Asset Management System Review

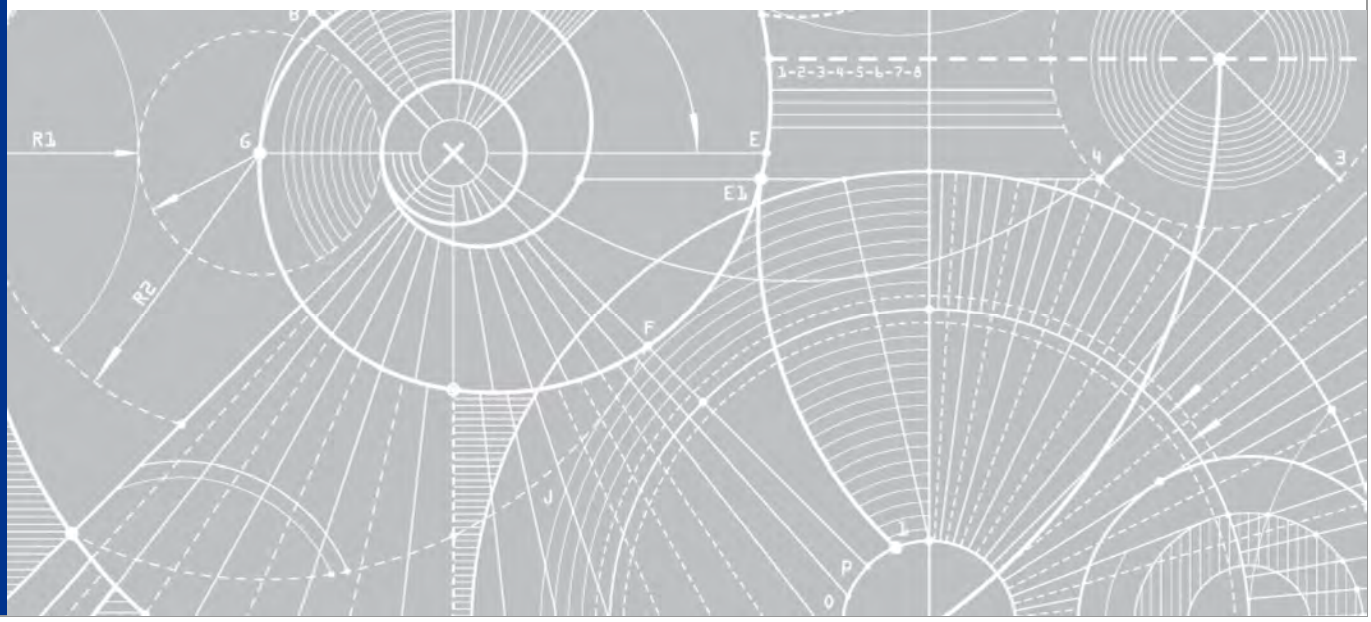
WESTERN POWER

Review Report

Revision No. 4.2 - Final

Order No. 4484

27 October 2014



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Project no:	VF00003
Document title:	Review Report
Revision:	Revision No. 4.2 - Final
Date:	27 October 2014
Client name:	Western Power
Client no:	Order No. 4484
Project manager:	Adam Homan
Author:	Adam Homan & Mike Tamp
File name:	VF00003_Western_Power-Asset_Management_System_Review_Revision_No_4-2_2014-10-27_(Final).docx

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Document history and status

Revision	Date	Description	By	Review	Approved
Rev. 0	19/08/2014	First issue	A. Homan & M. Tamp	R. Dudley	R. Dudley
Rev. 1	29/08/2014	Minor edits	A. Homan	R. Dudley	R. Dudley
Rev. 2	02/09/2014	Revisions to the format of previous recommendations review tables to meet the Authority's requirements.	A. Homan	M. Tamp	R. Dudley
Rev. 3	03/09/2014	Minor edit – repeated bullet removed from recommendation 2012/20	A. Homan	R. Dudley	R. Dudley
Rev. 4 Final	15/10/2014	Revisions and Edits in accordance with ERA feedback and discussions with WP.	A. Homan & M. Tamp	R. Dudley	R. Dudley
Rev. 4.2 Final	27/10/2014	Minor edit to recommendation 19/2014 wording.	A. Homan	R. Dudley	R. Dudley

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Margaret Pyrchla
Regulatory Compliance Manager
Western Power
363 Wellington Street Perth WA 6000

30 Octoberr 2014 VF00003

Dear Margaret,

Review of Western Power's Asset Management System

Jacobs was engaged by Western Power to review Western Power's Asset Management System in accordance with the Economic Regulation Authority's Audit and Review Guidelines: Electricity and Gas Licences, April 2014.

I am pleased to submit to you our report setting out our opinion. The attached Review Report, considers the 'effectiveness' of Western Power's Asset Management System over the 2012-14 period as measured against the criteria provided in the Guidelines. Jacobs affirms that the report is an accurate presentation of the findings and opinions of the Jacobs review team. We acknowledge that you may disclose our Report to the Economic Regulation Authority.

If you would like to clarify any aspect of this review or discuss other related matters then please do not hesitate to contact Adam Homan on 02 9032 1382.

Yours sincerely

Ryan Dudley
Group Manager - Utilities Management and Regulation

Contents

Table of acronyms and abbreviations

Acronym / Abbreviation	Name
[the] 2012-14 period	01 July 2012 to 30 June 2014
AMS	Asset Management System
AOSF	Area of Special Focus
[the] Authority	Economic Regulation Authority
AWP	Approved Works Program
BCP	Business Continuity Plan
BUCC	Backup Control Centre
Capex	Capital Expenditure
CBD	Central Business District
CBRM	Condition Based Risk Management
CURA	(Western Power's risk database)
DM#	Document Management Number
DMS	Distribution Management System
DNDP	Distribution Network Development Plan
EDL1	Electricity Distribution Licence 1
EMP	Emergency Management Plan
EPCC	East Perth Control Centre
ERMF	Enterprise Risk Management Framework
ETL2	Electricity Transmission Licence 2
GIS	Geographical Information System
[the] Guidelines	Audit and Review Guidelines: Electricity and Gas Licences, April 2014
HR	Human Resources
IEM	Investment Evaluation Model
JR	Jacobs Recommendation
KPA	Key Process Area
KPI	Key Performance Indicator
LCMP	Lifecycle Asset Management Plan
LMS	Learning Management System
MAO	Maximum Allowable Outage
NIS	Network Investment Strategy
NMP	Network Management Plan
NOCC	Network Operations Control Centre (Distribution)
NRMF	Network Risk Management Framework
NRMT	Network Risk Management Tool
OFI	Opportunity for Improvement
Opex	Operating Expenditure
P1, P2, P3, P4, P*n*…	Priority 1, Priority 2, Priority 3, Priority 4, Priority *n*…
PAR	Priority Attention Required
PIR	Post-Implementation Review
PR	Previous Recommendation
PRMF	Project Risk Management Framework

Acronym / Abbreviation	Name
QT	Query Trouble
RFR	Request for Repair
RMP	Risk Management Policy
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SDP	Strategic Development Plan
SES	State Emergency Service
SIF	Strategic Investment Framework
SOCC	System Operations Control Centre (Transmission)
TCS	Trouble Call System
TMS	Transmission Management System
Totex	Total Expenditure (Capex + Opex)
TNDP	Transmission Network Development Plan
WPGM	Work Program Governance Model
WSMS	Work Scheduling Management System
ZBAM	Zone Based Asset Management

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Executive Summary

Assurance statement

Jacobs affirms that the review documented in this report has been conducted in order to assess the effectiveness of Western Power's asset management system over the 2012-14 period. Particular attention has been given to providing constructive recommendations that can be implemented to improve the effectiveness of the asset management system moving forward.

