with passwords needing to be rotated every 70 days. ▪ S219 Information Systems Security – Internet Security is the Corporation's standard for providing guidelines for the integrity and security of the Corporation's network infrastructure and applications. The standard applies to all Water Corporation staff as well as its contractors. It includes information on: - User identification management - User Authorisation - Password Management - User Access Control - Resource Access Control - Audit/Data Recording and Reporting - Security Administration - Data Integrity and Confidentiality - Gateway Infrastructure - Reliability of System Services and Protection - Warning Banner ▪ The standard has been developed in accordance with the Corporate Information management Strategy and the requirements of the ISO Standards for Information Security Management (ISO27001:2013 & 27002:2013). The Standard was last reviewed in January 2014, with the next review due in January 2016.	▪ S219 Information Systems Security – Internet Security. (Doc ID: 558468, Version Date: 25 Jan 2014, Next Review Date: 25 Jan 2016.)
▪ Physical security access controls appear adequate	▪ We observed during the site visit to Newman that the Corporation's depot limits after-hours access and a pin number is required to enter the building. The building is alarmed and a staff swipe card is also required to disarm the alarm. ▪ During the site visit to the Subiaco WWTP, we confirmed that the physical security access controls for the plant are adequate. The site is fenced and access is through a controlled entry gate. All visitors are required to complete site inductions prior to visiting the site and the login created during this process is used as part of the sign-in process used to provide visitor passes.	▪ Site visits to Newman depot and Subiaco WWTP.

Effectiveness Criteria	Observations	Evidence reviewed
▪ Data backup procedures appear adequate and backups are tested	▪ Water Corporation completes a full back up of its systems and data every week and every month. It also carries out daily back-ups for differentials and SAP is backed-up every day. Back-ups are kept offsite and stored for six months. ▪ S103 – Information Systems and Security Server Backup and Recovery is the Corporation standard for back-up and recovery and provides the minimum set of rules governing the back-up of the Corporation's data, the storage of those back-ups and the mechanisms to recover those back-ups to comply with the Corporation's Information Management Policy principle in relation to Data Management. The Standard was last reviewed in July 2015, with the next review due in July 2018.	▪ S103 - Information Systems Security: Server Backup And Recovery. (Doc ID: 1960062, Version Date: 24 July 2015, Next Review Date: 25 July 2018.
▪ Key computations related to licensee performance reporting are materially accurate	▪ As part of its work to develop its data quality strategy, Water Corporation has implemented a data quality dashboard that can be accessed through the intranet reporting portal. This report works by comparing the data recorded on completed work orders logged back into SAP with a number of specific business rules in order to identify missing or incorrect field data collection. The report summarise the number of work orders with missing locations/options, missing pipe sizes, mis-matched information and were an incorrect asset/sub-program has been selected. The summary report can be drilled down to individual work orders to allow them to be followed up and corrected or completed. ▪ During the Newman site visit we confirmed the number of water main breaks and sewer blockages for the Newman systems over the course of the review period. We consider that this data represented the accurate performance. ▪ Key Performance Indicators are reviewed monthly and the long-term trending data that Water Corporation has available ensures that any examples of outlying performance can be quickly reviewed and confirmed or corrected if found to be erroneous. ▪ Based on our review of Water Corporation's asset management systems and reporting, and the data improvements made since the last review period with the implementation of the data quality strategy and associated projects, we consider that key computations related to licensee performance reporting in the review period are materially accurate.	▪ Examples of Business Performance Reports ▪ Examples of Activity Based Planning Reports
▪ Management reports appear adequate for the licensee to monitor licence obligations	▪ Water Corporation reports against its operating licence obligations through its Business Performance Report (BPR). We reviewed examples of these reports and confirmed that they are adequate for reporting against Key Performance Indicators. ▪ As noted previously, with regard to Water Corporation's asset management activities, operational and maintenance costs are reported through Activity Based Planning (ABP) Reports. The reports interrogate the data recorded in SAP and are able to present the data in the number of different ways, e.g. by business area or MAT code. ▪ The data included in the ABP reports is analysed monthly and used to update the operational plans. We reviewed an example of the Mid-West ABP and confirmed that budget and actual costs are included report. ▪ Water Corporation uses a number of different measures to measure the performance of the Aroona alliance, including budget compliance, a balanced scorecard system, and achievement	▪ Examples of Business Performance reports ▪ Examples of Activity Based Planning (ABP) Reports.

Effectiveness Criteria	Observations	Evidence reviewed
	of minimum conditions of satisfaction, which looks at regulatory compliance requirements and compliance against standards. ▪ Examples of operational and maintenance costs in SAP and reported in the ABP Reports were confirmed during the onsite interviews and site visits.	

Table 5-8 Asset Management System Review Observations for Risk Management

Effectiveness Criteria	Observations	Evidence reviewed
▪ **Risk management**		
▪ Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system	▪ Water Corporation identifies and manages risks at an asset, system and corporate level. ▪ A Risk Management Policy (PCY135) sets out overall accountabilities and principles for risk management. This "key principles" outlined in the policy are: a) Corporate and process risk profiles are reviewed annually (desktop or workshop). b) Under the Accountabilities Framework, Process Owners in conjunction with Process Managers have full accountability and authority to manage a risk in relation to their process. c) All risk assessments (process, business or project) within the Corporation will be assessed using the Corporate Risk Assessment Criteria and will be recorded in the Corporate Risk Information System or a formally recognised risk register. ▪ The Policy establishes a Risk Management framework through which risks are identified, assessed and treated consistently across the business in accordance with ISO31000 **Corporate level** ▪ Corporate risks are recorded in the Corporate Risk Information System (CRIS). In identifying and recording risks, the following roles are important: a) Business process owners are required to identify risks and contribute to their assessment b) Risk Coordinator for a business area provide support across the team acting as a 'champion' to ensure that accurate and complete data is entered into CRIS. c) Regional Manager is ultimately responsible for the quality and currency of risk information in CRIS and to use the risk information in decision making d) Rick 'Consultants' are provided to each business area throughout the year to help facilitate the risk review process ▪ Water Corporation's alliances align with the overall corporate risk management framework. **System level** ▪ The System Risk Assessment tool is a web based tool that is used as a planning tool by Water Corporation. The tool is applied to all of Water Corporation's ~1050 systems – ~550 regulated water supply systems, ~480 sewerage systems, irrigation systems and drainage systems. ▪ To streamline the process and help achieve consistent outcomes, Water Corporation has pre-defined risk events depending on the system type. For example, there are 11 pre-defined risk events for regulated water supply including "Supply of water with unacceptable aesthetics" and "The system is unable to maintain continuity of supply". The guidance material notes that not every risk event must be scored and events with a low risk may only have a desktop assessment completed. The intent is to be able to identify the highest risks across the business and be able to compare them on a consistent basis. To enable this, each system risk is given a risk score based on the corporate risk framework. A risk score >121 is classed as 'high' and a risk score of 72 – 121 is classed as 'moderate'. ▪ At our review sessions we reviewed multiple risks recorded in the System Risk Assessment tool including for the Warrenup sewer district, Karratha, Newman, Bunbury and Broome.	▪ Risk Management Policy (PCY135) ▪ Risk Management Framework ▪ System Risk Assessment User Manual ▪ System Risk Assessment quick reference sheet ▪ System Capability Matrix v3 website homepage ▪ Asset Risk Management Framework ▪ Asset Protection – risk Assessment form ▪ S389 Risk Assessment Criteria ▪ Risk Management Guidelines ▪ Regional risk management training slides ▪ Risk & Assurance Branch - Risk Team credentials

Effectiveness Criteria	Observations	Evidence reviewed

- The System Risk Assessment is linked with other corporate applications including the System Capability Matrix and the System Capability Forecasting tool which provide integrated and functions for risk management across the business.

Asset level

- Water Corporation has in place a "Linear Assets Risk Module" for assessing the risk associated with linear assets. Risk is rated in accordance with the corporate risk framework. Asset condition is used as a proxy for likelihood of failure. For linear assets, which are mostly buried, condition assessment is undertaken on a sample basis and the results extrapolated or age used as an alternative. The Linear Assets Risk Module is linked to the GIS which provides information relating to the attributes of the linear assets.
- For non-linear assets, Water Corporation uses the "Asset Risk Assessment" tool. Risks may be entered in this tool by operations staff or by those who have conducted a condition assessment of an asset.

Training

- We requested Water Corporation to provide more information on the competence of staff to provide the risk information required for each of its tool and the risk related training being undertaken cross the business. Water Corporation provided a summary of the credentials of the Risk and Assurance Branch. Two of the members of the Corporate Risk Team are Certified Practicing Risk Associates (CPRA), while one of these is also a Certified Internal Auditor (CIA). All team members have attended the following risk management courses:
  a) Internal Project Risk Management course accredited by the Challenger Institute of Technology
  b) Risk facilitation skills presented by the Australian Institute of Management (AIM)
  c) Annual 2011 and 2012 Risk Cover conferences
  d) Risk Team Charter development (in-house session by Human Resources)
- Further to the above, Water Corporation has provided an extract from Corporate Risk Information System (CRIS) training conducted by the Risk and Assurance Branch for the Regional Customer Services Group (RCSG) in June 2015. This extract is in the form of a PowerPoint presentation, titled, "RCSG – Risk Management" (PM-#12996545).
- Within the PowerPoint presentation, it is stated that live CRIS training was undertaken by the presentation attendees. Water Corporation has stated that "all licence holders have had full and complete training on how to use the system". Quick Reference Sheets (QRS) are used for all training sessions and are linked to on the CRIS website. The presentation also emphasises the use of risk information to support decision making processes, and outlines the role of risk coordinators within the organisation. Although this specific presentation was delivered to the RCSG, Water Corporation has stated that these PowerPoint slides were "tailored for each area of the business".

Conclusion

- We consider that Water Corporation has in place effective policies and procedures for management of risks across its business. It manages risks at different levels which are complementary and enables it to provide a detailed picture of its risk profile. The Corporate Risk Report is a summary of all corporate risks and is used to communicate the risks to the Board.

Findings of 2014 independent risk management review report

- We are required within the scope of this review to validate the findings in the independent risk management review report prepared by Odysseus-imc Pty Ltd. This review of risk management arose out of the 2012 asset

Effectiveness Criteria	Observations	Evidence reviewed

management review. It was undertaken in March 2014. The findings of the report and our notes on the findings are as follows:

- The report concluded that *"WaterCorp has undertaken a significant effort to achieve the outcomes identified in this report. This in part is due to the ongoing planning and monitoring, refined processes, additional systems implementation, the concerted effort by WaterCorp and the introduction of new processes such as ICAM for incident management and improvements to the ARA."* We note that this a very general conclusion and does not explicitly address the stated scope of the report to assess the Water Corporation's risk management practices against the ERA's Audit Guideline. However, we consider that this conclusion is warranted based on the activities undertaken by Water Corporation between the 2012 Review and this report.
- The report did not make any recommendation for improvement in addition to those that had already been identified and were being actioned by Water Corporation.
- The following observations were made and we make comment of our findings alongside these observations

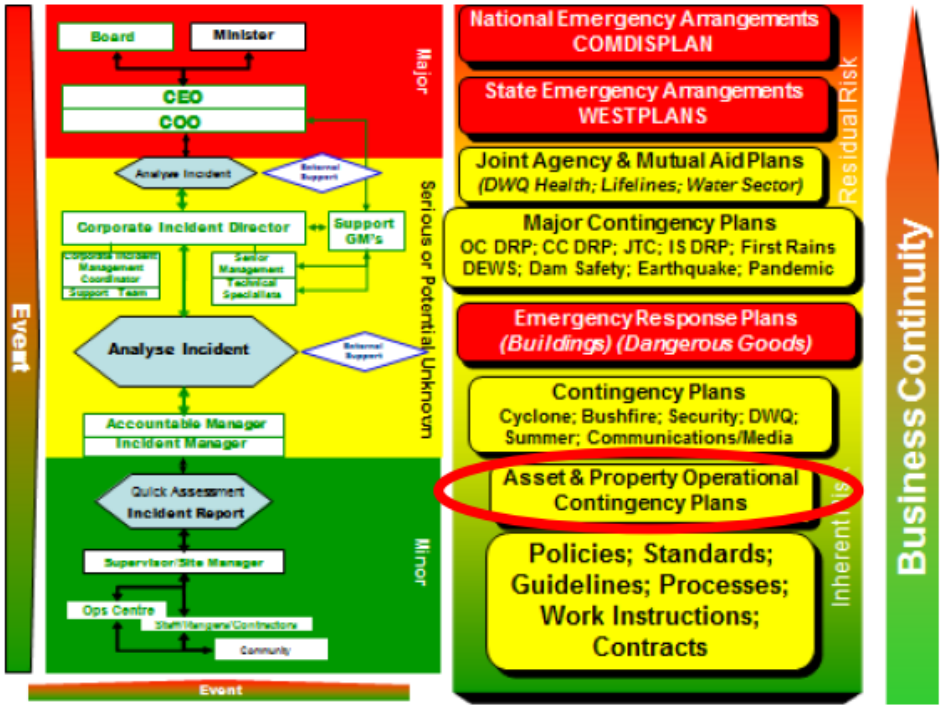
Observation from 2014 report	Comment on observation
It was clear that personnel had a sound knowledge of the subject matter they were working with.	We also found that personnel interviewed had a sound knowledge of risk management practices.
All documented processes could be readily located through the corporate intranet. WaterCorp personnel were able to demonstrate the use of the supporting activities and discuss elements of the activities to a high degree of comfort. Where personnel had yet to be trained on activities such as Sentinel they were aware of the requirements of the training and could discuss the objectives of the project	We also found that all necessary documentation (policy, processes etc.) supporting Water Corporation's risk management practices could be readily located on the intranet or document management system.
A review of the documents that have been approved indicates they are of good quality and complete with respect to content expected of such documents. As the documents are located in Aquadocs they can be located from all regions.	We also found that the risk management documentation was of a good quality and complete. However, our review found that one risk management related document (Asset Risk Assessment Rules) did not have a document reference number. This was an isolated incident with respect to risk management documentation.
All regions have access to the Risk Framework and supporting systems and documentation. Training supporting the regions is extensive and ongoing. By reviewing the content of the applications it can be seen that all regions use the framework consistently. The North West region was not consistent with the use of the ARA during the 2012 AM Effectiveness Review	We found that the risk framework was not being used consistently. In particular, we found that scoring of Asset Risk Assessments differed in examples that we reviewed. We