Assets within scope of review

The review covers Western Power assets that are used to provide services under its licences (Electricity Distribution Licence 1 – EDL1, Electricity Transmission Licence 2 – ETL2); this includes the network assets and their associated systems. At the direction of the Economic Regulation Authority (the Authority), special focus was given to transformers, distribution wood poles, the asset management information system and the East Perth Control Centre (EPCC).

Major changes affecting Western Power's network assets over the period are as follows:

- The distribution Network Operations Control Centre (NOCC) and the transmission System Operations Control Centre (SOCC) have merged to become a single function operating out of the EPCC. The functional merger was implemented during September / October 2013.
- Significant upgrades have been implemented over the 2012-14 period to improve the effectiveness of the asset management information system.
- The strategic approach to assessing and prioritising distribution asset defect remediation has transitioned from a simple time-based approach (Priority 1 – P1 to Priority 4 – P4) to a more rigorous risk-based approach (Fault / Priority Attention Required – PAR / Zone Based Asset Management – ZBAM).

Western Power's response to previous recommendations

The previous asset management system review was undertaken in 2012. Western Power's Post-Review Implementation Plan (DM# 11031543) brought the findings together into twenty individual recommendations, for which it proposed thirty-nine actions intended to address each of the recommendations.

In Jacobs' view Western Power's response to the Previous Recommendations (PR) over the 2012-14 period demonstrates a strong and culturally embedded attitude towards continually improving the effectiveness of its asset management system. This was apparent throughout the review, and especially evident with respect to actions undertaken to address the PRs.

Jacobs' review of the PRs is provided in Section 2 of this report. The outcomes are summarised below.

Of the twenty recommendations Jacobs found that:

- Fourteen have been completed in full.
- Two recommendations were considered not-applicable to the asset management system, as observed by the Jacobs review team; typically due to process changes arising from continual improvement efforts since the last review. Jacobs has identified opportunities for improvement and / or recommendations for the not-applicable actions by considering the original issue in the context of the strategies, systems and processes currently in effect.

  The not-applicable recommendations are:

  - PR: 2012/08.
  - PR: 2012/09.

- Four recommendations were assessed as 'Yes - further action is required' to resolve the issue; although, Jacobs notes that each of these had been partially attended to, and Western Power's intention to complete them in-full was apparent. The status of these actions is summarised as follows:
  - PR: 2012/14 – The recommendation is *'Ensure that risks identified in the Transmission Production Plan are included in the Division "Network Risk Issues Register" and improve their cross-traceability with the register. Clarify use of Risk register numbers'.*

    Jacobs found that the production plans had been updated as required; however, risk register reference numbers had not been included. Jacobs considers the inclusion of risk register numbers in the production plans as a document hygiene issue which will not have a material impact on the effectiveness of the asset management system.

    In accordance with the terminology definitions provided in Section 1.7 of this report, the further action has been considered as an Opportunity for Improvement (OFI).
  - PR: 2012/16 – The recommendation is *'In view of the risk of late rectification of P1 conditions it may be opportune to highlight the existence of this risk separately in risk registers so that sufficient attention and resources are available to mitigate this risk*

    Jacobs found that CURA had been updated; however, it appeared to be only partially complete, with some names of responsible officers missing and cases where risk register numbers had not been included. Also, it was noted that it did not appear to have been updated to reflect the new risk-based approach to distribution wood pole management.

    Notwithstanding, Jacobs observed strong wood pole risk treatment plans in effect, and again, considers that the updating of CURA to reflect the current risk treatments as a system hygiene issue that will not have a material impact on the effectiveness of the asset management system. In accordance with the terminology definitions provided in Section 1.7 of this report, the further action has been considered as an opportunity for improvement (OFI).
  - PR: 2012/19 – The recommendation is *'Carry out a risk analysis of the complete suite of contingency scenarios to ensure that all likely threats to responses are systematically evaluated and appropriate responses designed. For example the current set of responses does not include the event of maintenance and construction works being performed at the back up facility*'.

    The Jacobs team observed that Western Power had conducted an emergency management risk review across a range of scenarios in 2013. Various action items and opportunities were identified, recorded and assigned. However, no evidence was observed to support an intention to carry out these reviews annually.

    Jacobs considers that scheduling and carrying out annual emergency reviews of EPCC will have a material impact on the effectiveness of the asset management system. As such, Jacobs has made recommendations to this effect – refer to Jacobs' Recommendation (JR) 20/2014 in Section 5 of this report.
  - PR: 2012/20 – The recommendation is *'There is a need to adopt a methodology defining document review cycles and maintaining them, and to apply the methodology consistently to all documentation across the board, to avoid conflict between documents and registers control information*'.

    Jacobs observed that Western Power has carried out a review and identified appropriate actions. This has resulted in the decision to upgrade the document management system and address the identified document review control issues in the process. Jacobs understands that Western Power has gone out to tender with the intention of implementing the document system upgrade in the second half of 2014.

    Jacobs considers that having adequate document review controls will have a material impact on the effectiveness of the asset management system. As such, Jacobs has made recommendations to carry out a Post-Implementation Review (PIR) following the implementation of the new document management system to ensure that the issues have been addressed – refer to JR: 15/2014 in Section 5 of this report.

Jacobs' recommendations

Jacobs' Recommendations (JR) resulting from its review of Western Power's asset management system are summarised in Table 1-1 below. The issues are identified against the Previous Recommendation (PR), Key Process Area (KPA) and Area of Special Focus (AOSF) from which they have arisen. The complete recommendations tables are provided in Section 5 of this report.

Table 1-1: Recommendations summary table

Reference (no./year)	Previous Recommendation / Process Area / Area of Special Focus	Issue	Reviewers' Recommendation
01/2014	KPA: 1. Asset Planning EC: Asset management plan covers key requirements	At present Western Power does not have an overarching asset management strategy document which outlines an approach for each lifecycle stage.	Jacobs recommends that there should be an overarching asset management strategy applicable to all network assets which considers each stage in the asset lifecycle e.g. plan, design, build, operate, maintain, renew, dispose.
02/2014	KPA: 1. Asset Planning EC: Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning	It was difficult for Jacobs to gain insight into the total asset renewal driven investment requirements of the business. In particular, it is not clear whether Western Power can articulate an overall asset renewal strategy, and the extent to which there is a hierarchy in its approach to asset renewal planning that allows for the development of an optimised asset renewal driven investment portfolio. Also, it is unclear whether Western Power has a long term view of the total asset renewal expenditure requirement, or is able to demonstrate how renewal needs for "child" assets roll up in a coordinated way that would lead to an overall renewal plan for a parent asset; for example, being able to demonstrate the planning of how the confluence of replacement needs for individual assets in a substation may lead to the need to plan for the replacement of the substation as a whole.	It is recommended that Western Power establish a long term view of the total asset renewal expenditure requirement that integrates renewal needs across the range of asset classes. This should demonstrate how renewal needs for "child" assets roll up in a coordinated way to an overall renewal plan for a parent asset (for example, circuit breakers and transformers into substation renewal, etc.). The long-term renewal plan should be coordinated and articulate renewal needs across the whole asset base. It should include high-level planning data such as renewal expenditure modelling, "renewal" to "development" overlap synergies, and long-term objectives for overall asset and network health.
03/2014	KPA: 1. Asset Planning EC: Service levels are defined	Service levels are defined in the Network Investment Strategy (NIS) and in the Network Management Plan (NMP). The NIS defines the performance standards for the network as a whole, and the NMP articulates performance outcomes and re-investment needs for individual asset classes.	It is recommended that Western Power establish clear long-term objectives for the key performance measures such as SAIFI, SAIDI,