Effectiveness Criteria	Observations	Evidence reviewed
	due to staff shortages however, this has since been addressed through the assignment of a new asset manager and additional training by the Asset Renewal section. | have made a specific recommendation in this area.	
	▪ In summary, we consider that the findings of the 2014 independent review report are mostly valid. The one notable exception is that we identified inconsistencies in the application of the framework whereas the 2014 review considered that earlier issues relating to inconsistency had been addressed.	
▪ Risks are documented in a risk register and treatment plans are actioned and monitored	▪ A risk register exists for each level at which Water Corporation assesses risk: a) The Corporate Risk Information System (CRIS) which now uses the Stature software platform which replaced CIRA b) System Risk Assessment (intranet page) c) Asset Risk Assessment (intranet page) ▪ We reviewed each of the system live at our review meetings and discussed their operation and specific risks with various staff. ▪ We were provided with and discussed at the review meetings the Corporate Risk Report. The Corporate Risk Report details 18 corporate risks aggregated from business process risks that are deemed to have the highest level of risk to the business. Risks have been identified by business processes owners and their assessed risk endorsed by the Risk Management Committee. For the 2015 report, Water Corporation has organized the risks around a value chain (previously they were organized as being strategic/tactical) which provided a clearer line of sight between the risk and the value provided to customers. ▪ The Corporate Risk Report acts as a summary of the Water Corporation's overall risk profile but also contains detailed documentation of each risk. The documentation includes existing controls as well as further mitigating actions that are being pursued. For each mitigating action an owner and timing for delivery are identified. In this way, the major corporate risks are tracked and actions monitored. ▪ In addition to the highest risks in the Corporate Risk Report, all corporate risks identified have associated controls and mitigating actions identified. Under the accountability framework for risk management, each risk and the controls and mitigating actions must be reviewed and endorsed annually by the business area that owns the risk. Risks are reflected in Branch Plans, Section Plans and where appropriate, individual Performance Agreements. ▪ System Risk Assessments are fed into the System Capability Matrix. The System Capability Matrix provides the System Risk Assessment outcomes alongside relevant data sets that relate to monitoring of the risks and actions to address the risks. Monitoring (of the risks, not actions to address the risks) is in part achieved by the System Capability Forecasting tool which has the ability to forecast relevant parameters forward and compare them to triggers for action (e.g. forecast demand compared with available supply). The System Capability Matrix provides links to capital projects data within SAP that are related to addressing the particular risk. The System Capability Matrix sets out the expected timing of the capital projects. ▪ We conclude that there are risk registers in place for each of the three levels at which Water Corporation manages risk. We saw that treatment plans and mitigating actions are defined at all levels and that the systems	▪ Live demonstration of System Risk Assessment system ▪ Live demonstration of Asset Risk Assessment system ▪ Live demonstration of CRIS (Stature) ▪ Corporate Risk Report 2015

Effectiveness Criteria	Observations	Evidence reviewed
	track progress of these actions either through live links to other corporate systems (e.g. SAP) or through update via the review process.	
▪ The probability and consequence of risk failure are regularly assessed	▪ The Risk Management Policy requires that Corporate and process risk profiles are reviewed annually (desktop or workshop). ▪ An examination of the 2014 and 2015 Corporate Risk Reports shows that a number of consequence ratings were changed between the 2014 and 2015 versions of the report. Examples include: a) Risk 8 – Excessive non-revenue water: Environmental consequence rating lowered from Moderate to Minor. b) Risk 10 – Increased Infrastructure Failures: Financial consequence rating lowered from Moderate to Minor. c) Risk 13 – Change in Government Position: Reputation consequence rating lowered from Major to Moderate. ▪ In addition, the categorisation of risks was changed from a strategic-tactical-operational breakdown in the 2014 report to a value chain format in the 2015 report. ▪ Water Corporation explained that for corporate risks it has internal 'risk consultants' from the Risk and Assurance team that initiate meetings with each business area throughout the year to facilitate and help drive completion of annual risk reviews. The meetings are qualitative discussion which review existing risks and prompt business process owners to consider changes in the operating environment. ▪ We consider that the approach to reviewing and updating risks in the corporate risk management system should be effective at helping to ensure that the probability and consequence of risks are regularly assessed. This was confirmed by the corporate risks that we reviewed and through discussions with Water Corporation staff. ▪ For the System Risk Assessment, the frequency of review depends on the risk level. High risks (>121) must be reviewed annually while moderate risks (72 – 121) are to be reviewed every two years. ▪ In our review of the System Risk Assessment tool we identified that two high risks in the North West Region had not been reviewed by the due date. These were for risks associated with Burrup Seawater Scheme (Risks 8208 and 8255). We raised these risks in our discussions with Water Corporation staff at Karratha that were assigned responsibility for the risk. We were informed that work was in progress at the site to refurbish some assets that would lead to the risk profile changing. Further, the future demand for water from the scheme was uncertain due to a large industrial customer no longer requiring supply. While we understand the uncertainty over the current status of the risks, we do not consider that this is sufficient reason for the scheduled reviews and endorsement to have not been completed, especially as these risks were rated as high risks. The system has sufficient functionality to make it clear to end users the current circumstances and that the risk profile is likely to change in the short to medium term. ▪ During our site visit to Bunbury, we reviewed the System Risk Assessment for the Bunbury sewage scheme. A high risk (risk score 426) was recorded relating to the potential for sewage overflow from the Parade Road Sewage Pump Station. We were informed that this is the largest pump station outside of the Perth metropolitan area and that if an overflow occurs, sewage overflows into a watercourse that may flow into a wetland if not contained. We reviewed the likelihood and consequence underlying the risk score and found that the assessed risk was driven by reputational damage. It was assessed as being "almost certain" that there would be "sustained community outrage". We challenged Water Corporation to provide evidence of the "sustained community outrage" that had occurred in the last year and was informed that no overflows had occurred in the last few years. From our discussion with the staff at Bunbury, we were informed that the assessment was based on the assumption of what may occur in time if the risk was not addressed and on this basis, sustained community outrage would likely occur if overflows occurred at regular intervals. We note that this approach does	▪ Corporate Risk Report 2015 ▪ Corporate Risk Report 2014 ▪ Review of System Risk Assessment risks 8208 and 8255 ▪

Effectiveness Criteria	Observations	Evidence reviewed
	not align with how it was explained to us that asset risk assessments should be completed by those responsible for managing the risk tool centrally. We were informed that asset risks assessments should be completed to reflect the current operational circumstances using actual performance data and this is the approach we had seen taken in other risks assessments. It was also explained to us that those that manage the risk assessments centrally are sometimes required to adjust risk assessments to better reflect current operational circumstances. ▪ While we appreciate that there will always be some subjectivity and therefore inconsistency in completing risk assessments, it is concerning that two opposing approaches to completing the risks assessments appear to have been taken across the business. We recommend that Water Corporation review its guidance material for the Asset Risk Assessment tool with a group of users (input and end users) to identify any areas of ambiguity in the guidance provided or opportunities for improvement. ▪ Further, we recommend that Water Corporation communicates to all users of the Asset Risk Assessment tool its desired approach to scoring the likelihood and consequence of asset risks. That is, whether the risk scorer is to consider business as usual operations, a worst case scenario or some other operating context when undertaking the scoring. This communication should occur after the findings from the previous recommendations are endorsed. ▪ In our site visit to Karratha, we identified that Asset Risk 1967 (Tank 3 at Rosemary Rd, Karratha) was overdue for review and endorsement. ▪ We consider that Water Corporation needs to be more diligent over ensuring that scheduled review and endorsement of scheduled risks are completed on time. We note that our review of risk review and endorsement was undertaken as a random inspection and not a representative sample; we recommend that Water Corporation reviews all existing System Risks to identify high risks that are overdue for review and/or endorsement and completes the scheduled review and/or endorsement of the risks. ▪ Further, we recommend that Water Corporation reviews the review and endorsement process (activities and timing) for system risks to confirm if the current approach is appropriate for its business needs and implements any changes that it determines are necessary ▪ Water Corporation outlined that it has commenced a “Practical problem solving” initiative to better assess root causes of asset risks and to identify possible operational solutions. We reviewed the documentation relating to the Harvey – Myalup water scheme. This included a presentation outlining the problem observed and the investigation undertaken. We consider that this is a valuable approach for identifying improvements to asset management practices. We were informed that this tool is currently being trialled in the south-west region and may be rolled out more widely.	

Table 5-9 Asset Management System Review Observations for Contingency Planning

Effectiveness Criteria	Observations	Evidence reviewed
Contingency Planning		
▪ Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks	▪ Contingency planning is part of Water Corporation's Business Continuity Management Framework. This framework is shown diagrammatically below.  ▪ Water Corporation makes the following distinction between contingency planning and incident management: *Operational Contingency Planning and Operational Contingency Plans are appropriate to address short-term disruptions of normal asset operations. In the event that there is a sustained long term failure or outage of processes, infrastructure or operations that provide a potential loss of service to a customer or environmental damage being sustained, Operational Contingency Planning is no longer sufficient and must be supplemented by the initiation of the Incident Management Process.* ▪ This distinction is appropriate and in line with the approach taken by many other organisations, including water utilities, to business continuity management.	▪ Operational Contingency Planning, Version Date 16 January 2014 ▪ Contingency Plan template ▪ Contingency plans for Katanning WWTP, Subiaco WWTP, Nungarin WPS, Gascoyne District Cyclone event ▪ Screenshot of Sentinel system ▪ Live interrogation of document management system to identify contingency plans

Effectiveness Criteria	Observations	Evidence reviewed

- Incidents are managed using the corporate Incident Management Standard. Water Corporation records incidents on the Sentinel system and uses this system to rack incident close out and lessons learned.
- Water Corporation has prepared an Operational Contingency Planning Guideline which details the aim of the contingency planning process, the expected contents of contingency plans, roles and responsibilities, the relationship with Incident Management processes and requirements to monitor and review the plans.
- The Operational Contingency Planning Guideline defines the following important responsibilities relating to contingency planning:
  - An Asset Manager is responsible for identifying the events that may cause an asset to move outside of its normal operating parameters and plan for the actions necessary to return it to that normal operating mode. They are, therefore, responsible for developing and maintaining Operational Contingency Plans, whilst ensuring the acceptance and use of the plans by their Service Delivery colleagues.
  - The Service Delivery Manager is responsible for testing and providing confirmation to the Asset Manager that the activities in the Operational Contingency Plan are appropriate and/or identify any improvement opportunities for the update of the plan.
- Both Aroona and PRA conduct periodic reviews of their contingency plans to ensure currency. Aroona and PRA conduct both field and desktop exercises to test the contingency plans.
- We consider that the Operational Contingency Planning Guideline is robust and outlines an appropriate approach to contingency planning. However, there are two areas of contingency planning where we consider that Water Corporation does not meet the requirements of the effectiveness criteria. There are:
  - Ensuring that contingency plans adequately cover high risks to service delivery
  - Ensuring that contingency plans are tested to confirm their operability.

  These shortcoming more reflect the implementations of the Guideline than the adequacy of the Guidelines.
- The Operational Contingency Planning Guideline does not give specific guidance on the circumstances / assets / business aspects for which contingency plans should be prepared. It states that operational contingency planning is an integrated part of risk management and that *"the objective of Contingency Planning is not to identify and develop a plan for every possible contingency as that would be impossible and a waste of resources but more so to encourage thinking within the responsible team of what events are likely to occur and what are the appropriate responses to manage that occurrence."*
- We consider that this is an appropriate approach and aligns with the expectation of the effectiveness criteria that contingency plans cover high risks.
- However, following our discussions with Water Corporation and review of systems and supporting documentation, we were unable to conclude that Water Corporation has adequately identified the highest operational risks to its business and undertaken contingency planning to address them. This is because contingency planning has been undertaken inconsistently across the business in terms of level of application, coverage and depth of contingency plans. We note that this is the responsibility of the Asset Manager according to the Guideline.

Effectiveness Criteria	Observations	Evidence reviewed
	▪ Water Corporation explained that a number of years ago there was a concerted campaign to undertake contingency planning across the business which resulted in many contingency plans being prepared. A search of Water Corporation's document management system using the search term "contingency plan" returns around 500 documents. Other than searching the document management system, there is no register of contingency plans in place to document the scope of each, the risks they relate to and how the need to address the risk through a contingency plan was determined. ▪ Water Corporation explains that *issues requiring implementation of contingency measures for operational purposes are not reported formally to a central area. [There is not a list compiled related to contingency plans as an outcome of the Operational Contingency Planning process]. There is no expectation that there would be a need for operational contingency measures initiated to bring an asset back online from a failure to be recognised corporately, unless there are multiple issues with similar assets or a need identified through the Daily or Weekly Review Meetings. Management of OCP's is the responsibility of local operators.* ▪ While we accept that contingency planning is part of business-as-usual operational practices, it is not possible to conclude that there is sufficient contingency planning in place without some link between the coverage of plans and assessed risk. Conversely, it is also possible that there is too much contingency planning in place that may hinder the business's ability to act efficiently and effectively. ▪ Water Corporation states that testing of Operational Contingency Plans is recommended but not mandatory and that improvements are identified at a local level and improvements to the Plans are made at this local level. ▪ We note that the Operational Contingency Planning Guideline, while setting out requirements to review and update contingency plans, does not set out that lessons learned should be documented or that updates to the contingency plans should be documented. It should be possible to infer updates to contingency plans through inspection of the data in the document management system but it may not be certain that a contingency plan was updated because of lessons learned through testing. Therefore, we are unable to conclude that Water Corporation tests its contingency plans at an appropriate frequency and with appropriate rigour and acts on the lessons learned to improve its contingency plans. ▪ While we make the above conclusion in the negative, we note that Water Corporation's staff interviewed across multiple subject areas and in the regional offices visited were knowledgeable with regards to contingency planning and were familiar with their role in the contingency planning process. ▪ Water Corporation has identified that this is an area for improvement and it intends to review its practices in this area in the coming year. ▪ We recommend that Water Corporation identifies for its operations the desired: a) level of application b) coverage and c) contents of contingency plans, and implements contingency planning consistently using these criteria through a program of activity.	

Table 5-10 Asset Management System Review Observations for Financial Planning

Effectiveness Criteria	Observations	Evidence reviewed
Financial Planning		
▪ The financial plan states the financial objectives and strategies and actions to achieve the objectives	**Overview** ▪ The Strategic Development Plan and Statement of Corporate Intent are Water Corporation's two key documents related to its financial planning. ▪ The Strategic Development Plan provides a five year outlook and includes information on key emerging issues, financial objectives and operational targets, and an overview of how the Corporation will achieve the objectives and targets. ▪ Water Corporation prepares an annual Statement of Corporate Intent (SCI) that represents the agreement between the Water Corporation and the Minister for Water on the Corporation's expected level of performance for the financial year. This meets the requirements of the Water Corporations Act 1995. ▪ The Annual Report provides a backwards look at the Corporation's financial performance. ▪ Water Corporation's annual financial report is prepared in accordance with AASB Australian Accounting Standards and the Water Corporations Act 1995. The financial report is prepared on the accrual accounting basis and in accordance with the historical cost convention, except for certain financial assets and liabilities which are stated at their fair value. ▪ Water Corporation also develops budget papers for Treasury to help them prepare the overall State budget and the operating subsidies that the Government provides to the Corporation. **Interface and Relationship with Government** ▪ Water Corporation develops its annual Statement of Corporate Intent based on the assumption of adequate surface water storage at the end of the winter in the year. If the storage is below the assumed level, this may have a material impact on the Corporation's ability to supply water as projected and deliver the financial outcomes presented. ▪ In developing the targets and financial outcomes reported to Government in its annual Statement of Corporate Intent, Water Corporation makes assumptions related to Projected Growth, Operating Efficiency, and the CPI Annual Change. The Dividend Payout Rate is also included in the forecasting ▪ The Net Accrual to Government forms the return to the government and represents the Corporation's dividend and tax payments minus its operating subsidy. ▪ Currently 85% of the Corporation's surpluses (excluding developers' hand-over assets, Government grants and grants received from Government for Capital Expenditure purposes) are returned to Government as dividends and it also pays income tax to the WA Government according to the National Tax Equivalents Regime. ▪ The Corporation receives Operating Subsidies from the WA Government as payment for loss running systems/schemes that that would not otherwise be commercially viable service to provide. 98% of the anticipated dividend is paid out at year end with the remainder paid on completion of the audited financial statements.	▪ Statement of Corporate Intent 2014/15, June 2014 ▪ Water Corporation Strategic Development Plan ▪ Water Corporation Annual Report 2013/14 ▪ Water Corporation Annual Report 2012/13 ▪ Micro Planning Guidelines Operating Budget 2014/15 Key Assumptions & Inputs – Part 1, PM-#13499605-v1-201415_Micro_Budget_Guidelines_-_Key_Assumptions.DOCX. ▪ Micro Planning Guidelines Operating Budget 2014/15 Base Load Information – Part 2, PM-#13499609-v1-2014_15_Micro_Budget_Guidelines_-_Base_Load_Information.DOCX. ▪ Appendix B Micro Planning Guidelines in SAP Business Analysis, footer states no amendments have been made since the Micro Planning Guidelines 2003/04. ▪ Macro Budgeting Guidelines 2015/16, PM# 9476463. ▪ Program Management Guideline, Doc ID 2721044, version date 28 January 2015, next review date 28 January 2017. ▪ Strategic Investment Business Case (SIBC) Author Guideline, Doc ID 9786937 v1, version date Nov 2013, next review Nov 2015. ▪ Executive Summary – Asset Investment Program 2015/16 to 2019/20, Board Meeting November