Reference (no./year)	Previous Recommendation / Process Area / Area of Special Focus	Issue	Reviewers' Recommendation
		Jacobs was unable to observe however how long-term objectives for these service levels were developed, whether they were informed by particular strategic business objectives, or the extent to which they reflected community and stakeholder expectations.	supply security standards etc., and provide a sharp focus for the investment program through this. These objectives may be along the lines of maintaining current standards but at higher efficiency levels, or may be targeted, for example, by increasing performance standards for rural areas whilst maintaining standards for urban areas, etc., and should be clearly linked to overall business strategic plans and objectives.
04/2014	KPA: 2. Asset Creation and Acquisition EC: Full project evaluations are undertaken for new assets, including comparative assessment of non-asset solutions	Whilst it was clear that the consideration of non-network options formed part of the planning process, Western Power's strategic intent in this area was not strongly evident. Jacobs was unable to observe a Demand Management (DM) or non-network solution policy, framework or strategy that would normally be expected in order to drive behaviours in this regard. It was not clear whether there exists within Western Power a specific DM strategy, and the extent to which this is actively pursued as a separate corporate activity with its own objectives, management framework, and performance measurement. Jacobs is of the view that DM initiatives tend only to be actively considered when done so with deliberate corporate intent and are resourced accordingly.	Jacobs recommends that Western Power articulate its intentions regarding DM and non-network solutions through a specific policy and associated strategy, and should consider developing high-level targets for DM programs or outcomes if practicable.
05/2014	KPA: 2. Asset Creation and Acquisition EC: Ongoing legal/environmental/safety obligations of the asset owner are assigned and understood	Jacobs explored Western Power's approach to the management of strategic spares (at a whole-of-plant level). Whilst it was clear that Western Power had intent around this issue and facilities to acquire and manage strategic plant spares, it is not clear the extent to which this was actively planned and managed in accordance with a policy framework that governed issues such as the identification, acquisition, management, and deployment of strategic spares for key items of electrical plant.	Jacobs recommends that a strategic spares policy be developed that specifically spells out the types of risks being addressed, the appropriate level of spares to be kept, location and spares access arrangements, and a spares management regime (e.g. rotation through the live network, retention periods, maintenance arrangements, etc.) This spares policy should also give consideration to access, transport arrangements and define boundaries around acceptable time-to-site in order to better define storage requirements.
06/2014	KPA: 3. Asset Disposal	Jacobs notes that while asset performance is considered in the annual Network Management Plan (NMP)	Jacobs recommends that review of the

Reference (no./year)	Previous Recommendation / Process Area / Area of Special Focus	Issue	Reviewers' Recommendation
	EC: Under-utilised and under-performing assets are identified as part of a regular systematic review process	revisions, it was not clear what emphasis the review process places on validation and re-evaluating the performance KPIs and targets that are used to assess asset performance. It is noted that KPI review is not specified within the scope of the Network Management Plan Review (Period: 1 July 2014 – 30 June 2019) (DM# 12028950).	performance KPIs and targets be formalised within an appropriate review process.
07/2014	KPA: 4. Environmental Analysis EC: Performance standards (availability of service, capacity, continuity, emergency response, etc.) are measured and achieved AOSF: 2. Distribution Wood Poles	Jacobs recognises that Western Power's approach to the management of wood poles has significantly evolved over the 2012-14 period. However, Jacobs considers that the reporting mechanisms (Executive Dashboard – Delivery & Public Safety and Western Power Corporate Monthly Performance Report and Unserviceable Wood Pole Report) have not been revised consistent with the new approach. In Jacobs' view this means that the risk profiles associated with wood poles are no longer being accurately reflected in the dashboard reports.	Jacobs recommends that Western Power introduce and monitor timeliness indicators for attending to defects. This should be consistent with the new approach such that risk profiles are accurately represented to stakeholders. Specific areas that should be considered include: • Pole remediation for all risk categories (Fault-Short Term Deferred/PAR/ZBAM); including volumes, failures and timeliness. • Pole remediation with respect to Western Power's high consequence areas (i.e. bushfire zones etc.); including volumes, failures and timeliness. Jacobs advises that Western Power may wish to consider revising its reporting for all assets consistent with the above; with a view on ensuring that risk profiles are being accurately represented.
	PR: 2012/08	Jacobs has reviewed the Wood Pole Management Dashboard for December 2013 (DM# 11674354). Jacobs is satisfied that the December 2013 dashboard appropriately reported performance against the backlog of Priority 1 (P1) / Priority 2 (P2) poles. However, with the transition to a risk based approach the previous P1 and P2 timeliness targets are no longer applicable. Under Zone Based Asset Management (ZBAM) a volume of high-risk poles are targeted based upon available resources. This means that measuring the backlog against the resources-based target volume no longer captures the issue surrounding timeliness of pole remediation. Jacobs understands that under the new risk-based approach the highest priority categories are 'fault' poles and the second highest priority are Priority Attention Required (PAR). Faults are addressed immediately or, should this be prevented due to access restrictions, made safe and reclassified as 'Short Term Deferred' works. PAR poles have 12 week remediation targets and Short Term Deferred poles are re-assessed on a two-weekly basis until remediated. Performance against these targets is not however reported in the dashboard. Wood pole performance is now reported in the Executive Dashboard for Delivery & Public Safety, and Jacobs has reviewed this dashboard for May 2014 (DM# 12081090). Jacobs is not satisfied that the May 2014 dashboard reported wood poles remediation KPIs against timeliness targets.	