Effectiveness Criteria	Observations	Evidence reviewed
	▪ Water Corporation consider that there are only a very small number of systems/schemes outside the metropolitan areas that are profitable. ▪ The services that are not otherwise commercially viable, and for which Water Corporation is compensated by the Government for the shortfall between customer revenue and the cost of providing the services, can relate to systems/schemes that are impacted by issues of remoteness, diseconomies of scale, topographical considerations and in some instances, harsh climatic conditions. These factors contribute to the high cost of providing water and wastewater services in the country regions. ▪ As a result, the Corporation provides these services and are compensated by the Government for the shortfall between customer revenue and the cost of providing the services. ▪ Differentiating rating charges are applied to the systems/schemes depending on the level of the subsidy. The Operating Subsidies provided by the Government cover: – Non-commercial country services – to cover the losses Water Corporation incurs in providing existing services to customers in non-profitable country schemes. As a result of the Government's commitment to providing services at reasonable prices, regulated prices charged in country regions are typically less than the cost of supply. – Revenue concessions – to cover concessions to pensioners, seniors and other customers, provided at the request of the Government. – Infill Sewerage Program – to cover the net loss incurred from the development of infill assets in non-commercial areas. ▪ The financial assessments that identify the systems/schemes that require Government operating subsidies are scrutinised by Treasury. There is a robust annual review process of the operating subsidies that assesses the previous year actual operating costs for each scheme to confirm the financial operating loss and quantify the extent of the loss. This then either drives more money to the Government in dividends or more money from the Government for the operating subsidy. It is the responsibility of Water Corporation to operate the systems/schemes to provide the necessary levels of service. ▪ Water Corporation is bound to achieve a five year average 2% efficiency outcome on its operating expenditure by Treasury and agreed with the ERA. In addition, the Corporation has to meet efficiency dividends sought by Government and delivered through operating cost reductions. These efficiency requirements result in the biggest efficiency driver on the Corporation's operating expenditure. ▪ As Water Corporation is owned by the WA Government, any borrowings have an impact on State borrowings and form part of the Government's total debt. As a result, Water Corporation's capital program is sized to minimise the impact on State debt. Beginning in 2013/14, the Corporation has used a financial arrangement under a Public Private Partnership for the Mundaring Water Treatment Plant. ▪ The debt parameters are set by Government. Water Corporation prepares its capital budget for a five year period although the State government works on a four year period. Capital projects need pre-approval from the Government and projects cannot be initiated unless the operating subsidy has been approved.	2014, PM# 11714657, dated 11 Nov 2014. ▪ PCY112 Delegated Financial and Legal Authorisations, Doc ID 410999, version date 17 Nov 2014, next review date 30 Nov 2015. ▪ S072 Financial Authorisation standard, Doc ID 411000, version date 1 July 2015, next review date 30 Nov 2015. ▪ PCY263 Capitalisation policy, Doc ID 428676, version date 14 Nov 2013, next review date 14 Nov 2016. ▪ Water Corporation Business Plan, Aqua Doc# 12046632 and 12874280, dated 19 May 2015. ▪ Water Corporation Operating Budget Pack 2015-16, Board Meeting, 15 December 2014

Effectiveness Criteria	Observations	Evidence reviewed

- Water Corporation self-funds its operating expenses from revenues and a short term debt facility, within parameters set by Government.
- There is a pricing model for Water Corporation but this is currently being reviewed and re-costed between the Corporation and Treasury. A review of the model by the ERA three years ago resulted in a reduced WACC and was not accepted by Government.

Financial Model

- Water Corporation's Corporate Financial Model (CFM) picks up all of the organisation's revenue and expenditure items, including opex and capex, borrowing etc, and uses this information to project the return to government resulting from the operating surplus.
- The CFM is used to provide a high level summary of Water Corporation's financial performance and position. The model consists of a series of linked spreadsheets for the period 2006/07 to 2029/30 that cover Balance Sheet, Profit & Loss, Cash Flow Statement and Impact on State Finances. It is used to record the Corporations financial information related to capex and opex, revenue, tax, debt, balance sheet items, financial indices and growth predictions.
- The Pricing and Evaluation Branch within the Corporation is responsible for the operations of the CFM, with the source data in the model provided from different branches within the Corporation. The model has very limited edit access, with one point of contact for edit purposes. The model also has limited general access and appropriate security. It has built-in logic checks to ensure that data is correctly flowing through the different worksheets correctly. It has logs that record information uploaded into the model and also record any changes made to the spreadsheets.
- Although designed and developed within Water Corporation, the CFM reflects Treasury's Strategic Information Management System (SIMS) and allows them to consolidate the Corporations financial data with other State Government agencies financials. The Government uses the data for its overall expenditure reviews and also in expenditure review submissions such as Royalty For Regions projects or when State assets are being transferred to the Corporation.
- It is also used for the Corporation's financial planning, operations and strategy, with the data used for input into the Strategic Development Plan and Statement of Corporate Intent and also for scenario planning purposes. The Strategic Development Plan forms a five year financial view although the model is able to look out less robustly to a 25 year period.
- The CFM was last audited by an external consultant in 2012, driven by the requirements of the Corporation's Review and Audit Management Committee. This audit concluded that there was a low risk that the CFM included information that was incomplete, inaccurate or unreliable.

Budget Process

- A macro budget is prepared by the Financial Management Branch in October every year. This goes through a number of review and approval processes before being presented to the Board for endorsement and then being incorporated into the Strategic Development Plan for submission to the Government.

Effectiveness Criteria	Observations	Evidence reviewed

- The CFM processes the Corporation's macro budget to provide:
  - The five year period for the Strategic Development Plan
  - The one year period for the Statement of Corporate Intent
  - The four year period for the budget submission of the State Government for inclusion into their overall information management system, allowing them to consolidate the Corporations financial data with other State Government agencies financials.
- Water Corporation has a number of budget planning and development guideline documents to assist finance with the preparation of detailed financial plans and to ensure a consistent approach is taken throughout the Business.
- The budget guidelines also provide the minimum information requirement to the regions and branches, in order to ensure that plans are in accordance with agreed base budget allocations and New Initiatives/Key Management Priority projects.
- The budget guidelines include:
  - Micro Planning Guidelines Operating Budget 2014/15 Key Assumptions & Inputs – Part 1 (PM-#13499605)
  - Micro Planning Guidelines Operating Budget 2014/15 Base Load Information – Part 2 (PM-#13499609)
  - Appendix B Micro Planning Guidelines in SAP Business Analysis (We note that the footer states no amendments have been made since the Micro Planning Guidelines 2003/04)
  - Macro Budgeting Guidelines 2015/16 (PM# 9476463).

Strategic Investment Business Cases

- Financial Impact Statements are used for assessing new capital projects. Operational Impact Business Cases are used to complete business cases for non-asset solutions.
- Water Corporation utilises a Strategic Investment Business Case (SIBC) process to present and provide justification for capital investment projects. SIBCs are prepared for each capital project, to allow the economics of the different engineering options to be assessed. The documents set out the business outcomes that would follow from different levels of investment over a 20-year horizon.
- Water Corporation has a 'Strategic Investment Business Case (SIBC) Author Guideline' (Doc ID 9786937 v1, version date Nov 2013, next review Nov 2015) to ensure the SIBCs are completed correctly and consistently throughout the Corporation.
- Further information on the SIBC process is included in the Capital Expenditure Planning section of this report.

Financial Delegation and Authorities

- Water Corporation has a 'PCY112 Delegated Financial and Legal Authorisations' policy, Doc ID 410999, version date 17 Nov 2014, next review date 30 Nov 2015.

Effectiveness Criteria	Observations	Evidence reviewed

- Water Corporation has an 'S072 Financial Authorisation' standard, Doc ID 411000, version date 1 July 2015, next review date 30 Nov 2015.

Business Plan

- Water Corporation provided its 'Water Corporation Business Plan' (Aqua Doc# 12046632 and 12874280, dated 19 May 2015), which provides a high level overview of the Corporation's overall business plan for a three year period.
- The Business Plan is a living document that Water Corporation continues to update and refine as it moves towards the start date.
- The 'Our Business Plan on a Page' section in the Business Plan includes the overall financials for the three year period.
- The Business Plan sets out the three year plan for the main Executive Managers and each Group within the business, namely:
  - Chief Executive Officer Business Plan
  - Chief Operating Officer Business Plan
  - Finance Group Business Plan
  - Customer & Community Group Business Plan
  - Regional Customer Services Group Business Plan
  - Metropolitan Customer Services Group Business Plan
  - Planning & Capability Group Business Plan
  - Acquisition Group Business Plan
  - Business Services Group Business Plan
- These individual plans set out the Strategy for each Group and include an action plan that sets out:
  - Objectives
  - Actions
  - Responsibilities
  - Due Dates
  - Measures of Success
  - Target for the Year
  - Corporate Risk link
  - Change link
  - Funding
  - Status

Effectiveness Criteria	Observations	Evidence reviewed
	– Comments ▪ Water Corporation also provided a copy of the Operating Budget Pack for 2015/16 that was provided for a Board meeting on 15 December 2014. The pack includes the financial forecasts that form the basis of the 2015/16 Statement of Corporate Intent and the 2015/16 – 2019/20 Strategic Development Plan. This build on the assumptions presented to the Board in the November 2014 report (Executive Summary – Asset Investment Program 2015/16 to 2019/20, Board Meeting November 2014, PM# 11714657, dated 11 Nov 2014) ▪ We confirmed during the review that the documents provided by Water Corporation state the financial objectives and strategies and actions to achieve the objectives, most specifically in Operating Budget Pack for 2015/16, Board Meeting 15 December 2014, the Executive Summary – Asset Investment Program 2015/16 to 2019/20, Board Meeting November 2014, 11 Nov 2014, and also the Water Corporation Business Plan, Aqua Doc# 12046632 and 12874280, dated 19 May 2015.	
▪ The financial plan identifies the source of funds for capital expenditure and recurrent costs	▪ The budget papers developed by the Corporation's Finance branch assess different funding scenarios. These are driven by the Corporation's overall Corporate Financial Model (CFM). ▪ Water Corporation has an efficiency model that it uses to assess performance against its 2% operating expenditure requirement. The model indices for the impact of inflation, interest, growth and service level projects. The forecast inputs drive the model to identify what the Corporation can financially afford. ▪ The Taxation sheet within the CFM calculates the Corporation's income tax liability to Government, ▪ The Borrowings forecast within the CFM provides the level of borrowings required based on the Cash Flow Statement ▪ The Net Debt sheet calculates the Corporation's debt and contribution to the overall Sate Net Debt. ▪ The Corporation prepares papers on growth projections that form the assumptions used in its planning assumptions. Population growth in the Perth Metro area remains steady, with 24,000 new services being installed in the previous year and a further 18,000 forecast for the coming year. This growth also means that the developer contributions remain steady. ▪ The Corporation's population and growth forecasts also show that a number of the regional centres are continuing to grow, e.g. Bunbury, Albany and Geraldton. Population growth in most of the smaller regional areas is either slowing or declining. ▪ A variety of scenarios for the source of funding are discussed in Executive Summary – Asset Investment Program 2015/16 to 2019/20, Board Meeting November 2014, PM# 11714657, dated 11 Nov 2014, albeit at high level i.e. 'Self-funded' and 'New borrowings'. We also confirmed that funding sources are included in the business cases and options analysis planning reports that were reviewed for the Asset Planning section of this report. ▪ The overall Business Plan document provides a high level three year overview and the action plans in the Plan include a column for reporting the funding source.	▪ Executive Summary – Asset Investment Program 2015/16 to 2019/20, Board Meeting November 2014, PM# 11714657, dated 11 Nov 2014. ▪ Water Corporation Operating Budget Pack 2015-16, Board Meeting, 15 December 2014 ▪ Water Corporation Financial Corporate Model ▪ Water Corporation Business Plan, Aqua Doc# 12046632 and 12874280, dated 19 May 2015.
▪ The financial plan provides projections of operating statements (profit	▪ Projections of operating statements (profit and loss) and statement of financial position (balance sheets) are included in Water Corporation's Financial Corporate Model. ▪ As noted previously, the CFM is used to provide a high level summary of Water Corporation's financial performance and position. The model consists of a series of linked spreadsheets for the period	▪ Water Corporation Financial Corporate Model

Effectiveness Criteria	Observations	Evidence reviewed
and loss) and statement of financial position (balance sheets)	2006/07 to 2029/30 that cover Balance Sheet, Profit & Loss, Cash Flow Statement and Impact on State Finances. It is used to record the Corporations financial information related to capex and opex, revenue, tax, debt, balance sheet items, financial indices and growth predictions. ▪ The financial forecasts included in the CFM roll up into the financial reports and plans developed by the Corporation, e.g. the Strategic Development Plan, Statement of Corporate Intent, overall Business Plan. ▪ Water Corporation also provided an extract from the Profit and Loss analysis used for the current Strategic Development Plan. The statement includes the 2013/14 actual spend, the EOT for 2014/15 and the confirmed forecasts for inout into the five year Strategic Development Plan for 2015/16 to 2019/20.	▪ Statement of Corporate Intent 2014/15, June 2014 ▪ Water Corporation Strategic Development Plan ▪ Water Corporation Operating Budget Pack 2015-16, Board Meeting, 15 December 2014 ▪ Executive Summary – Asset Investment Program 2015/16 to 2019/20, Board Meeting November 2014, PM# 11714657, dated 11 Nov 2014. ▪ PM-#13810595 – Excerpt from P&L analysis for inclusion in the Strategic Development Plan ▪ Water Corporation Annual Report 2013/14 ▪ Water Corporation Annual Report 2012/13 ▪ Water Corporation Business Plan, Aqua Doc# 12046632 and 12874280, dated 19 May 2015
▪ The financial plan provide firm predictions on income for the next five years and reasonable indicative predictions beyond this period	▪ The revenue budget is developed by the Pricing and Evaluation Branch. The budget includes the projected annual regulated revenue split by Region, line of business (e.g. water, wastewater, drainage, irrigation) and operating type. ▪ The budget also takes into account the financial operating subsidies provided by the Government to operate loss making services and cover concessional rebates. The Corporate Business Development branch is responsible for feeding in the projected revenue from commercial customers. The Development Services Branch is responsible for developing the develop contributions budget. ▪ The Pricing and Evaluation Branch are also responsible for developing the inflation and growth forecasts, with the other groups involved in developing the different aspects of the revenue budget also feeding in to the growth predictions. The growth predictions are derived by assessing the services available and the new properties expected to be connecting to the Corporation's systems in the next five years. The projections also take into account ABS building figures, economic outlook data provided by Treasury. ▪ We reviewed the CFM during our review and confirmed that it includes revenue forecasts out to 2029/30. We also confirmed that a log is maintained that shows any changes that have been made to the model, based on changes provided by Treasury as well as any internal changes.	▪ Water Corporation Financial Corporate Model ▪ Statement of Corporate Intent 2014/15, June 2014 ▪ Executive Summary – Asset Investment Program 2015/16 to 2019/20, Board Meeting November 2014, PM# 11714657, dated 11 Nov 2014. ▪ Water Corporation Operating Budget Pack 2015-16, Board Meeting, 15 December 2014 ▪ Water Corporation Annual Report 2013/14 ▪ Water Corporation Annual Report 2012/13