Reference (no./year)	Previous Recommendation / Process Area / Area of Special Focus	Issue	Reviewers' Recommendation
	AOSF: 4. Transformer Management	Jacobs has reviewed the June 2014 Asset Performance Dashboard - Distribution Transformers (DM# 12049029). This provides a snapshot of the transformer population for the previous month; including general attributes and defect analysis. Jacobs found that there is scope to improve the dashboard reporting to better present risk profiles to stakeholders. For example, statistics for pole-top and ground-mount transformers are grouped together, pending defects are identified but there is no information on timeliness, and no historical data is presented to give an understanding of trends. Also, the dashboard did not provide any information on inspections.	
08/2014	KPA: 4. Environmental Analysis EC: Compliance with statutory and regulatory requirements AOSF: 2. Distribution Wood Poles	Western Power is reporting pole failures against the 'target' of 1 in 10,000 in accordance with its pole management policy and strategy. It is unclear how this target was derived, and therefore whether a comparison against this target is appropriate. It is further unclear whether such a comparison is an effective representation of the level of risk associated with the number of pole failures, particularly given that Western Power now prioritises its pole replacements on the basis of risk impact.	Jacobs recommends that Western Power seek guidance from Energy Safety and the Authority on appropriate pole failure targets for reporting purposes.
09/2014	KPA: 6. Asset Maintenance EC: Risk management is applied to prioritise maintenance tasks	Jacobs observes that for its transmission assets Western Power plans to migrate away from a time-based routine maintenance approach to a Condition Based Risk Management (CBRM) approach where the nature of the plant and the condition data available facilitates this. This has the potential to impact the project planning and implementation phases of the Combined Maintenance program, and may introduce risks in the effectiveness of the Combined Maintenance approach, especially in the light of the observations regarding the project management aspects of the Combined Maintenance program (refer to JR: 11/2014).	Jacobs recommends that a review be undertaken of the merits of adopting a broad CBRM approach in the light of the Combined Maintenance framework. This would be aimed at: • Assessing the impacts of CBRM on the efficiencies of combined maintenance, • Ensuring an orderly migration plan from time-based maintenance to condition and risk based maintenance across the asset base, • Ensuring the Combined Maintenance Framework is adjusted to reflect the impacts of the CBRM approach, and that the project management structures are in place to accommodate this, and • Ensuring that CBRM remains targeted to the areas of greatest impact.

Reference (no./year)	Previous Recommendation / Process Area / Area of Special Focus	Issue	Reviewers' Recommendation
10/2014	KPA: 6. Asset maintenance EC: Maintenance policies and procedures are documented and linked to service levels required	The 12 week Priority Attention Required (PAR) benchmark was selected on the maximum reasonable time to rectify a defective pole based on the pragmatic issues such as the time to schedule access (up to 6 weeks) and the time to plan the work (up to a further 6 weeks). There is performance monitoring against this benchmark, and the reasons for not achieving this timeframe for some poles are investigated and understood. Nevertheless, it was not evident whether this benchmark was in itself a focus for performance improvement, whether it generated an appropriate risk-management outcome, and whether strategies were being considered to facilitate improvement in this benchmark.	Jacobs recommends that Western Power should investigate the appropriateness of the 12 week PAR remediation timeframe to assess whether it is appropriate, and whether there is scope for its improvement. Additionally, Western Power should consider the monitoring and reporting of time to remediate 'Faulted' and 'Short-Term Deferred' Poles. Jacobs is of the view that Western Power should exercise a demonstrable focus on improving defect rectification times, not just for poles but across all of its distribution maintenance activities (where practicable). Issues that may frustrate the achievement of benchmarks (and benchmark improvement) may be considered to develop a suite of sub-benchmarks, for example time to rectify for access constrained poles versus access available poles.
	AOSF: 2. Distribution Wood Poles	As a legacy and nature of Western Power's works programming structure, the timeframe for remediating PAR poles is nominally 12 weeks. Jacobs has not observed any investigation that concludes these timeframes as appropriate, or whether they should be improved.	
11/2014	KPA: 6. Asset maintenance EC: Risk management is applied to prioritise maintenance tasks	Jacobs notes that, in general, Western Power displayed the broad application of project management principles to the planning and implementation of its Combined Maintenance program for transmission assets (in particular substation assets). Whilst Jacobs observed that the approach was sophisticated, well-understood, and well-embraced within Western Power, it is believed that some risks with the approach exist. These mainly relate to a degree of informality in the project management approach, and the fact that the Combined Maintenance program was largely planned and managed by one subject matter expert.	Jacobs recommends that project management disciplines are formally implemented, and that Western Power considers the more formal provision of project planning and management support, perhaps through the formation of a permanent Combined Management Projects team. The creation of this team would need to be underpinned by process and procedure documentation, team resource planning, and succession planning.
12/2014	KPA: 6. Asset maintenance	Jacobs considers the Zone Based Asset Management (ZBAM) approach to be a rigorous methodology for	Jacobs recommends that Western Power

Reference (no./year)	Previous Recommendation / Process Area / Area of Special Focus	Issue	Reviewers' Recommendation
	EC: Risk management is applied to prioritise maintenance tasks AOSF: 2. Distribution Wood Poles	prioritising non high-risk poles. However, it was not clear what timeframes are in place to ensure that low-risk defects will eventually be treated.	consider whether firm time limits are appropriate for low-risk defects, and whether defect escalations are appropriate after specified time periods have lapsed.
13/2014	AOSF: 4. Transformer Management	Jacobs understands that investigations have identified the suspected causes of the transformer failures at Muja. However, investigations are ongoing with the following currently being carried out: • An independent investigation of the BTT2 transformer failure at Muja. • An internal investigation of the power system to understand if there were network operating conditions that may be a contributing factor in the failure of the transformers. Jacobs understands that this investigation is also considering the reactive attributes of the network including the location of reactive compensation equipment.	Jacobs recommends that: • Western Power takes appropriate action based on the findings of the independent investigation, and in view of the findings of other investigations and actions taken to-date. • A report be produced detailing the findings of the internal system investigation, and actions to be taken as appropriate based on the findings. • Based on the outcome of the current investigations Western Power may wish to consider whether external expertise may be of assistance in diagnosing any broader system irregularities that may have contributed to the transformer failures.
14/2014	KPA: 2. Asset Creation and Acquisition EC: Projects reflect sound engineering and business decisions	Western Power demonstrated that Post-Implementation Reviews (PIR) are conducted for Board approved projects, and an annual report is provided to the Board accordingly (DM#11689575 PIR Board Approved Projects January 2014). Samples of the Work Program Governance Model (WPGM) 'gate compliance' reports for individual projects/programs (undertaken post-project) were also provided for review. Notwithstanding this, Jacobs did not see evidence that comprehensive PIRs were undertaken for all Board-approved projects and programs. Further, Jacobs is of the view that there may be some projects that fall below the Board approval threshold that are worthy of PIR due to their nature, scale, or complexity.	Jacobs recommends that a more formal and comprehensive approach to undertaking project post implementation reviews be developed. This would include a framework to facilitate a broader identification of projects that require a PIR. This should include high-significance non-Board approved projects or programs; such as the new approach to distribution assets management and significant upgrade to the asset management information system. A PIR framework (including a plan) should be developed that ensures that these are conducted

Reference (no./year)	Previous Recommendation / Process Area / Area of Special Focus	Issue	Reviewers' Recommendation
			as required and that actions and learnings are agreed upon, formally tracked and are used to inform improvements in project governance and project execution. Recommendation 15/2014 identifies a number of current or planned projects / programs where Jacobs considers that PIRs would be beneficial but would not necessarily be carried out under the existing policies.
15/2014	KPA: 12. Review of asset management system EC: A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current PR: 2012/20	In carrying out the 2012-14 asset management system review Jacobs found that uncertainties surrounding document revisions and control still persist within the organisation; for example: • Critical documents don't always contain document control information. • Documents with control sections do not identify the intended start and completion dates for the next review. Jacobs understands that Western Power has carried out a review of document control and record keeping functions. Jacobs has observed a presentation of the recommendations and action plan stemming from this review (DM# 11061903). A key recommendation of the review was that 'the document management system should be upgraded, simplified and automation introduced to manage controlled documents'. In response Western Power has reviewed options for upgrading its document management system to simplify and automate the review of controlled documents. In relation to the upgrade of the electronic document management system Western Power has advised that: • A preferred option is to replace the current electronic document management system with the 'OpenText Content Server', which is expected to provide the enhanced capability that is required for effective document control. • An Expression of Interest (DM#11703735) for implementation services was released and responses assessed in February 2014. • A Scope of Work (DM#11791901) was issued to three short-listed providers and the responses are being assessed now (May 2014). • The upgrade is currently scheduled to commence in the second half of 2014, subject to business case	Jacobs recommends that PIRs be carried out for the following projects and programs that are scheduled or were implemented during the 2012-14 period: • Following the implementation of the new document management system which is currently out for tender. This should consider whether the document control and review issues have been addressed – as per the OFI detailed in Jacobs observations with respect to KPA 12 i.e.: o *Jacobs understands that a number of controlled documents are routinely reviewed and updated similar to the NMP. However, Jacobs has noted (2012/20) that uncertainties picked up in the 2012 review surrounding document revisions and control still persist within the organisation; for example:* - *Critical documents don't always contain document control information.* - *Documents with control sections do not*

Reference (no./year)	Previous Recommendation / Process Area / Area of Special Focus	Issue	Reviewers' Recommendation
		development and approval.	*identify intended start and completion dates for the next review.* *Jacobs advises that:* - *Western Power outlines and monitors all reviews that are required for each of its asset management system documents, processes and systems.* - *All documents should have a document control sections that includes information on past revisions and intended start and completion dates for the next review.* • New distribution maintenance approach (Fault / PAR / ZBAM). This review should be scheduled at an appropriate time once the outcomes can be effectively considered against the original objectives. This should also consider the re-evaluation of categorisation and risk assessment criteria such as the PAR classifications and the 20:80 split of resources between high-risk poles and ZBAM. In general, all specific risk prioritisation criteria should be periodically reviewed for appropriateness based on outcomes. • Asset Management Information System upgrade. This should include (but not be limited to) an overview of costs compared to
	KPA: 6. Asset Maintenance EC: Maintenance policies and procedures are documented and linked to service levels required	The transition to Fault/Priority Attention Required (PAR) /Zone based Asset Management (ZBAM) represents a significant change to Western Power's approach to managing its distribution assets. Jacobs recognises that the approach applies an enhanced degree of scientific rigour that is expected to have significant benefits.	
	AOSF: 1. Asset Management Information System	It would normally be expected that a comprehensive Post-Implementation Review (PIR) would be conducted to assess the effectiveness of the implementation of the project against key objectives articulated in the strategy or the plan. In particular, a PIR should be conducted to assess the following: - The extent to which expected outcomes were achieved; - The actual costs of the project and how they compared to budget estimates; - Issues identified (an issues register including close-out progress); - Reviews on data quality and system performance outcomes; and - Outstanding functionality requirements and opportunities for future development.	

Reference (no./year)	Previous Recommendation / Process Area / Area of Special Focus	Issue	Reviewers' Recommendation
	AOSF: 2. Distribution Wood Poles	The 'Pareto Principle' has been applied to allocate resources between high-risk (Sniper, PAR, high-priority) poles and poles to be managed via ZBAM. This means that 20% of resources are allocated to addressing high-risk poles and 80% to addressing ZBAM poles. Jacobs considers this to be a reasonable starting point; however this should be revaluated as the new approach continues. The above also applies to the PAR classification and other risk assessment criteria. In general, all specific risk prioritisation criteria should be periodically reviewed for appropriateness based on outcomes.	budget, gap analysis of implemented specification to original specification, a review of changes and the change control process, observable benefits compared to originally expected benefits, and outstanding issues and action plan to resolve them.
16/2014	KPA: 5. Asset Operations EC: Risk management is applied to prioritise operations tasks KPA: 7. Asset Management Information System EC: Adequate system documentation for users and IT operators KPA: 8. Risk Management EC: Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system KPA: 9. Contingency Planning EC: Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks	Western Power has a high-level Risk Management Policy (RMP) (DM# 3842495) which defines a consistent approach to risk management that is intended to be applied to all aspects of the business. The policy overarches three risk management frameworks; these are: • The Enterprise Risk Management Framework (ERMF) (DM# 3861477): Jacobs understands that this covers corporate type risks such as insurance and Western Power's licence to operate. • Project Risk Management Framework (PRMF) (DM# 9937853): Jacobs understands that this covers specific project delivery risks such as contracts, project delays and safe works delivery. • The Network Risk Management Framework (NRMF) (DM# 6592239): Jacobs has reviewed the NRMF and its underlying documents and processes in detail. It focuses on network planning and management and has strong links to network investment. Notably omitted from the suite of risk management framework documents was the specific inclusion of network operations (including contingency planning) and asset information systems.	Jacobs recommends that the Risk Management Framework include network operation (including contingency planning) and business information systems.

Reference (no./year)	Previous Recommendation / Process Area / Area of Special Focus	Issue	Reviewers' Recommendation
17/2014	KPA: 7. Asset Management Information System EC: Adequate system documentation for users and IT operators	Jacobs understands that an asset data quality framework is currently under development. Data management quality and performance indicators are tracked and routinely published in various asset information dashboards (either pertaining to generic data quality and timeliness standards, or relating data quality requirements of asset management process owners). It is not clear however how this information is used to drive performance improvement at the current development stage of the asset information management system. Western Power does not appear to have a demonstrable long-term strategic plan for asset information management, and there does not appear to be long-term stated objectives for improving data quality, data integrity, and timeliness.	Jacobs recommends that Western Power develop a strategic plan for its asset management information systems and data. This plan should include a review current state of the systems and where Western Power is placed along the strategic journey. It should also include a long-term vision for the systems and outline an understanding of the likely costs, benefits, and timeframes for achieving the vision. Western Power should undertake a strategic review of asset information requirements for the business and establish long term objectives for key process areas as well as system integration needs; recognising that high quality data is an enabler for asset management performance improvement. Western Power should specifically consider as part of this strategic review the need for better gathering and integration of transmission asset condition data (and associated test data) to ensure ready access to this information. This is particularly pertinent given the separation of the Operations Asset Management group from the day-to-day management of the asset maintenance activities undertaken managed from the Kewdale depot.
	AOSF: 1. Asset Management Information System	Jacobs observed that whilst individual implementation plans for various modules of the integrated asset management information system existed, an overall strategic plan for the integration was not evident. It would normally be expected that such a complex project would have a high-level over-arching plan, or perhaps be influenced by a strategic plan for asset management information. Jacobs is of the view that such a comprehensive systems renewal and integration project is complex and risky, with issues such as cost escalation, applications interfacing, data quality, and organisational culture potentially creating some of the highest risks to successful implementation.	
18/2014	KPA: 9. Contingency Planning EC: Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks	Jacobs observed that contingency planning does not appear to be widespread across all major foreseeable risks and contingencies to which the network may be subjected. In particular, Jacobs observed that there did not appear to be a formal structure that provided for contingencies to be methodically identified and responded to. Given that Western Power has jurisdictional responsibilities for both Transmission and Distribution, it is foreseeable that widespread network events could simultaneously occur in such a manner that could	Jacobs is of the view that Western Power should develop response plans for a broad range of contingencies, as given by way of example in the list below. These are by no means exhaustive but are provided as an indication of the range of issues that should be considered:

Reference (no./year)	Previous Recommendation / Process Area / Area of Special Focus	Issue	Reviewers' Recommendation
		confound the ability of the Emergency Management Team to effectively prioritise response and respond accordingly.	• Simultaneous loss of transmission and widespread distribution due to a single event (storm and or bushfire); review network topology where this may be a susceptibility due to local environmental factors or network topology. • Credible (although unlikely) multiple transmission network contingencies; Common-mode or simultaneous failures of key elements. • Widespread generation loss or network islanding scenarios; Jacobs recognises that this is not necessarily in Western Power's jurisdiction, but plans will be required to manage community requirements nonetheless. • Widespread interruptions to major load centres (e.g. Perth CBD). These should be reviewed and tested on a routine basis – see JR: 20/2014.
	PR: 2012/18	Refer to PR: 2012/18 commentary. Jacobs is satisfied that the training, identification of issues and action item responses by western Power for this recommendation have been addressed. However, Jacobs is of the view that Western Power has not rigorously identified all reasonably foreseeable contingencies that would form the basis of the Emergency Management Response planning and testing exercises.	
	AOSF: 3. SOCC & NOCC Business Continuity		
	PR: 2012/19	Jacobs observed that notwithstanding actions arising from the previous review being implemented, an opportunity for improvement continues to exist in the contingency planning area. Jacobs did not see evidence of a systematic and comprehensive approach to scenario planning.	
	AOSF: 3. SOCC & NOCC Business Continuity		
19/2014	KPA: 9. Contingency Planning EC: Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks	Jacobs understands that in the event of a significant network event, third-party impacts tended to be "operationally" factored into restoration responses on the basis of a Restoration Priority Framework. However, the extent to which the framework priorities and response plans are overtly factored into contingency plans is not clear. In this respect Jacobs is of the view the Western Power should actively consider and factor into its contingency and emergency response plans issues such as social infrastructure impacts and restoration prioritisation. This should not only include the management of supply restoration on a priority basis, but operational issues regarding relieving emergency officers standing by fallen wires, 'make-safe' protocols, etc. In this respect Jacobs notes that Western Power has a program in place where suitably qualified, trained and equipped staff are utilised in the event of such incidents to relieve other emergency services personnel from stand-by and make-safe activities.	Jacobs recommends that Western Power consider and factor into its contingency and emergency response plans for a broad range of issues such as social infrastructure impacts and restoration prioritisation. This in particular applies where Western Power's response plans actively rely upon the availability of this infrastructure such as mobile phone capability and fuel supply. In this respect, contingency plans should actively consider the restoration of supply to vital infrastructure such

Reference (no./year)	Previous Recommendation / Process Area / Area of Special Focus	Issue	Reviewers' Recommendation
	PR: 2012/18 AOSF: 3. SOCC & NOCC Business Continuity	Refer to PR: 2012/18 commentary. Jacobs is satisfied that the training, identification of issues and action item responses by western Power for this recommendation have been addressed. However, Jacobs is of the view that Western Power has not rigorously identified all reasonably foreseeable contingencies that would form the basis of the Emergency Management Response planning and testing exercises.	as the examples listed below, noting that this list is not exhaustive: • Water supply. • Sewage systems. • Food supply. • Traffic Management and Public Transport • Mobile telephones and emergency services telecommunications. • Hospitals (coordination with Department of Health and routine testing of standby generation capability). • Fuel supply (Supply to Kwinana refinery, bulk supply terminals, and local supplies). Active consideration should be given to the Management and review of Western Powers' mobile radio capability, and the management and coordination of a fleet of mobile generators in order facilitate their rapid deployment to vital locations and key third party infrastructure sites. This would also include agreeing on supply connection standards for such assets. In addition to the above, contingency plans will need to consider the coordination of responses with other utilities. In this respect, protocols should be established with other emergency service departments and social-infrastructure service providers, including the examples listed below. These are by no means exhaustive but are provided as an indication of the range of issues that should be considered. • Police.
	PR: 2012/19 AOSF: 3. SOCC & NOCC Business Continuity	Jacobs observed that notwithstanding actions arising from the previous review being implemented, an opportunity for improvement continues to exist in the contingency planning area. Jacobs did not see evidence of a systematic and comprehensive approach to scenario planning.	

Reference (no./year)	Previous Recommendation / Process Area / Area of Special Focus	Issue	Reviewers' Recommendation
			• Fire Brigade. • Ambulance and Hospitals. • SES. These should be reviewed and tested on a routine basis – see PR: 20/2014.
20/2014	KPA: 9. Contingency Planning EC: Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks	Jacobs notes that whilst some vulnerability and emergency management response reviews were recently undertaken, evidence was not observed that regular reviews of such response plans are planned.	Jacobs recommends that Western Power develop a review timetable for the contingency and emergency management plans and the reviews should be undertaken at a frequency commensurate with the nature of the scenario and the likelihood of its occurrence, in recognition of the changes in the network over time. Western Power should also develop an annual review policy, timetable or framework as appropriate for the East Perth Control Centre (EPCC). A routine formal risk re-assessment program should be implemented for the EPCC in line with Western Power's general facilities management responsibilities. These reviews also relate to contingency planning JR: 18/2014 and JR: 19/2014.
	PR: 2012/17	Refer to PR: 2012/17 commentary. Whilst Jacobs is satisfied that the action taken was sufficient, Western Power would need to ensure that the risks are routinely reviewed and updated accordingly. Jacobs notes that evidence provided of the review is dated 2011. It would be prudent to reassess these risks, particularly in the light of recent organisational changes that have led to changes in the management arrangements for the operations centre.	
	AOSF: 3. SOCC & NOCC Business Continuity		
	PR: 2012/18	Refer to PR: 2012/18 commentary. Jacobs is satisfied that the training, identification of issues and action item responses by western Power for this recommendation have been addressed. However, Jacobs is of the view that Western Power has not rigorously identified all reasonably foreseeable contingencies that would form the basis of the Emergency Management Response planning and testing exercises.	
	AOSF: 3. SOCC & NOCC Business Continuity		
	PR: 2012/19	Western Power conducted an emergency management risk review across a range of scenarios in 2013. Various action items and opportunities were identified, recorded and assigned. However, it is not clear that the review will be conducted annually as recommended.	
	AOSF: 3. SOCC & NOCC Business Continuity		

Western Power's control environment

The Jacobs team carried out a risk assessment with respect to the key process areas as part of its planning for the review of Western Power's asset management system. In doing so the reviewers made a preliminary assessment on the adequacy of the controls that Western Power has in place to mitigate the inherent risks.