Effectiveness Criteria	Observations	Evidence reviewed
	▪ The financial forecasts, included in the CFM, including projected income, roll up into the financial reports and plans developed by the Corporation, e.g. the Strategic Development Plan, Statement of Corporate Intent, overall Business Plan.	▪ Water Corporation Business Plan, Aqua Doc# 12046632 and 12874280, dated 19 May 2015
▪ The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services	▪ Water Corporation's capital expenditure budget is managed by the Capital Investment Branch. However, the annual amount that the Corporation can spend on capital projects is determined by State Treasury. ▪ The capex budget is formulated from annual capital requests, that set out the project and the timing of the cash flow required to undertake the project, and a workshop process that determines the projects to be included in the capital expenditure budget for the next year and confirms that the overall budget is within the financial limits set by Treasury. ▪ The Board approves the capital budget and it is incorporated into the Corporation's macro budget and the CFM. ▪ The Capital Investment Branch provide two capital expenditure reports to the Board, a one year and a five year report. An annual report is provided to Government on the capital expenditure incurred by the Corporation during the year. ▪ We reviewed the CFM during our review and confirmed that it includes expenditure forecasts out to 2029/30. We also confirmed that a log is maintained that shows any changes that have been made to the model, based on changes provided by Treasury as well as any internal changes.	▪ Water Corporation Financial Corporate Model ▪ Statement of Corporate Intent 2014/15, June 2014 ▪ Executive Summary – Asset Investment Program 2015/16 to 2019/20, Board Meeting November 2014, PM# 11714657, dated 11 Nov 2014. ▪ Water Corporation Operating Budget Pack 2015-16, Board Meeting, 15 December 2014 ▪ Water Corporation Annual Report 2013/14 ▪ Water Corporation Annual Report 2012/13 ▪ Water Corporation Business Plan, Aqua Doc# 12046632 and 12874280, dated 19 May 2015
▪ Significant variances in actual / budget income and expenses are identified and corrective action taken where necessary	▪ Water Corporation prepares a number of different reports that it uses to report on financial performance. ▪ Reporting at an Activity level is the de facto level for the reporting of the Corporation's financial information. ▪ Financial KPIs are included in the monthly Business performance Report that is provided to the executive management team and the Board. ▪ In addition, the Board is provided with Budget Pack containing information prepared at corporate level monthly and at the end of each financial year. ▪ The 'Executive Summary – Asset Investment Program 2015/16 to 2019/20, Board Meeting November 2014', PM# 11714657, (dated 11 Nov 2014), provided by Water Corporation is an example of the mid-year report used to inform the Board on the current status of the Asset Investment Program and to seek approval of the Recommended Capital Budget for the next year. ▪ The Corporation prepares low level KPI reporting in its MOS (Management Operating System) Reports. Regular reports, e.g. the weekly commitment report, are prepared on the scheduled and planned work completed by the Corporation that include the costs associated with the operations and maintenance work tasks.	▪ Examples of ABP Monthly Reports ▪ Profit and Loss worksheet reports from SAP ▪ Excerpts from Analysis of Financial Performance 2014-15 report ▪ Operating Budget 2015-16, Board Meeting December 2014 ▪ Asset Investment Program 2015/16 to 2019/20, Board Meeting November 2014, PM# 11714657, dated 11 Nov 2014. ▪ Water Corporation Business Plan, Aqua Doc# 12046632 and 12874280, dated 19 May 2015

Effectiveness Criteria	Observations	Evidence reviewed
	▪ External auditing of the Corporation's financial data and performance is carried out twice each year, at the mid-year and at the end of the financial year. ▪ Reports which monitor performance against the targets outlined in the Statement of Corporate Intent are provided to the Minister for Water quarterly. In addition, the Board and Chief Executive Officer advise the Minister of any significant variations in our performance. An Annual Report which includes the financial performance is also provided to the Minister.	

Table 5-11 Asset Management System Review Observations for Capital Expenditure Planning

Effectiveness Criteria	Observations	Evidence reviewed
Capital Expenditure Planning		
▪ There is a capital expenditure plan that covers issues to be addressed, actions proposed, responsibilities and dates	**Overview of Capital Planning Process** ▪ Water Corporation's capital program and projects are centrally managed. This includes the pre-planning, planning and design activities. ▪ Water Corporation has a long-term strategic planning process that considers asset management planning, growth and renewals, taking into account the condition and performance of assets to develop renewals planning programs. Growth and renewals planning activities are cross-checked in order to take account of the longer-term view and to check the delivery of service levels into the future. Systems/Schemes and potential capital project options are monitored and assessed until specific trigger points are reached. ▪ When trigger levels are reached, the Corporation undertakes its 'Optioneering' process to assess project options and identify whether capital solutions can be deferred as a result of a change in the operating strategy for that particular asset. Once the trigger has been met or is about to be met, Water Corporation uses a select phase to look at the projects. Ideally this happens six years out from when a capital option is needed to be built and allows the Corporation to review the timing of the project, the scope and the options available. A planning review is completed to assess the data prior to any options for solution being developed and costs estimated. After a capital project has been peer reviewed, it is included in the five year capex plan. ▪ The projects go through a similar review process in Year 3 and Year 1 to refine the projects as they get nearer to the construction date. ▪ The Year 1 review is undertaken as a final confirmation that the project is still required and a refinement to lock in the project into the next year capex budget. This review is completed in August of the previous year in order to allow the project to be included in the Corporation's macro budget process for the following year and to allow the different branches involved with implementing the capital project to include it in their future year resource planning. ▪ The Activation phase involves the handover of the project to the nominated project manager to deliver the project on behalf of the responsible program manager. The project team are also identified at this point.	▪ Statement of Corporate Intent 2014/15, June 2014 ▪ Water Corporation Strategic Development Plan ▪ Water Corporation Business Plan, Aqua Doc# 12046632 and 12874280, dated 19 May 2015. ▪ Water Corporation Operating Budget Pack 2015-16, Board Meeting, 15 December 2014 ▪ Micro Planning Guidelines Operating Budget 2014/15 Key Assumptions & Inputs – Part 1, PM-#13499605-v1-201415_Micro_Budget_Guidelines_-_Key_Assumptions.DOCX. ▪ Micro Planning Guidelines Operating Budget 2014/15 Base Load Information – Part 2, PM-#13499609-v1-2014_15_Micro_Budget_Guidelines_-_Base_Load_Information.DOCX. ▪ Appendix B Micro Planning Guidelines in SAP Business Analysis, footer states no amendments have been made since the Micro Planning Guidelines 2003/04. ▪ Macro Budgeting Guidelines 2015/16, PM# 9476463.

Effectiveness Criteria	Observations	Evidence reviewed
	▪ Once the project has been activated, the scope and external approvals are finalised. A further refining scoping phase for project delivery is completed to cover items such as planning, design, safety and commissioning prior to a project plan being developed to set out the project timeframes and costs. An engineering summary review assesses the design against the user requirements. ▪ Water Corporation has a panel of two major design consultants. The design work is split to provide approximately a third of the design work to each of GHD and a Jacobs-Worley Parsons joint venture, with the remaining third of the workload completed in-house. The Corporation also has a separate panel of second tier design consultants for minor capital projects. Minor works are project managed by the Regions. ▪ The Regions are involved as a stakeholder in any capital projects being planned for their region as they provide the key component for providing asset condition and performance data on the proposed asset (assuming the asset will be operated centrally from the Operational Centre and the Region will not be providing O&M services). The Regions are also involved in the handover process and providing training/certification to staff. ▪ Water Corporation's alliances are able to request capital projects but these need to be endorsed by the Planning and Asset Management branches. These projects go through the same process as if they had been internally requested. ▪ After the capital project has been delivered, it goes through a commissioning phase prior to being handed over to the operators. There is a 12 months defect period to allow any issues to be identified and rectified. **Capex Policy** ▪ Water Corporation has a 'PCY263 Capitalisation' policy, Doc ID 428676, version date 14 Nov 2013, next review date 14 Nov 2016. ▪ We noted during our site visit to Newman that Water Corporation's sewer access chamber covers are not capitalised assets. This policy differentiates from numerous other Australian water businesses, where the covers are considered to be capital expenditure items. We also note that some of the work to replace the lids has involved construction work to alter the size of the chamber due to it being covered and needing to be raised back to ground level. We recommend that Water Corporation reviews its capitalisation policy to confirm whether the access chamber lids should be treated as capital assets. **Capital Expenditure Plan/Program** ▪ The Corporation prepares a five year capital program and submits this annually to the Board for approval and endorsement and also to Treasury for inclusion in the State Government budget process. The process results in a five year capex plan agreed by Treasury. ▪ In May each year, a one year capex plan is provided to the Board for approval and sign-off and this sets the capex program and budget for the following financial year. ▪ A full register of all of Water Corporation's capital projects and programs is recorded in SAP.	▪ Program Management Guideline, Doc ID 2721044, version date 28 January 2015, next review date 28 January 2017. ▪ Strategic Investment Business Case (SIBC) Author Guideline, Doc ID 9786937 v1, version date Nov 2013, next review Nov 2015. ▪ Executive Summary – Asset Investment Program 2015/16 to 2019/20, Board Meeting November 2014, PM# 11714657, dated 11 Nov 2014. ▪ PCY112 Delegated Financial and Legal Authorisations, Doc ID 410999, version date 17 Nov 2014, next review date 30 Nov 2015. ▪ S072 Financial Authorisation standard, Doc ID 411000, version date 1 July 2015, next review date 30 Nov 2015. ▪ PCY263 Capitalisation policy, Doc ID 428676, version date 14 Nov 2013, next review date 14 Nov 2016. ▪ Water Corporation Business Plan, Aqua Doc# 12046632 and 12874280, dated 19 May 2015. ▪ Executive Summary – Capital Investment Budget 2015/16, Board Meeting, PM# 12604016, dated May 2015. ▪ Araluen Pumpback Station Source Value [Development Plan], aquaDOC# 9227263, endorsed on 21/08/2013. ▪ Frankland Rocky Gully Planning Review [Development Plan], aquaDOC# 12581839, dated March 2015. ▪ Woodman Point Potable Reuse Options [Development Plan], aquaDOC# 12203559, dated June 2015. ▪ Yanchep Water Supply Scheme 2013 Short Term Source Planning [Development Plan], aquaDOC# 8634106, dated July 2013. ▪ Gravity Sewers Asset Class Strategies, PM# 6900493, dated November 2012.

Effectiveness Criteria	Observations	Evidence reviewed
	Budget Process ▪ Refer to Financial Planning section. ▪ In addition to the guidelines for developing the macro and micro budget, Water Corporation also has a 'Program Management Guideline', (Doc ID 2721044, version date 28 January 2015, next review date 28 January 2017). This document provides an overview of program management for the purposes of managing the Capital Investment Program. Program management integrates the projects funded by the Approved Capital Investment Program with the strategic direction of the Water Corporation. ▪ Water Corporation also has an 'S066 Manage Finance – Evaluate Investments' standard (Doc ID 367574, version date 24 June 2015, next review 24 June 2018). The purpose of this document is to ensure that the likely financial outcome of proposed investments is clearly understood. All investments and investment options, including staging options, are subject to financial analysis using the Discounted Cash Flow methodology. **Financial Delegation and Authorities** ▪ Refer to Financial Planning section.	▪ Wastewater Pressure Mains, Pump Stations and Vacuum Sewer Systems Asset Class Strategy, PM# 9364160, dated April 2014.
▪ The plan provides reasons for capital expenditure and timing of expenditure	▪ Water Corporation uses Strategic Investment Business Cases (SIBCs) to justify the projects included in its capital program. Each SIBC drives business outcomes with capital requirements. The SIBCs are completed for each level/type of service (e.g. corporate, water, wastewater, drainage, irrigation) and provide a 20 year view of the issues/drivers, asset risks, available options, project scope, costs, timings, changes in risk profiles and the impact on the business. ▪ Executive endorsement of the SIBCs drives the Corporation's capital requirements from the top-down and this is supported by a bottom-up approach from the different Branches within the Corporation to assess capex projects that it needs in a five year timeframe. ▪ Previously Water Corporation had a set capex budget for each year but has moved away from this approach in the last few years, with the bottom-up approach considered to be a more effective and efficient methodology to develop the capital program. ▪ Capex projects are risk scored using the Corporate risk system. Projects must also comply with business outcomes and must be critically assessed. For growth-related projects, the System Capability Matrix is used to derive a risk score at a system/scheme level and scheme projects are identified to mitigate the risks. For renewals-based capex projects, the Asset Risk Assessment tool is used to score the risks for specific assets. ▪ SIBCs have a two year life before they are required to be reviewed and updated. Although they form a 20 year view of the future capital needs, the information included in the documents is brought down to a ten year horizon for submission to Treasury and to a five year timeframe for inclusion in the Corporation's Strategic Development Plan.	▪ Statement of Corporate Intent 2014/15, June 2014 ▪ Water Corporation Strategic Development Plan ▪ Water Corporation Business Plan, Aqua Doc# 12046632 and 12874280, dated 19 May 2015. ▪ Water Corporation Operating Budget Pack 2015-16, Board Meeting, 15 December 2014 ▪ Water Corporation Financial Corporate Model ▪ Executive Summary – Asset Investment Program 2015/16 to 2019/20, Board Meeting November 2014, PM# 11714657, dated 11 Nov 2014. ▪ Executive Summary – Capital Investment Budget 2015/16, Board Meeting, PM# 12604016, dated May 2015. ▪ Araluen Pumpback Station Source Value [Development Plan], aquaDOC# 9227263, endorsed on 21/08/2013.

Effectiveness Criteria	Observations	Evidence reviewed
	▪ The risk appetite/tolerance for each asset portfolio is assessed in the investment decision process that Water Corporation is currently developing and this is expected to flow back into the SIBCs to provide further information to be used in the prioritisation process. ▪ Every SIBC has the same criteria for safety, environment, service, security and compliance. This consistency between the different SIBCs allows projects in different portfolios to be compared against each other and establishes a business decision as to which identified projects are moved forwards and which are deferred. ▪ Water Corporation has a state-wide, proactive fire hydrant replacement program that is run centrally from the Leederville office and funded as a capital program. Prioritisation of the hydrant renewals is carried out with input from the Department of Fire and Emergency Services (DFES) to take high fire risks into consideration. ▪ Specific reasons for capital expenditure and timing of expenditure can be found in the Development Plans provided by Water Corporation: – 'Araluen Pumpback Station Source Value', aquaDOC# 9227263, endorsed on 21/08/2013. – 'Frankland Rocky Gully Planning Review', aquaDOC# 12581839, dated March 2015. – 'Woodman Point Potable Reuse Options', aquaDOC# 12203559, dated June 2015. – 'Yanchep Water Supply Scheme 2013 Short Term Source Planning', aquaDOC# 8634106, dated July 2013. ▪ Executive Summary – Asset Investment Program 2015/16 to 2019/20, Board Meeting November 2014, PM# 11714657, dated 11 Nov 2014, and Executive Summary – Capital Investment Budget 2015/16, Board Meeting, PM# 12604016, dated May 2015 outline at high level the reasons for, and timing of (normally for budget smoothing), capital expenditure. ▪ Water Corporation provided its 'Water Corporation Business Plan' (Aqua Doc# 12046632 and 12874280, dated 19 May 2015), which provides a high level overview of the Corporation's overall business plan for a three year period. ▪ Water Corporation also provided a copy of the Operating Budget Pack for 2015/16 that was provided for a Board meeting on 15 December 2014. The pack includes the financial forecasts that form the basis of the 2015/16 Statement of Corporate Intent and the 2015/16 – 2019/20 Strategic Development Plan. This build on the assumptions presented to the Board in the November 2014 report (Executive Summary – Asset Investment Program 2015/16 to 2019/20, Board Meeting November 2014, PM# 11714657, dated 11 Nov 2014).	▪ Frankland Rocky Gully Planning Review [Development Plan], aquaDOC# 12581839, dated March 2015. ▪ Woodman Point Potable Reuse Options [Development Plan], aquaDOC# 12203559, dated June 2015. ▪ Yanchep Water Supply Scheme 2013 Short Term Source Planning [Development Plan], aquaDOC# 8634106, dated July 2013.
▪ The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan	▪ The asset lives used by Water Corporation are set out for each asset type in the SIBCs. Asset lives are also included in the Corporation's financial system, where they are used for calculating depreciation. ▪ As a project closes out, the project manager provides details of the spend against the asset structure to allow the Finance branch to use data for the asset life depreciation. ▪ Water Corporation provided its Asset Class Strategies (Asset Management Plans) and a number of specific business case documents. We observed that not all of the Asset Class Strategies set out the asset lives, with links provided to other supporting design specification documents. Links to supporting maintenance and renewals strategies are also included in the	▪ Gravity Sewers Asset Class Strategies, PM# 6900493, dated November 2012. ▪ Wastewater Pressure Mains, Pump Stations and Vacuum Sewer Systems Asset Class Strategy, PM# 9364160, dated April 2014. ▪ PM-#12369504 Water Reticulation Valves Program Business Case, Jun 2015

Effectiveness Criteria	Observations	Evidence reviewed
	strategies. However, where the asset lives have been explicitly stated in the Asset Class Strategies, we confirmed that they are consistent with asset life information included in the project/program documentation and are in line with accepted industry standards.	▪ PM-#7950069 Water Reticulation Asset Class Strategy, March 2013 ▪ PM-#7950069 Water Reticulation Asset Class Strategy ▪ PM-#10143421 SIBC Renewals Water Mains, April 2014 ▪ PM-#10991212 CBD Renewal Program Business Case, June 2014 ▪ PM-#7603054 Meters Asset Class Strategy, December 2012 ▪ PM-#7603054 Meters Asset Class Strategy, April 2012 ▪ PM-#10215123 SIBC Renewals Water Production and Storage, April 2014 ▪ PM-#10215123 SIBC Renewals Water Production and Storage ▪ PM-#11201391 Meter Replacement Program Business Case, April 2015 ▪ PM-#11201391 Meter Replacement Program Business Case ▪ PM-#10990884 Switchgear Asset Class Strategy, June 2014 ▪ PM-#10427193 SIBC Wastewater Pumping and Treatment Assets, Feb 2014 ▪ PM-#8092960 Farmlands Reticulation Asset Class Strategy, June 2013 ▪ PM-#13566711 Farmlands Capital project Business Case, July 2015 ▪ PM-#13349325 Farmlands TOTEX Program Business Case, May 2015
▪ There is an adequate process to ensure that the capital expenditure plan is regularly updated and actioned	**Overview of Review Processes** ▪ Water Corporation has a number of review processes for developing and accessing progress for its capital program. ▪ The Water Corporation's comprehensive Capital Investment Program and project cost management processes involve regular meetings between Program Managers, Project Directors, Project Managers, Cost Analysts and Estimators and project and program reporting on a daily, weekly, monthly, quarterly and annual basis.	▪ Capital Project records and reports in SAP ▪ Macro Budgeting Guidelines 2015/16, PM# 9476463. ▪ Program Management Guideline, Doc ID 2721044, version date 28 January 2015, next review date 28 January 2017. ▪ PM-#10638129 Capital Program Delivery Report – September 2015

Effectiveness Criteria	Observations	Evidence reviewed
	▪ A Governance process is in place to oversee the Corporation's program management. Water Corporation has developed Terms of References for the committees that review, approve and monitor capital projects. **Recording of Capital Projects Data** ▪ The process of creating a Functional Location ID is completed early on in a capital project to register the asset and allow information to be recorded. This can be done as much as 12 months before the detailed design is commenced. ▪ When a capex project is settled, it goes through a process to survey the financial assets and register the different asset types. This ensures that there is a relationship between the data recorded in the Corporation's Financial Register and the master data that relates to the facility and means that financial asset information can be accessed from the Functional Locator information for a capital asset. ▪ New capital projects are also registered in Water Corporation's geo special system. As Constructed drawings are recognised in the system as actual assets and the Functional Locator ID is assigned to the drawings to relate them back to the built asset. ▪ During the review we observed a demonstration of the SAP-FICO module and confirmed the Functional Location of the assets via a Function Location Asset Report that can be generated from the system. This report includes the replacement value of the asset based on an indexed value. **Reporting Capital Expenditure Projects** ▪ Data and reporting tools from project estimates, schedules and cash flow are managed using Primavera and SAP and used to manage projects and program. Water Corporation has a series of reports related to its capital planning activities that it can run from SAP and from the business data warehouse portal: – Water Corporation is able to report on all of its capital expenditure projects at a project level using the '220' series of reports from SAP. These reports provide the project background, including the needs and scope statements, as well as the expenditure profiles that show forecast against actual expenditure, month-by-month forecast cash flow and milestone dates. Expenditure data and progress is updated by the project managers through the life of the project. The reports are linked with SAP. – A '201' report is also able to be generated from SAP to provide the Approved Program Report: Overview. This shows the whole year's capital program and is able to be drilled down to provide much more detailed information and data on specific projects. ▪ Additional reports that can be run from SAP include: – ZR210 – Reports the approved capital program – ZR2015 – Reports the five year snapshot of the capital program – ZR170 - Reports an overview of project milestones, from Activation to Practical Completion.	▪ PM-#1647660 Capital Investment Management Committee Terms of Reference Feb 2009. ▪ PM-#1647638 Capital Investment Committee Terms of Reference Feb 2009

Effectiveness Criteria	Observations	Evidence reviewed
	– ZR50 – Reports the work breakdown of all the costs and where the costs are being incurred, including actual expenditure and cash flow for a project. ▪ Project information is stored in hard copy for seven years in accordance with the Corporation's audit and document management requirements. ▪ Progress and issues related to capital projects are reported to the Board in the monthly Business Performance report. In addition, the Board is provided with a five year and one year paper for projects in these timeframes. A quarterly report to the Board includes information on major capital projects completed in the quarter and contracts coming up in the forthcoming three month period. ▪ Dates in Macro Budgeting Guidelines 2015/16, PM# 9476463 outlines the process for identifying new capital expenditure programs is undertaken annually. ▪ Pages 19-21 of Program Management Guideline, Doc ID 2721044, version date 28 January 2015, next review date 28 January 2017, detail the requirements for review and reporting of individual programs, program schedule optimisation and program budget change etc. ▪ Water Corporation provided PM-#10638129 Capital Program Delivery Report – September 2015 which provide a monthly and YTD update of budget against actual expenditure. The reporting provides the updates by geographic region and by responsible Branch within the Business.	

Table 5-12 Asset Management System Review Observations for Review of AMS

Effectiveness Criteria	Observations	Evidence reviewed
▪ Review of AMS		
▪ A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current	▪ During our initial review of the asset management documentation provided to us by Water Corporation, which was carried out in advance of the site work, we observed that a large number of Water Corporation's documents were out of date, with the review date having passed with no updates being recorded. ▪ These included: – 'PCY223 Infrastructure Asset Management' policy, Doc ID 364852, version date 09/07/2012, next review date 09/07/2015, which specifies reviews are undertaken, although does not specify any frequencies. The policy itself has a 'next review date', although this is slightly out of date (09/07/2015). – Page 2 of the Strategic Asset Management Plan 2012/13 – 2032/33, PM#5756948 indicates that the document is to be reviewed annually. However, the approval date is shown as February 2012, i.e. this document is out of date. – Asset Risk Assessment (ARA) Business Rules guidance document does not have a document number, suggesting that it is not being regularly reviewed. – Plan Assets guidance document, Doc ID# 9236611, dated 01/07/13, has a next review date of 01/07/14, i.e. is out of date. – Optioneering – Workshop Guide & Checklist, document #7607012-v1, does not have a date, suggesting that it is not being regularly reviewed. – System Capability Forecasting (SCF) user manual, Doc ID 5754454, dated 25/04/2012, has a next review date of 01/07/2014, i.e. it is out of date. ▪ However, as noted previously, Water Corporation has held off on the 2015 reviews and updates of its documents as a result of the changes to the business that are currently being carried out. Once the restructure of the organisation has been completed, Water Corporation intends to complete these late reviews of its documents in order to better allocate ownership of the documents and align them with the new structure. ▪ Water Corporation noted that the update of PCY 223 Infrastructure Asset Management policy will, therefore, be included in the next phase of implementation of the to-be-established Assets Strategy Branch in Assets Planning Group. ▪ Water Corporation confirmed that the Strategic Asset Management Plan was reviewed in 2013 and a refreshed version was finalised in 2014. This updated version was provided as evidence. ▪ Water Corporation has also developed a draft Asset Management Strategy (SAMP) 2015 but work on this has not finished due to the organisational changes and resource limitation. ▪ Although it was identified that the Asset Risk Assessment Rules document did not have a document reference number, Water Corporation regard this more a guidance document than a policy. However, it confirmed that the last review was completed in July 2014 and that a document control table has now been included to allow version control to be recorded. The	▪ PCY223 Infrastructure Asset Management, Doc ID 364852, version date 09/07/2012, next review date 09/07/2015. ▪ Strategic Asset Management Plan 2012/13 – 2032/33 PM #5756948. ▪ Asset Risk Assessment (ARA) Business Rules guidance document, no document number. ▪ Plan Assets guidance document, Doc ID# 9236611, dated 01/07/13. ▪ Optioneering – Workshop Guide & Checklist, document #7607012-v1, no date. ▪ System Capability Forecasting (SCF) user manual, Doc ID 5754454, dated 25/04/2012. ▪ Strategic Asset Management Plan 2014/15 ▪ PM-#13410801 Asset Management Strategy Update, August 2015

Effectiveness Criteria	Observations	Evidence reviewed
	document has also been registered in the Corporation's CorDocs document management system, meaning that a reminder will be issued to the custodian when a review is next required. ▪ Water Corporation confirmed that the Optioneering Workshop Guide & Checklist (document #7607012) was last edited in October 2014, i.e. less than a year ago. It noted that as it is neither a policy doc nor a "Cordocs" document, it does not have a review date. However based on our initial finding, the absence of any version control has been noted and Water Corporation intend to add a review date to the document. ▪ Water Corporation confirmed that the SCF manual is loaded on its intranet site and has been going through a sustained period of continuous development. During this time a comprehensive online help function has been added to the software.	
▪ Independent reviews (e.g., internal audit) are performed of the asset management system	▪ Internal audits within Water Corporation are the responsibility of the Risk and Assurance Branch. These audits include asset management processes. Water Corporation provided the register of completed asset management process audits and we observed that the following internal audits have been completed since 2012/13: – Integrated Operations Maintenance and Asset Management Alliances - Contract Management and Governance – Asset Pre-funding Process – Regulatory Compliance – Operating Licence and AMSER – Competency of Operational & Maintenance Work – SCADA Use – Operations Centre – Decommissioning and Disposal of Assets – Management of Buried Assets – Assets Handover Processes – Quality of Assets – Asset Acquisition Process (End to End) – Preparation and Follow up of Operating Licence and AMSER Audit Findings. – Quality of Information about the Age and Condition of Assets near Critical Areas within Perth Metropolitan Area – Coordinate the Replacement of Aging Urban Pipes with other Planned Road Work Activities – Consolidation of Information about Major and Significant Bursts and Leaks – Competency of Operational and Maintenance Work – Stage 2 – Water Treatment Plants Activities - Country Regions ▪ In addition, Water Corporation has recently conducted an extensive review of its asset management system which has been fed into recent restructuring within the business. REFRESH has also been initiated to manage the review and implementation of systems and processes to support a more aligned and integrated asset management framework. Although	▪ PM-#12971920 Asset Measure within OPI Component of Corporate TBR 2015 - Full Report with Measures ▪ PM-#12363068 WSAA Aquamark Final Report 2012 ▪ PM-#13795792 WSAA ISO55001 Utility Report - Water Corporation ▪ PM-#13763604 Internal Audit - Assets Management Reviews - 1 July 2012 to 30 June 2015 ▪ PM-#12433833 Business Case for Refresh Program ▪ Asset Management System Effectiveness Review, dated February 2013 (Odysseus-imc). ▪ 2012 Post Review Implementation Plan, dated February 2013 (Odysseus-imc) ▪ Letter from ERAWA in response to the 2012 Review, ERAWA ref D121177, PM# 11122823, dated 15/4/2014.

Effectiveness Criteria	Observations	Evidence reviewed
	occurring outside the review period, throughout our review, we observed the impacts of this restructure and its implementation. ▪ The Corporation has a target-based remuneration scheme that includes an asset management component in the scoring process that assesses where improvements have been realised. The target-based remuneration scheme impacts on the executive and permanent staff. ▪ The Corporation undertakes an annual review of its asset management system through this Target Based Rewards system which uses the WSAA Aquamark Framework and Tool to annually assess the effectiveness of its asset management processes. The outcomes feed overall business planning. ▪ The AquaMark asset management benchmarking and process improvement review is completed every four years. Water Corporation uses the outcomes from the AquaMark framework for its annual review process of its asset management activities. The recommendations are recorded in the Corporation's Strategic Asset management Plan (SAMP) and Business Plan for action. Every year the Corporation's Risk and Assurance Branch review the progress against the improvement recommendations coming out of the AquaMark process. ▪ Water Corporation has played a significant role as a Steering Committee member assisting in shaping the new Aquamark Framework as aligned with ISO 55001. WC also project managed the ISO 55001 Implementation Guideline on behalf of WSAA. ▪ Water Corporation has conducted an external ISO 55001 gap analysis and is looking to align its asset management framework to ISO 55001 for its asset management systems. In addition, the Aroona Alliance has Quality, Environment, Safety and Energy certification taking place before the end of 2015. As the Aroona Operational Asset Management systems and process are aligned to the Water Corporation Strategic Asset Management Plan, Aroona will follow the direction taken by Water Corporation. Aroona is aligning to ISO55000 but not seeking certification at present. ▪ Water Corporation had an Asset Management System Effectiveness Review undertaken by a third party in 2012 (report issued February 2013). With the undertaking of the current review in 2015, this satisfies the requirement of the Operating Licence for undertaking such a review every three years. ▪ Water Corporation had a '2012 Post Review Implementation Plan' created by third party Odysseus-imc. ▪ Water Corporation received a letter from ERAWA in response to the 2012 Review, ERAWA ref D121177, PM# 11122823, dated 15/4/2014, acknowledging that Water Corporation had completed 32 recommendations and partially completed five recommendations. ▪ During the discussions for the Review of the AMS section, there was uncertainty relating to whether Water Corporation has a Correction Action Register (CAR) system that is used to record deficiencies and improvements recommendations/opportunities so that actioning them can be managed, with reminders automatically sent out to the responsible officers and escalation if they are not completed within the set timeframes. We recommend that Water Corporation reviews this to confirm whether it has a corporate CAR system and, if not, looks to implement such a system.	