The preliminary assessments of these controls have been revised in hindsight of the review. The resulting post-review risk assessments are provided in Table 1-2 and Table 1-3 below for each of Western Power's licences – EDL1 and ETL2. The tables can be interpreted as follows:

- Controls that were found to be stronger in the post-review are indicated in **blue** and those found to be weaker are indicated in **red**.
- The Review Priority outcomes from the preliminary review are marked with an '**x**', and the post-review outcomes are indicated by colour  .

Jacobs notes that across both licences the only area assessed post-review as having 'weak' controls is contingency planning; whereas prior to the review Jacobs had expected weak controls across several areas.

Table 1-2 below shows that the Jacobs' review team generally found the distribution controls to be stronger than the preliminary review had indicated, except in the case of contingency planning where some weaknesses were identified. The contingency planning issues are reflected in JR: 18/2014, JR: 19/2014 and JR: 20/2014 – the complete recommendations tables are provided in Section 5 of this report.

Table 1-2: Preliminary priority assessment – EDL1

Asset management system components	**Consequence** (1=minor, 2=moderate, 3=major)	**Likelihood** (A=likely, B=probable, C=unlikely)	**Inherent Risk** (Low, Medium, High)	**Adequacy of existing controls** (S=strong, M=moderate, W=weak)	**Adequacy of existing controls** (S=strong, M=moderate, W=weak)	**Review Priority**					
				Pre-Review	Post-Review	1	2	3	4	5	N/A
1. Asset planning	2	C	Medium	M	M				X		
2. Asset creation and acquisition	2	B	Medium	W	M			X			
3. Asset disposal	1	B	Low	W	M					X	
4. Environmental analysis	2	B	Medium	M	M				X		
5. Asset operations	2	C	Medium	M	S				X		
6. Asset maintenance	1	B	Low	M	S					X	
7. Asset management information system	2	B	Medium	M	S				X		
8. Risk management	3	B	High	S	S		X				
9. Contingency planning	2	B	Medium	M	W				X		
10. Financial planning	2	C	Medium	W	M			X			
11. Capital expenditure planning	2	C	Medium	W	S			X			
12. Review of asset management system	1	C	Low	S	S					X	

Table 1-3 below shows that the Jacobs' review team found a spread of stronger and weaker transmission controls compared to the preliminary review assessment. Weaker than expected areas are risk management, contingency planning and environmental analysis. The risk management and contingency planning issues are reflected in JR: 18/2014, JR: 19/2014 and JR: 20/2014.

Some gaps were found with respect to revising environmental analysis indicators in view of changes in the system environment; this was applicable to both transmission and distribution and has resulted in a weaker assessment the preliminary review had indicated; reduced from 'strong' to 'moderate'. This issue is reflected in JR: 07/2014; although JR: 07/2014 primarily concerns the issue associated with distribution wood poles, the reviewers' observations and 'professional scepticism' concluded that this is an area that can be improved across all assets.

Table 1-3: Preliminary priority assessment – ETL2

Asset management system components	**Consequence** (1=minor, 2=moderate, 3=major)	**Likelihood** (A=likely, B=probable, C=unlikely)	**Inherent Risk** (Low, Medium, High)	**Adequacy of existing controls** (S=strong, M=moderate, W=weak)	**Adequacy of existing controls** (S=strong, M=moderate, W=weak)	**Review Priority**					
				Pre-Review	Post-Review	1	2	3	4	5	N/A
1. Asset planning	3	C	High	S	S		X				
2. Asset creation and acquisition	3	B	High	M	M		X				
3. Asset disposal	2	B	Medium	W	M			X			
4. Environmental analysis	2	B	Medium	S	M				X		
5. Asset operations	3	C	High	S	S		X				
6. Asset maintenance	2	B	Medium	M	S				X		
7. Asset management information system	2	B	Medium	M	M				X		
8. Risk management	3	B	High	S	M		X				
9. Contingency planning	3	B	High	S	W		X				
10. Financial planning	2	C	Medium	M	S				X		
11. Capital expenditure planning	2	C	Medium	M	S				X		
12. Review of asset management system	1	C	Low	S	S					X	

Overall asset management system effectiveness assessment

Jacobs' assessment of Western Power's performance against each of the key process areas and effectiveness criteria is provided in Table 1-4 below. The ratings are defined as follows:

- Asset management process and policy definition adequacy rating:
  - A = Adequately defined
  - B = Requires some improvement
  - C = Requires significant improvement
  - D = Inadequate
- Asset management performance ratings
  - 1 = Performing effectively
  - 2 = Opportunity for improvement
  - 3 = Corrective action required
  - 4 = Serious action required

It should be noted that:

- Each of the effectiveness criteria underpinning each key process area have been assessed individually and the overall assessment for each key process area is based upon the average of its underpinning effectiveness criteria.
- There are instances where the Jacobs team has observed more than one issue arising with respect to a given effectiveness criteria. In such cases Jacobs has selected the overall lowest rating. For example, if two different issues have resulted in B3 and C2 assessments for the same effectiveness criteria, these have been combined to give an overall rating for the effectiveness criteria as C3.

The Jacobs' team have considered the validity of the overall assessments in view of the above approach and are satisfied that the overall ratings for each key process area are reflective of the fieldwork observations and review findings.

Table 1-4: Asset management system effectiveness summary

Asset Management System Component & Effectiveness Criteria	Asset management process and policy definition adequacy rating	Asset management performance rating
1. Asset Planning	B	2
2. Asset Creation and Acquisition	B	2
3. Asset Disposal	B	1
4. Environmental Analysis	B	2
5. Asset Operations	B	2
6. Asset Maintenance	B	2
7. Asset Management Information System	A	1
8. Risk Management	B	2
9. Contingency Planning	C	3
10. Financial Planning	A	1
11. Capital Expenditure Planning	A	1
12. Review of asset management system	A	1

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Important note about your report

The sole purpose of this report and the associated services performed by Jacobs is to review the 'effectiveness' of Western Power's asset management system in accordance with the scope of services set out in the contract between Jacobs and the Client. That scope of services, as described in this report, was developed with the Client.

In preparing this report, Jacobs has relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by the Client and/or from other sources. Except as otherwise stated in the report, Jacobs has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

Jacobs derived the data in this report from information sourced from the Client (if any) and/or available in the public domain at the time or times outlined in this report. The passage of time, manifestation of latent conditions or impacts of future events may require further examination of the project and subsequent data analysis, and re-evaluation of the data, findings, observations and conclusions expressed in this report. Jacobs has prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

This report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by Jacobs for use of any part of this report in any other context.

It should be noted that the review has been conducted over a period of five weeks (excluding the preliminary review); covering twelve 'key process areas' of the asset management system, four 'special areas of focus' and a review of Western Power's actions to resolve the previous recommendations. In Jacobs' view a comprehensive review of each of these elements would require a minimum of two weeks each. As such, Jacobs has taken a risk-based approach to assessing the appropriate risk factors in order to focus the review on higher risk areas, with less intensive coverage of medium and lower risk areas.

Additionally, it should be noted that the report has been structured in accordance with the specifications of the Economic Regulation Authority's Audit and Review Guidelines: Electricity and Gas Licences, April 2014.