6 Recommendations

6.1 Asset Management System Review

Table 6-1 Table of Current Review Asset System Deficiencies/Recommendations

A. Resolved during current Review period			
Ref.	**Asset System Deficiency (Rating / Asset Management System Component & Effectiveness Criteria / Details of Asset System Deficiency)**	**Date Resolved (& management action taken)**	**Auditor's Comments**

B. Unresolved at end of current Review period			
Reference (no./year)	**Asset System Deficiency (Rating / Asset Management System Component & Effectiveness Criteria / Details of Asset System Deficiency)**	**Auditor's recommendation**	**Management action taken by end of Review Period**
4/2013	*Asset Planning - Asset management plan covers key requirements.* The previous review report noted the following: ▪ The AM Branch is replacing Asset Class Plans with Strategic Statements. The 2013 recommendation was for Water Corporation to complete the remaining 17 Strategic Statements. WC has completed asset class strategies for 15 Asset Class Strategies. The need for the remaining Strategies is currently being reviewed.	We recommend that Water Corporation complete the remaining Asset Class Strategies, should they be required.	Water Corporation has completed a number of actions related to this recommendation which have been detailed in Section 3.1 Table C to this report.
7/2013	*Asset Planning - Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning.* The previous review report noted the following: ▪ Good quality data for strategic planning is not currently available. The 2013 recommendation was that there needs to be a joint effort by the central group and	We recommend that Water Corporation complete this recommendation by commencing implementation of data standards that have been developed, prioritised by business value.	Water Corporation has completed a number of actions related to this recommendation which have been detailed in Section 3.1 Table C to this report.

B. Unresolved at end of current Review period			
	regions to improve quality and accuracy of data. Water Corporation has completed a number of actions related to this recommendation which have been detailed in Section 3.1 Table C to this report.		
8/2013	*Asset Planning - Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning.* The previous review report noted the following: ▪ Good quality data for strategic planning is not currently available. The 2013 recommendation was that Water Corporation's data collection KPIs process need to be re- initiated to ensure the collection of the data is undertaken in a timely manner.	Refer back to the recommendation for 7/2013.	Water Corporation has completed a number of actions related to this recommendation which have been detailed in Section 3.1 Table C to this report.
17/2013	*Asset Operations - Staff resources are adequate and staff receive training commensurate with their responsibilities.* The previous review report noted the following: ▪ While operational data is being captured, good quality data is not being captured to support operations. The 2013 recommendation was for Water Corporation to extend current training to provide operators in the field with the importance of data collection, the role they play in asset management and how their job is important to the greater business outcomes.	We recommend Water Corporation complete this recommendation to support implementation of prioritised data standards referenced in 7/2013.	Water Corporation has completed a number of actions related to this recommendation which have been detailed in section 3.1 Table C to this report.
18/2013	*Asset Operations - Operational policies and procedures are documented and linked to service levels required.* The previous review report noted the following: ▪ Good quality data is not being captured to support operations. Based on the review, gaps in the asset and asset attributes currently	We recommend that Water Corporation consider the need for further actions, pending the outcome of the Aroona Alliance trial.	Water Corporation has completed a number of actions related to this recommendation which have been detailed in Section 3.1 Table C to this report.

B. Unresolved at end of current Review period			
	exist. Also the maintenance data being recorded in the region reviewed is inconsistent and difficult to interpret. The 2013 recommendation was that asset related data capture should be embedded into normal operational activities by Water Corporation. Aroona has an initiative to improve collection of asset condition data from the field, capturing condition data as part of routine maintenance activities at Beenyup WWTP. Condition data capture rates are up to 85%. Another trial commenced early in 2015 based on tagging equipment with its Functional location (FL). Over half the assets have now been physically tagged.		
20/2013	*Asset Operations - Operational policies and procedures are documented and linked to service levels required.* The previous review report noted the following: ▪ SCADA data is collected, however a plan is needed that guides the use of this data for planning purposes. The 2013 recommendation was for Water Corporation to develop a plan on how to utilise SCADA data for all asset classes, e.g. Data to be used, what purpose and what asset class and to incorporate the use of the Data Historian within the plan. Although Water Corporation has updated its Dynamic Data Standards to include SCADA sourced information. However, the implementation of the Data Standards into its business processes is currently on hold pending the outcome of the corporate 'Refresh" system platform review.	We recommend that Water Corporation implement the SCADA Data Standards into its business processes, prioritised by business value.	Water Corporation has completed a number of actions related to this recommendation which have been detailed in section 3.1 Table C to this report.
21/2013	*Asset Maintenance - Maintenance policies and procedures are documented and linked to service levels required.*	We recommend that Water Corporation update maintenance standards and procedures to reflect the new business structure.	Water Corporation has completed a number of actions related to this recommendation which have

B. Unresolved at end of current Review period			
	The previous review report noted the following: ▪ The current documentation process needs to be completed. The 2013 recommendation was for Water Corporation to continue to review and complete process documentation including maintenance standards and procedures. Water Corporation has completed a number of actions related to this recommendation which have been detailed in Section 3.1 Table C to this report. However, due to a restructure completed outside of this review period, the documentation will need to again be updated to reflect the new business structure.		been detailed in Section 3.1 Table C to this report.
22/2013	*Asset Maintenance - Maintenance policies and procedures are documented and linked to service levels required.* The previous review report noted the following: ▪ The maintenance standards are stored in a library (spreadsheet) and incorporated in SAP for new assets. 83% of the asset base is covered by the new generation maintenance standards. The 2013 recommendation was for Water Corporation to complete the maintenance standards for the asset base. Water Corporation has completed a number of actions related to this recommendation which have been detailed in section 3.1 Table C to this report. However, due to a restructure completed outside of this review period, the documentation will need to again be updated to reflect the new business structure.	Refer to 21/2013 We recommend that Water Corporation complete the maintenance standards and procedures once the current business changes and restructure have been completed.	Water Corporation has completed a number of actions related to this recommendation which have been detailed in section 3.1 Table C to this report.
26/2013	*Asset Maintenance - Failures are analysed and operational /*	We recommend that Water Corporation formalises its	Water Corporation has completed a number of

B. Unresolved at end of current Review period			
	maintenance plans adjusted where necessary. The previous review report noted the following: ▪ Fault mode analysis is being applied inconsistently. The 2013 recommendation was for Water Corporation to formalise fault mode analysis and develop guidelines for data requirements and analysis. Although Water Corporation's fault and Position Code specification is sound, user ability to select appropriate equipment has been flagged as an issue. Water Corporation has identified an action to undertake an end-to-end review of the information flow to identify process and system pinch points is to be undertaken. This will result in fault mode analysis being formalised and the development of guidelines for data requirements and analysis.	approach to fault mode analysis and develops guidelines to assist in its application.	actions related to this recommendation which have been detailed in section 3.1 Table C to this report.
27/2013	*Asset Maintenance - Regular inspections are undertaken of asset performance and condition.* The previous review report noted the following: ▪ Data is entered into the maintenance management system inconsistently resulting in poor quality supporting data. The 2013 recommendation was for Water Corporation to improve the quality of data being fed back into the work orders by providing documented direction and support for maintenance personnel. The actions that Water Corporation developed for completing this recommendation were: 1. Review the detailed data needs for the maintenance process, including data integrity requirements and source system.	We recommend that Water Corporation completes the actions it has developed to address the 2013 recommendation. It has amended the original dates for completing each of the four actions to the following dates: 1. December 2015 2. January 2016 3. March 2016 4. June 2016	Water Corporation has completed a number of actions related to this recommendation which have been detailed in section 3.1 Table C to this report.

B. Unresolved at end of current Review period			
	2. Implement system changes and changes to collection processes where required. 3. Develop reports to review and validate the data and to KPI's monitor process compliance. 4. Monitor data on a regular basis and feedback KPI's and non-compliance to Field Users. However, the original dates for completing these actions were not achieved during the review period.		
28/2013	*Asset Maintenance - Regular inspections are undertaken of asset performance and condition.* The previous review report noted the following: ▪ Good quality data is not being captured to support asset information and analysis. The 2013 recommendation was for Water Corporation to incorporate the data capture as part of planned maintenance and/or inspections as part of normal operations. Although Water Corporation has completed most of the actions associated with this recommendation, it will need to review additional feedback requirements following the actions included in 27/2013.	We recommend that Water Corporation completes the actions it has developed to address the 2013 recommendation.	Water Corporation has completed a number of actions related to this recommendation which have been detailed in section 3.1 Table C to this report.
35/2013	*Risk Management - Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system.* The previous review report noted the following: ▪ Application of Asset Risk Assessment in the regions can be greatly improved. The 2013 recommendation was for Water Corporation to improve the application of the Asset Risk Assessment in the regions.	We recommend that this recommendation be superseded by recommendations R1/2015 and R2/2015 of this review.	Water Corporation has completed a number of actions related to this recommendation which have been detailed in section 3.1 Table C to this report.

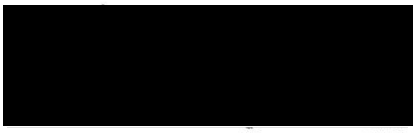
B. Unresolved at end of current Review period			
	However, our review found that there is still opportunity to improve use of the asset risk assessment tool.		
49/2013	*Contingency Planning - Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks.* The previous review report noted the following: ▪ A formal and prioritised approach to contingency planning is required. The 2013 recommendation was for Water Corporation to consider prioritising the update of contingency plans based on risk, in addition to the current update frequencies, e.g. use the ARA process to identify high risk assets and then update the associated contingency plan. As a result, the relationship between ARA and Contingency plans was scoped. Water Corporation commenced definition work in July 2014 and agreed the conceptual needs related to developing a formal and prioritised approach to contingency planning. However, the further detailed definition that was necessary to complete the application programming scoping phase of the work was delayed due to other higher branch priorities. Due to the current activities surrounding the Business Review, all 'new' work was halted by Water Corporation and this has had a direct impact on the development work that had been proposed for this project. Water Corporation has completed a number of actions related to this recommendation which have been detailed in section 3.1 Table C to this report. However, it has not completed all of the actions that it were proposed to complete the recommendation.	We recommend that this recommendation be superseded by recommendation R5/2015 of this review.	Water Corporation has completed a number of actions related to this recommendation which have been detailed in section 3.1 Table C to this report.
R1/2015	*B2* *Risk Management - The probability and consequence of risk failure are regularly assessed*	We recommend that Water Corporation review its guidance material for the Asset Risk Assessment too with a group of users (input and end users) to identify any areas of ambiguity in	

B. Unresolved at end of current Review period		
	We found that Water Corporation staff take differing approaches to completing asset risk assessments	the guidance provided or opportunities for improvement.
R2/2015	*B2* *Risk Management - The probability and consequence of risk failure are regularly assessed* *We found that Water Corporation staff take differing approaches to completing asset risk assessments*	We recommend that Water Corporation communicates to all users of the Asset Risk Assessment tool its desired approach to scoring the likelihood and consequence of asset risks. That is, whether the risk scorer is to consider business as usual operations, a worst case scenario or some other operating context when undertaking the scoring. This communication should occur after the findings from the previous recommendations are endorsed.
R3/2015	*B2* *Risk Management - The probability and consequence of risk failure are regularly assessed* *We found that a number of risk rated as "high" in the System Risk Assessment tool had not been reviewed and endorsed in the desired timeframe*	We recommend that Water Corporation reviews all existing System Risks to identify high risks that are overdue for review and/or endorsement and completes the scheduled review and/or endorsement of the risks.
R4/2015	*B2* *Risk Management - The probability and consequence of risk failure are regularly assessed* *We found that a number of risk rated as "high" in the System Risk Assessment tool had not been reviewed and endorsed in the desired timeframe*	We recommend that Water Corporation reviews the review and endorsement process (activities and timing) for system risks to confirm if the current approach is appropriate for its business needs and implements any changes that it determines are necessary
R5/2015	*B3* *Contingency Planning -* Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks	We recommend that Water Corporation identifies for its operations the desired: a) level of application b) coverage and c) contents of contingency plans, and implements contingency planning consistently using these criteria through a program of activity.
R6/2015	*A1* *Capital Expenditure Planning - The plan provides reasons for capital expenditure and timing of expenditure* We noted during the site visit to Newman that Water Corporation's sewer access chamber covers are not	We recommend that Water Corporation reviews its capitalisation policy to confirm whether the access chamber lids should be treated as capital assets.

B. Unresolved at end of current Review period		
	capitalised assets. This policy differentiates from numerous other Australian water businesses, where the covers are considered to be capital expenditure items. We also note that some of the work to replace the lids has involved construction work to alter the size of the chamber due to it being covered and needing to be raised back to ground level.	
R7/2015	*A1* *Review of AMS - A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current* During the discussions for the Review of the AMS section, there was uncertainty relating to whether Water Corporation has a Correction Action Register (CAR) system that is used to record deficiencies and improvements recommendations/opportunities so that actioning them can be managed, with reminders automatically sent out to the responsible officers and escalation if they are not completed within the set timeframes.	We recommend that Water Corporation reviews this to confirm whether it has a corporate CAR system and, if not, looks to implement such a system.

7 Confirmation of the Asset Management System Review

I confirm that the review carried out at the Water Corporation on Monday 19 to Friday 23 October 2015 and recorded in this report is an accurate presentation of our findings and opinions.



Stephen Walker
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11 February 2016

APPENDIX A
RISK MANAGEMENT FRAMEWORK

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Types of Compliance Risk

Type of Risk	Examples
Supply quality and reliability	Delays in new connections, excessive supply interruptions, supply quality standards not met.
Consumer protection	Customer service levels not met, incorrect bills, disconnection and reconnection standards not met, customers unable to access financial hardship assistance.
Legislation/licence	Breach of industry Acts, regulations and codes, contravention of licence conditions.

Risk Assessment Rating Scales

The consequence, likelihood, inherent risk and adequacy of internal controls are assessed using a 3-point rating scale as described below. The rating scale is as per the Economic Regulation Authority's Audit and Review Guidelines: Water Licences, July 2014.

Consequence Rating

The consequence rating scale is outlined below.

	Rating	Supply Quality and Reliability	Consumer Protection	Breaches of Legislation or Other Licence Conditions
1	Minor	Breaches of supply quality or reliability standards – affecting small number of customers. Delays in providing a small proportion of new connections.	Customer complaints procedures not followed in a few instances. Small percentage of disconnections or reconnections not completed on time. Small percentage of bills not issued on time.	Legislative obligations or licence conditions not fully complied with, minor impact on customers or third parties. Compliance framework generally fit for purpose and operating effectively.
2	Moderate	Supply quality breach events that significantly impact customers; large number of customers affected and/or extended duration and/or damage to customer equipment. Supply interruptions affecting significant proportion of customers on the network for up to one day. Significant number of customers experiencing excessive number of interruptions per annum. Significant percentage of new connections not provided on time/ some customers experiencing extended delays.	Significant percentage of complaints not being correctly handled. Customers not receiving correct advice regarding financial hardship. Significant percentage of bills not issued on time. Ongoing instances of disconnections and reconnections not completed on time, remedial actions not being taken or proving ineffective. Instances of wrongful disconnection.	More widespread breaches of legislative obligations or licence conditions over time. Compliance framework requires improvement to meet minimum standards.
3	Major	Supply interruptions affecting significant proportion of customers on the network for more than one day. Majority of new connections not completed on time/ large number of customers experiencing extended delays.	Significant failure of one or more customer protection processes leading to ongoing breaches of standards. Ongoing instances of wrongful disconnection.	Wilful breach of legislative obligation or licence condition. Widespread and/or ongoing breaches of legislative obligations or licence conditions. Compliance framework not fit for purpose, requires significant improvement.

Likelihood Ratings

The likelihood rating scale is described below.

	Level	Description
A	Likely	Non-compliance is expected to occur at least once or twice a year
B	Probable	Non-compliance is expected to occur once every three years
C	Unlikely	Non-compliance is expected to occur once every 10 years or longer

Inherent Risk Assessment Rating and Description

The inherent risk rating is based on the combined consequence and likelihood rating. The inherent risk assessment rating scale and descriptions are outlined below.

Likelihood	Consequence		
	Minor	**Moderate**	**Major**
Likely	Medium	High	High
Probable	Low	Medium	High
Unlikely	Low	Medium	High

Level	Description
High	Likely to cause major damage, disruption or breach of licence obligations
Medium	Unlikely to cause major damage but may threaten the efficiency and effectiveness of service
Low	Unlikely to occur and consequences are relatively minor

Adequacy Ratings for Existing Controls

The adequacy of existing internal controls is also assessed based on a 3-point scale as indicated below.

Level	Description
Strong	Controls that mitigate the identified risks to an appropriate level
Moderate	Controls that only cover significant risks; improvement required
Weak	Controls are weak or non-existent and have minimal impact on the risks

Assessment of Review Priority

The assessment of review priority is used to determine the audit objectives, the nature of audit testing and the extent of audit testing required. It combines the inherent risk and risk control adequacy rating to determine the priority level.

Inherent Risk	Adequacy of Existing Controls		
	Weak	**Medium**	**Strong**
High	Audit Priority 1	Audit Priority 2	
Medium	Audit Priority 3	Audit Priority 4	
Low	Audit Priority 5		

APPENDIX B

ASSET MANAGEMENT PERFORMANCE RATING DEFINITIONS

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Asset Management Review Rating Scales

The asset management review utilises a combination of asset management adequacy ratings and asset management performance ratings, which are outlined below. These are based on the Economic Regulation Authority's Audit and Review Guidelines: Water Licences, July 2014.

Asset Management Adequacy Ratings

Rating	Description	Criteria
A	Adequately defined	▪ Processes and policies are documented. ▪ Processes and policies adequately document the required performance of the assets. ▪ Processes and policies are subject to regular reviews, and updated where necessary. ▪ The asset management information system(s) are adequate in relation to the assets that are being managed.
B	Requires some improvement	▪ Process and policy documentation requires improvement. ▪ Processes and policies do not adequately document the required performance of the assets. ▪ Reviews of processes and policies are not conducted regularly enough. ▪ The asset management information system(s) require minor improvements (taking into consideration the assets that are being managed).
C	Requires significant improvement	▪ Process and policy documentation is incomplete or requires significant improvement. ▪ Processes and policies do not document the required performance of the assets. ▪ Processes and policies are significantly out of date. ▪ The asset management information system(s) require significant improvements (taking into consideration the assets that are being managed).
D	Inadequate	▪ Processes and policies are not documented. ▪ The asset management information system is not fit for purpose (taking into consideration the assets that are being managed).

Asset Management Performance Ratings

Rating	Description	Criteria
1	Performing effectively	▪ The performance of the process meets or exceeds the required levels of performance ▪ Process effectiveness is regularly assessed and corrective action taken when necessary
2	Opportunity for improvement	▪ The performance of the process requires some improvement to meet the required level ▪ Process effectiveness reviews are not performed regularly enough ▪ Process improvement opportunities are not actioned
3	Corrective action required	▪ The performance of the process requires significant improvement to meet the required level ▪ Process effectiveness reviews are performed irregularly or not at all ▪ Process improvement opportunities are not actioned
4	Serious action required	▪ Process is not performed or the performance is so poor that the process is considered to be ineffective

APPENDIX C

DETAILS OF KEY DOCUMENTS AND OTHER INFORMATION SOURCES

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Asset Planning

- PM-#13643834-Draft Strategic Development Plan 2016-2017 to 2020-2021 SDP
- PM-#12694037-2015 Corporate Risk Report - Final Copy
- Statement of Corporate Intent, Aquadoc #13643797
- ARA Overview – Asset Risk Assessment Quick Reference Sheet, DocID ARA-QRS-001, issue date 25 October 2013.
- Araluen Pumpback Station Source Value [Development Plan], aquaDOC# 9227263, endorsed on 21/08/2013.
- Assess Asset Capability guideline, DocID 1164951, dated 12 Dec 2013.
- Asset Management Strategy 2015-2025 PM# 12949347.
- Asset Risk Assessment (ARA) Business Rules guidance document, no document number.
- Asset Risk Assessment (ARA) Business Rules guidance document, version 2, dated 7/2/14.
- Bullsbrook Wastewater Treatment and Treated Wastewater Management business case, aquaDOC# 5583522, planning approval date 6/12/11.
- Byford SD – Wastewater discharge point for Lot 1 Abernethy Rd and Whitby developments, file number JT1 2006 12359 V01, dated 20/02/2014.
- Dardanup WWTP and TWWM business case, aquaDOC# 9093890, planning approval date 26/6/2013.
- Derby WWTP and TWWM Planning business case, aquaDOC# 12895162, planning approval date 30/06/15.
- East Rockingham SD – Latitude 32 conveyance to Kwinana WWTP business case, file number JT1 2012 08549 V01, dated 11/06/2014.
- Frankland Rocky Gully Planning Review [Development Plan], aquaDOC# 12581839, dated March 2015.
- Frankland Rocky Gully Planning Review [Development Plan], aquaDOC# 12581839, dated March 2015. Utilizing ‘Royalties for Regions’ funding is suggested.
- Geraldton Water Supply System – 2013/14 Infrastructure Planning Report, aquaDOC# 10132795, dated October 2014.
- Gravity Sewers Asset Class Strategy, PM# 6900493, dated November 2012.
- Halls Creek Wastewater Scheme – Wastewater Treatment and Treated Wastewater Management, aquaDOC# 9781021, dated January 2015.
- Infrastructure Planning Process Manual, aquaDOC# 3623527, version 10 dated March 2012
- Jandakot Groundwater Scheme – Long Term Planning – IWSS Source Planning, PM# 8068975, dated 21/2/14.
- Management of Project Deferral guideline, DocID 3284897, dated 14 Dec 2014.
- Optioneering – Workshop Guide & Checklist, document #7607012-v1, no date.
- PCY223 Infrastructure Asset Management, Doc ID 364852, dated 09/07/2012.
- Plan Assets guidance document, Doc ID# 9236611, dated 01/07/13.

- Plan Assets guidance document, DocID# 9236611, dated 01/07/13.
- S469 Condition Assessment Strategy, version 2, dated 17/6/13.
- Strategic Asset Management Plan 2012/13 – 2032/33 PM# 5756948.
- System Capability Forecasting (SCF) user manual, Doc ID 5754454, dated 25/04/2012.
- Wastewater Pressure Mains, Pump Stations and Vacuum Sewer Systems Asset Class Strategy, PM# 9364160, dated April 2014.
- Woodman Point Potable Reuse Options [Development Plan], aquaDOC# 12203559, dated June 2015.
- WWT&D Section Guidelines, Volume 1, aquaDOC# 10726992, dated February 2015.
- WWT&D Section Guidelines, Volume 2, aquaDOC# 10726901, dated February 2015.
- Yanchep Water Supply Scheme 2013 Short Term Source Planning [Development Plan], aquaDOC# 8634106, dated July 2013.

Asset Creation/Acquisition

- Acquire Infrastructure Assets Roles and Responsibilities Map
- Activation Phase PM4539231 version6, last updated 31/03/2014
- Asset Acquisition Definitions Doc 4605691, last updated 29/03/2011
- Asset Commissioning Guideline PM457191, version 21 October 2013
- Asset Data Handover Guideline PM589709, version 19 November 2013
- Asset Handover Checklist, Doc ID 606059 (Ref PM #7065974.v2B), version 4, version date 22 October 2013.
- Asset Handover Maintenance Guideline PM589721 version 11, November 2013
- Asset Acquisition Guidelines PM-#2367933-v12- version dated 4 December 2012
- Defects and Warranty Management Guideline PM589718, version date 11 November 2013
- Deliver Phase PM4539246 version 5, last updated date 31/03/2014
- Drawings Handover Guideline PM589734 version 21 October 2013
- Drawings Handover Guideline PM589734, version date 21 October 2013
- Engineering Design Manual Acquadoc #1074204, Revision 06/05/2015
- Fit for Purpose Review Phase PM539256 version 4, last updated 02/07/2012
- Guidelines for Procurement - Doc 372092 (Ref Document Number 1953256 for basic guide to procurement – flowchart) version 23/08/2013
- Handover and Closeout Phase PM4539248 version 5, last updated date 21/08/2013
- IDB Job Management and Execution Process Map
- Infrastructure Planning Phase Process PM4539206 version 4, last updated date 29/06/2012
- Operating Resources Guideline PM589722, version 18 June 2013

- Ops and Maintenance Manual Handover Guideline PM589723 version 12 November 2013
- OSH Handover Guideline PM 589724 version 19, November 2013
- PCY216 Procurement of Goods and Services, version 10/03/2015
- PM-#1376931-v20-PMB Website Document – Project Management Guidelines – Guideline 252 version 02 July 2015
- PM-#2367933-v12 – Asset Acquisition Guidelines version 4 December 2012
- Post Delivery Review Phase PM4539262 version 5 last updated date 31/03/2014
- Renewals Planning Phase Process PM4539210 version 5 last updated date 09/04/2014
- SCADA Handover Guideline PM589733 version 1 February 2013
- Security and Fire Process Guideline PM589731 version 22 October 2013
- Select Phase PM4539217 version 5 last updated date 24/04/2014
- Spare Parts Handover Guideline PM589725 version 21 October 2013
- Training Requirements Guideline PM589727 version 29 October 2016
- Karratha – Balmoral Road Wastewater Pump Station (WWPS) 2 pressure main and gravity sewer (Project Number: CS01705): “Project / Appropriation Request Summary Report” (PM#-13686819) (Date: 30/09/2015)
- Karratha – Balmoral Road Wastewater Pump Station (WWPS) 2 pressure main and gravity sewer (Project Number: CS01705): "Project Scoping Business Case” (PM#-5778747) (Version Date: 16/09/2010)
- Karratha – Balmoral Road Wastewater Pump Station (WWPS) 2 pressure main and gravity sewer (Project Number: CS01705): “Project Delivery Business Case – Major Project” (PM#-9633511) (Version Date: 6/02/2013)
- Karratha – Balmoral Road Wastewater Pump Station (WWPS) 2 pressure main and gravity sewer (Project Number: CS01705): “Project Practical Completion Certificate” (PM#-12441549) (PPC Actual Date: 14/01/2015)
- Karratha – Balmoral Road Wastewater Pump Station (WWPS) 2 pressure main and gravity sewer (Project Number: CS01705): “Asset Transfer Certificate” (PM#-12584130) (Asset Transfer Date: 14/03/2015)
- Karratha – Balmoral Road Wastewater Pump Station (WWPS) 2 pressure main and gravity sewer (Project Number: CS01705): “Project Closeout Report” (PM#-12337103) (Date: 24 February 2015)
- My Water Stage 2 (Project Number: CC00488): “Project / Appropriation Request Summary Report” (PM#-13686823) (Date: 29/09/2015)
- My Water Stage 2 (Project Number: CC00488): “Program Planning Business Case” (PM#-1815569) (Version Date: 27/11/2008)
- My Water Stage 2 (Project Number: CC00488): “Project Delivery Business Case & Budget Release: Minor Projects (Cat D) & Pre-Approved Major Projects” (PM#-10102702) (Version Date: 15/09/2010)
- My Water Stage 2 (Project Number: CC00488): “Service Provider Completion Statement” (PM#-12604445) (Last signature obtained on 27/03/15)

- My Water Stage 2 (Project Number: CC00488): “Project Closeout Report” (PM#-12478939) (Date: 20/03/2015)
- Cost Estimating for Infrastructure Planning (PM#-365453) (Version Date: 18/06/2014) (Next Review Date: 18/06/2016)
- S066 Financial – Investment Analysis (PM#-367574) (Version Date: 25/01/2013) (Next Review Date: 25/01/2016)
- Meter Replacement Program Financial Analysis Memorandum (PM#-11529445) (Date: 3 October 2014)
- Carnarvon Borefield Pipeline Replacement Analysis (PM#-12051993) (Date: 18 December 2014)
- Carnarvon Borefield Pipeline Replacement Analysis Update (PM#-12295318) (Date: 29 January 2015)
- GWAMCO Sensitivity Analysis Memorandum (PM#-10250649) (Date: 05 February 2014)
- GWAMCO Investment Analysis (PM#-9374824) (no date)
- Balannup WWPS B No. 175-03 – Balfour St Type 180 (Project Number: CS01240): Commissioning Plan
- Balannup WWPS B No. 175-03 – Balfour St Type 180 (Project Number: CS01240): Commissioning Verification Report
- Balannup WWPS B No. 175-03 – Balfour St Type 180 (Project Number: CS01240): Commissioning Report
- Geraldton Brown Lane Water Storage Tank, Connecting Pipework, Pressure Reducing Valve and Surge Vessel (Project Number: CW-00287): Commissioning Plan
- Geraldton Brown Lane Water Storage Tank, Connecting Pipework, Pressure Reducing Valve and Surge Vessel (Project Number: CW-00287): Commissioning Verification Report
- Geraldton Brown Lane Water Storage Tank, Connecting Pipework, Pressure Reducing Valve and Surge Vessel (Project Number: CW-00287): Commissioning Report
- Geraldton Brown Lane Water Storage Tank, Connecting Pipework, Pressure Reducing Valve and Surge Vessel (Project Number: CW-00287): Commissioning Activity Master Equipment List (CAMEL)

Asset Disposal

- Decommission & Dispose Assets (Guideline, Doc ID 242016, Version Date 11 February 2015, Next Review Date 11 February 2018)
- Decommission Assets Process Web Page (generated on 26/08/2015 -13:50 from http://waternet.watercorporation.com.au)
- Disposal of Corporation Assets (Obsolete)
- Notification of Asset Retirement (Write-Offs) Form
- PCY 342 Decommission and Disposal of Infrastructure Assets (Doc ID: 3955810 Version Date 13 December 2013, Next Review 16 December 2016)
- S087 Disposals Standard (Doc ID #367588, Version Date 15/08/2013, Next Review date 14/08/2016 with incomplete Document History August 2013))
- Decommission and Dispose Assets (Plan, Doc ID 2217251, Version date 19 Oct 2011, Next Review Date 14 Jan 2016 with incorrect and incomplete Document Revision History and version such as revision dates 19 Oct 119 and 02 May 12)

Environmental Analysis

- Broome Groundwater Water Monitoring Summary 2014, Date:27/03/2015
- Broome Water Resource Management Operation Strategy June 2014, aquaDOC File No JT1 2014 00522 V01, Date:19/09/2014
- Customer and Stakeholder Intelligence, WaterNet
- Customer Charter, What you can expect as a Water Corporation customer, ISBN: 1 74043 847 7 August 2014
- Draft Organisational Structure 1 Sep 2015 PM13035416
- Environmental Scan, News Scan – Insights 17 August 2015, Aqua #13454352
- Environmental Scan, News Scan – Insights, 24 July 2015, Aqua #13280733
- Esperance Water Monitoring Summary 2013, PM-#10540758-v1-Esperance Water Monitoring Summary 2013, aqua DOC No. JT1 2011 03774, Date:04/04/2014
- Exmouth Ground Water Monitoring Summary 2013-14, Date:30/12/2014
- Industry regulation licensing, Guide to licensing, Environmental Protection Act 1986, version 1.2, March 2014
- Kununurra Ground Water Monitoring Review 2013 Rev1, aquaDOC No JT1 2003 13949 V01, Date:03/07/2013
- Marble Bar Ground Water Monitoring Review 2010-2015, Date:25/06/2015
- PCY 225 Customer Complaints Version Date, 4 December 2013, (revision history 19 February 2014), Next Review Date, 10 February 2017
- PCY230 Environment Policy, Date February 2010, Doc#375822
- PM-#11424707-v2 Water Loss Performance Summary 2013/ 2014
- PM-#12817824-v3-Asset Management Strategy 2015-2025, Annexure A, Request for endorsement by Capital Investment Management Committee, Revised version incorporating feedback from M,CIB and M,IDB, 04 June 2015
- Seabird Water Resource Management Operation Strategy July 2014, aquaDOC File No JT1 2014 00590 V01, Date:24/12/2014
- Statement of Corporate Intent 2014/2015, 11604468, ISSN Number: 1443 – 1947, Aqua Doc # 9994824, June 2014
- Statement of Corporate Intent 2014/2015, 11604468, ISSN Number: 1443 – 1947, Aqua Doc # 9994824, June 2014.
- Three Springs Water Resource Management Operation Strategy January 2014, Aqua#9993938, Date:16/04/2014
- Warren Blackwood Water Monitoring Review 2015, Date:30/03/2015
- Water Forever 50 year plan, Towards Climate Resilience, ISBN 1 74043 521 4, OCTOBER 2009, Water Corporation
- Water Forever South West Final Report, ISBN 1 74043 907 4 July 2015

- From Strategy to Action Roadmap, Version Date: 24th September 2015, Aqua Doc # 5288521
- Water Services Operating Licence: Water Corporation, Licence No 32, Version: OL9, Version Date: 24 January 2011
- Water Services Operating Licence: Water Corporation, WL32, Version 13, Version Date: 13 February 2014
- Water Services Code of Conduct (Customer Service Standards) 2013, Version 00-b0-03, as at 18 Nov 2013
- Performance Reporting submission for 2014/15, e-mail from Water Corporation to ERAWA, 15/10/2015, PM#-13789337
- ERA Performance Reporting Datasheet 2015, spreadsheet, submitted on 15/10/2015, PM-#12922702

Asset Operations

- PCY340 Scheme and Asset Operations. (Doc ID: 3955868, Version Date: 13 June 2013
- Scheme Operations Plans Index. (PDF print-out of PM-# 4567044-v2-Scheme_Operations_Plans_Index.XLS, generated on 28/08/2015.)
- System Capability Matrix home page (PDF print-out of http://scm.watercorporation.com.au/, generated on 26/08/2015.)
- Geraldton Regional Water Supply Scheme Operating Plan 2011 – 2012 Part A (Version 6.)
- Geraldton Regional Water Supply Scheme Operating Plan 2011 – 2012 Part B (Version 6)
- Esperance Water Supply Scheme Operating Plan (Version 1, published on 26/08/2015.)
- Lower Great Southern Water Supply Scheme Operating Plan (Version 2B, published on 26/08/2015.)
- Work Planning and Scheduling: RCSG – Procedure for Planning (Doc ID: 9032486, Version Date: 25 March 2015)
- Work Planning and Scheduling Procedure for Commitment (Doc ID: 9050583, Version Date: 13 June 2013)
- Work Planning and Scheduling Procedure for Scheduling (Doc ID: 9072160, Version Date: 14 June 2013)
- Work Management Using ZW05: Plant Maintenance – Quick Reference Sheet. (Doc ID: SAP-QRS-PM-018, Issue Date: 31 July 2015.)
- Managing PM04 Work Orders in the Planning Table Using ZW05a: Plant Maintenance – Quick Reference Sheet (Doc ID: SAP-QRS-PM-046, Issue Date: 17 November 2014.)
- Draft Organisational Structure - 1 September 2015 (PM #13035416)
- SCADA Infrastructure Plan (PM # 7796020, version 3, last updated in September 2012.
- Gravity Sewers Asset Class Strategy (PM #6900493, published in November 2012)
- Wastewater Pressure Mains, Pump Stations and Vacuum Sewer Systems Asset Class Strategy (PM # 9364160, published in April 2014.)
- Customer Charter (Published on 9 June 2012.)
- PCY208 Identification of Engineering Assets (Doc ID: 2180054, Version Date: 26 Nov 2009)

- PM-#13527030-v1-Wasterwater_Assets_Representation_of_Thelma_St_West_Pump_Station_AMSSER.XLSX (Incorporates Functional Location Hierarchy extract, SAP Functional Location screenshot, myWorld screenshot and SAP Maintenance Plan screenshot)
- PM-#13522493-v1-Functional_Locations_Decommisioned_in_2014_15_.pdf (PDF print-out generated on 28/08/2015.)
- Draft - PCY328 Corporate People Development and Training Policy (Doc ID: 1991393, Version Date: 9 September 2013)
- PM-#3655044-Plan Asset Operations Process and Guideline
- PM-#9032486 Work Planning and Scheduling - RCSG - Procedure for Planning
- PM-#9072160 Work Planning and Scheduling - Procedure for Scheduling
- PM-#9050583 Work Planning and Scheduling - Procedure for Commitment
- PM-#13257022 Operations Group Weekly Flash Report - Regional Manager to General Manager - Region: Mid West
- #13780761 Critical Assets Framework & Assessment Methodology
- PM-#3395233 FLER Asset Classes and Definitions and Class Characteristic Values
- PM-#8944573 S469 Condition Assessment Strategy
- PM-#11573252Condition Assessment Methodology - Concrete Structures

Asset Maintenance

- PCY341 Asset Maintenance (Doc ID: 4126906, Version Date: 13 June 2013)
- Work Planning and Scheduling: RCSG – Procedure for Planning (Doc ID: 9032486, Version Date: 25 March 2015)
- Work Planning and Scheduling Procedure for Commitment (Doc ID: 9050583, Version Date: 13 June 2013)
- Work Planning and Scheduling Procedure for Scheduling (Doc ID: 9072160, Version Date: 14 June 2013)
- Work Management Using ZW05: Plant Maintenance – Quick Reference Sheet (Doc ID: SAP-QRS-PM-018, Issue Date: 31 July 2015)
- Managing PM04 Work Orders in the Planning Table Using ZW05a: Plant Maintenance – Quick Reference Sheet (Doc ID: SAP-QRS-PM-046, Issue Date: 17 November 2014.)
- Draft Organisational Structure - 1 September 2015 (PM #13035416)
- Gravity Sewers Asset Class Strategy (PM #6900493, published in November 2012)
- Wastewater Pressure Mains, Pump Stations and Vacuum Sewer Systems Asset Class Strategy (PM # 9364160, published in April 2014)
- Customer Charter (Published on 9 June 2012)
- S469 Condition Assessment Strategy (Doc ID: 8944573, Version Date: 27 June 2013)

Asset Management Information System

- PCY208 Identification of Engineering Assets (Doc ID: 2180054, Version Date: 26 Nov 2009)
- Asset Information Applications webpage (PDF print-out of http://waternet.watercorporation.com.au/a/amb/sections/data_and_information/html/asset_information_applications.cfm, generated on 26/08/2015)
- SAP BW and BWIP Stage 2 webpage (PDF print-out of http://waternet.watercorporation.com.au/a/amb/sections/data_and_information/html/sap_business_warehouse.cfm, generated on 26/08/2015)
- Asset Data and Information Strategy webpage (PDF print-out of http://waternet.watercorporation.com.au/a/AMB/Sections/Data_and_Information/Html/Asset_Data_and_Information_Strategy.cfm, generated on 26/08/2015)
- Static Data Standard web page (PDF print-out of http://waternet.watercorporation.com.au/a/amb/sections/data_and_information/html/data_standards/static_data_standards.cfm, generated on 26/08/2015)
- Dynamic Data Standard web page (PDF print-out of http://waternet.watercorporation.com.au/a/amb/sections/data_and_information/html/data_standards/dynamic_data_standards.cfm, generated on 26/08/2015)
- S209 Dynamic Field Data Collection Standard: Water and Wastewater (Doc ID: 393539, Version Date: 17 October 2014)
- Dynamic Field Data Collection Schedule (Copy of S209 Dynamic Field Data Collection Standard - Water and Wastewater - Schedule.pdf, no generation date)
- Work Management Using ZW05: Plant Maintenance – Quick Reference Sheet (Doc ID: SAP-QRS-PM-018, Issue Date: 31 July 2015.)
- Managing PM04 Work Orders in the Planning Table Using ZW05a: Plant Maintenance – Quick Reference Sheet (Doc ID: SAP-QRS-PM-046, Issue Date: 17 November 2014)
- Regional Customer Services Group Business Management System web page (PDF print-out of http://waternet.watercorporation.com.au/qms/csd/bms_w.cfm, generated on 26/08/2015)
- SAP PM Business Rule No. 1: Use of PM06 (Standing) Orders (Doc ID: aquaDOC # 4235152, Version Date: 04 August 2014)
- SAP PM Business Rule No. 4: Allocating SAP PM Orders to Faults (Doc ID: aquaDOC # 4260460, Version Date: 19 August 2013)
- SAP PM Business Rule No. 13: Application of Maintenance Activity Types (MAT's) in SAP PM (Doc ID: aquaDOC # 4260466, Version Date: 26 March 2014)
- S219 Information Systems Security – Internet Security (Doc ID: 558468, Version Date: 25 Jan 2014)
- S103 - Information Systems Security: Server Backup And Recovery (Doc ID: 1960062, Version Date: 24 July 2015)
- PM-#12242510 Static Data Standards –Implementation Business Case
- PM-#4794503 Spatial Capability Vision for the Water Corporation Plan (May 2011)
- PM-#10847609 Static Data Standard – Bores
- Example of Business Performance Report

Risk Management

- Asset Management Framework (PM# 981716, no date or version number)
- Asset Protection – risk Assessment form, PM#2618826-v3-Asset_Protection_-_Risk_Assessment_Form.DOC, revision date 14/4/2010.
- Protecting Buried Pipelines Information Brochure (DOC ID 2627750, Version date 18/3/2010)
- PCY298 Buried Asset Damage Prevention (Doc ID 457125, version date 13 June 2015)
- System Capability Matrix v3 website homepage
- System Risk Assessment (SRA) User Manual, Doc ID 2675129, version date 16 Feb 2011, including 'Appendix A – SRA Consequence Table', PM# 852589.v3
- S389 Risk Assessment Criteria (Doc ID 621047, version date 29 April 2015)
- Risk Management Guidelines (Doc ID 625204, version date 29 April 2015)
- PCY135 Risk Management (Doc ID 699610, version date 29 April 2015)
- 2015 Corporate Risk Report, PM#12694037, dated June 2015
- Risk & Assurance Branch - Risk Team credentials (PM-#13785109).
- "RCSG – Risk Management" PowerPoint presentation (PM-#12996545)
- 2014 Corporate Risk Report, PM# 10278808, dated June 2014.

Contingency Planning

- Contingency Plan (PM#3620800: Version Date 30/01/2015)
- Operational Contingency Planning (Guideline, Doc ID 1311512, Version Date 16 January 2014)

Financial Planning

- Water Corporation Financial Corporate Model
- Micro Planning Guidelines Operating Budget 2014/15 Key Assumptions & Inputs – Part 1, PM-#13499605-v1-201415_Micro_Budget_Guidelines_-_Key_Assumptions.DOCX
- Micro Planning Guidelines Operating Budget 2014/15 Base Load Information – Part 2, PM-#13499609-v1-2014_15_Micro_Budget_Guidelines_-_Base_Load_Information.DOCX
- Appendix B Micro Planning Guidelines in SAP Business Analysis (footer states no amendments have been made since the Micro Planning Guidelines 2003/04)
- Macro Budgeting Guidelines 2015/16 (PM# 9476463)
- Program Management Guideline (Doc ID 2721044, version date 28 January 2015)
- Strategic Investment Business Case (SIBC) Author Guideline (Doc ID 9786937 v1, version date Nov 2013)
- Executive Summary – Asset Investment Program 2015/16 to 2019/20, Board Meeting November 2014 (PM# 11714657, dated 11 Nov 2014)
- PCY112 Delegated Financial and Legal Authorisations (Doc ID 410999, version date 17 Nov 2014)
- S072 Financial Authorisation standard (Doc ID 411000, version date 1 July 2015)

- PCY263 Capitalisation Policy (Doc ID 428676, version date 14 Nov 2013)
- Water Corporation Business Plan (Aqua Doc# 12046632 and 12874280, dated 19 May 2015)
- Executive Summary – Asset Investment Program 2015/16 to 2019/20, Board Meeting November 2014 (PM# 11714657, dated 11 Nov 2014)
- Statement of Corporate Intent 2014/15, June 2014
- Water Corporation Strategic Development Plan
- Water Corporation Annual Report 2013/14
- Water Corporation Annual Report 2012/13
- Water Corporation Business Plan, Aqua Doc# 12046632 and 12874280, dated 19 May 2015.
- Water Corporation Operating Budget Pack 2015-16, Board Meeting, 15 December 2014

Capital Expenditure Planning

- Micro Planning Guidelines Operating Budget 2014/15 Key Assumptions & Inputs – Part 1, PM-#13499605-v1-201415_Micro_Budget_Guidelines_-_Key_Assumptions.DOCX
- Micro Planning Guidelines Operating Budget 2014/15 Base Load Information – Part 2, PM-#13499609-v1-2014_15_Micro_Budget_Guidelines_-_Base_Load_Information.DOCX
- Appendix B Micro Planning Guidelines in SAP Business Analysis (footer states no amendments have been made since the Micro Planning Guidelines 2003/04)
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- S072 Financial Authorisation standard (Doc ID 411000, version date 1 July 2015)
- PCY263 Capitalisation policy (Doc ID 428676, version date 14 Nov 2013)
- Water Corporation Business Plan (Aqua Doc# 12046632 and 12874280, dated 19 May 2015)
- Executive Summary – Capital Investment Budget 2015/16, Board Meeting (PM# 12604016, dated May 2015)
- Araluen Pumpback Station Source Value [Development Plan] (aquaDOC# 9227263, endorsed on 21/08/2013)
- Frankland Rocky Gully Planning Review [Development Plan] (aquaDOC# 12581839, dated March 2015)
- Woodman Point Potable Reuse Options [Development Plan] (aquaDOC# 12203559, dated June 2015)
- Yanchep Water Supply Scheme 2013 Short Term Source Planning [Development Plan] (aquaDOC# 8634106, dated July 2013)

- Gravity Sewers Asset Class Strategies (PM# 6900493, dated November 2012)
- Wastewater Pressure Mains, Pump Stations and Vacuum Sewer Systems Asset Class Strategy (PM# 9364160, dated April 2014)

Review of the Asset Management System

- PCY223 Infrastructure Asset Management (Doc ID 364852, version date 09/07/2012)
- Strategic Asset Management Plan 2012/13 – 2032/33 (PM #5756948)
- Asset Risk Assessment (ARA) Business Rules guidance document, no document number.
- Plan Assets guidance document (Doc ID# 9236611, dated 01/07/13)
- Optioneering – Workshop Guide & Checklist, document #7607012-v1, no date.
- System Capability Forecasting (SCF) user manual (Doc ID 5754454, dated 25/04/2012)
- Asset Management System Effectiveness Review, dated February 2013 (Odysseus-imc).
- 2012 Post Review Implementation Plan, dated February 2013 (Odysseus-imc)
- Letter from ERAWA in response to the 2012 Review, ERAWA ref D121177 (PM# 11122823, dated 15/4/2014)
- Strategic Asset Management Plan 2014/15,
- PM-#13410801 Asset Management Strategy Update, August 2015
- PM-#12971920 Asset Measure within OPI Component of Corporate TBR 2015 - Full Report with Measures
- PM-#12363068 WSAA Aquamark Final Report 2012
- PM-#13795792 WSAA ISO55001 Utility Report - Water Corporation
- PM-#13763604 Internal Audit - Assets Management Reviews - 1 July 2012 to 30 June 2015
- PM-#12433833 Business Case for Refresh Program