This report has been prepared on behalf of, and for the exclusive use of, Jacobs's Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party.

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1. Review scope

1.1 Purpose and objectives

The purpose of the asset management system review is to assess the measures taken by Western Power for the proper management of assets used in the provision and operation of services and, where appropriate, the construction or alteration of relevant assets.

The primary objective of the asset management system review is to provide the Economic Regulation Authority (the Authority) with an independent assessment of the effectiveness of Western Power's asset management system in respect of the assets that are delivering the services covered by its licences.

1.2 Methodology

Jacobs has taken a risk-based approach to assessing the appropriate risk factors in order to focus the review on higher risk areas, with less intensive coverage of medium and lower risk areas. In doing so, the detailed guidance on the ERA's preferred risk evaluation model, which is based on Australian/New Zealand Standard 31000:2009 (Risk Management – Principles and Guidelines), has been applied.[1]

To facilitate a consistent approach Jacobs assigned priority ratings to each of the twelve asset management system key processes identified; essentially:

- Areas with a priority rating of 1 or 2 were subject to more extensive examination involving process reviews, interviews of relevant staff and, where applicable, sample procedures of process outputs; and
- Items with a lower review priority rating were examined through desktop reviews of procedures and confirmatory discussion with relevant staff.

The Jacobs team has exercised professional judgement to determine the review procedure to be performed depending on priority, and has collected "sufficient appropriate evidence" commensurate with that priority.

The specific procedures that Jacobs has applied for each priority rating are detailed in Table 1-1 below. The procedures have been adopted from the Audit and Review Guidelines and applied as appropriate.

Table 1-1 : Priority rating procedures – Audit and Review Guidelines, page 16

Review Priority		Procedures to be applied
1	High Priority	• Interviews with supervisory and operational personnel; • Inspection of relevant documents; • Obtain evidence that policies, procedures and controls are in place and working effectively;[2] • Examine compliance reports and breach register; • Obtain confirmations from third parties if applicable; • Examine reports and correspondence with other regulators (e.g., EnergySafety); • Close inspection of applicable asset infrastructure; • Examination of asset management system effectiveness criteria; • High level sampling may be applicable for output and timeliness procedures; and • Recalculation of a sample of relevant performance indicators.
2		
3	Moderate Priority	• Interviews with supervisory and operational personnel; • Inspection of relevant documents; • Obtain evidence that policies, procedures and controls are in place and that controls are working effectively;[3]

[1] Audit Review Guidelines: Electricity and Gas Licences, April 2014 – Economic Regulation Authority, Western Australia – Appendix 2, Risk Based Approach to Audits and Reviews.

[2] A controls assessment is mandatory for priorities 1 and 2.

[3] This is mandatory for review priority 3 but optional for review priority 4.

Review Priority		Procedures to be applied
4		• Examine compliance reports and breach register; • Physical examination of applicable asset infrastructure; • Examination of asset management system effectiveness criteria; • Sampling may be applicable for output and timeliness procedures; and • Walkthrough the process to calculate relevant performance indicators.
5	Lowest Priority	• Interviews with supervisory or operational personnel; • Desktop review of relevant documents; • Desktop review of policies, procedures and controls in place; • View compliance reports and breach register; • Visit applicable asset infrastructure; • Desktop review of asset management system effectiveness criteria; and • Low level Sampling may be applicable for output and timeliness procedures.

During the review the Jacobs team has visited three Western Power sites to access information and systems, make enquiries and interview key personnel. This has been followed by a post-fieldwork review which involved ongoing information requests and twice-weekly teleconference meetings.

In accordance with ASAE 3000, Jacobs affirms that the reviewers have based their conclusions on sufficient and appropriate evidence. The reviewers have exercised professional judgement to determine what constitutes sufficient review evidence for each element of the review.

The Jacobs team has adopted an attitude of professional scepticism throughout the review. The reviewers have made critical assessments, with a questioning mind, of the validity of evidence obtained and have been alert to evidence that contradicts or brings into question the reliability of documents and responses to enquiries and other information obtained from Western Power.

Jacobs has assessed the effectiveness of Western Power's asset management system through the application of the below procedures which are prescribed in the Authority's Audit and Review Guidelines – it should be noted that these procedures have been adapted to focus on asset management system effectiveness rather than compliance with the licence conditions.

- **Control environment:** Western Power's management philosophy and operating style, organisational structure, assignment of authority and responsibilities, the use of internal audit, the use of information technology and the skills and experience of the key staff members.
- **Information system:** the appropriateness of Western Power's information systems to record the information needed to ensure the effectiveness of the asset management system, including accuracy of data, security of data and documentation describing the information system.
- **Control procedures:** the presence of systems and procedures to monitor the effectiveness of the asset management system and to detect or prevent instances of under-performance.
- **Effectiveness attitude:** the action taken by Western Power in response to any previous review recommendations, and an assessment of the attitude towards maintaining an effective asset management system.
- **Outcome effectiveness:** the actual performance against the effectiveness criteria prescribed in the Audit and Review Guidelines.

1.3 Timeline

The review covers the 2012-14 period, with a focus on improving effectiveness of the asset management system going forward. It has been carried out over the period of 02 May 2014 to 05 August 2014. Key events/milestones of the review are as follows:

- 02 May 2014 – Western Power engaged Jacobs to conduct the review.
- 05 May 2014 to 04 July 2014 – Jacobs carried out its preliminary review.
- 13 June 2014 – Review Plan submitted to the Authority.
- 04 July 2014 – Review Plan approved by the Authority.

- 07 July 2014 to 11 July 2014 – Fieldwork carried out. This included site visits to Western Power's:
  - Head Office (3 days).
  - East Perth Control Centre (1 day).
  - Kewdale Depot (1 day).
- 14 July 2014 to 01 August 2014 – Post-fieldwork review carried out.
- 07 August 2014 – Complete Draft Asset Management System Review report submitted to Western Power.

1.4 Western Power representatives

The key personnel from Western Power that assisted in the review are as follows:

- Margaret Pyrchla: Regulatory Compliance Manager
- John Paolino: Senior Compliance Specialist
- Kim McArthur: Asset Strategy & Risk Manager
- Michael Pover: Senior Asset System Analyst

Jacobs would like to thank all Western Power personnel involved in the review – in particular:

- Those identified above; for their efforts in facilitating the asset management system review.
- Jacobs has interviewed a broad range of relevant personnel within Western Power as required throughout the course of the review. The complete list of interviewed personnel is provided in Appendix A.

1.5 Documents and information sources

In forming its opinions Jacobs has reviewed a large quantity of Western Power's documents, systems and processes as required. As appropriate, Jacobs has:

- Traced through from higher level policies and strategic documents, to lower level planning and procedural documents.
- Interviewed a range of personnel; walking through process implementation and system operation, probing to stress-test the effectiveness of the controls and cultural attitudes towards effectiveness.
- Sampled system reporting information, and process implementation / output documents as required.
- Reviewed external reports submitted to the Authority, Energy Safety and the State Government.

The complete list of documents reviewed by Jacobs is provided in Appendix B.

1.6 Jacobs' review team

The Jacobs review team members and hours utilised by each are as follows:

- Ryan Dudley: Group Manager, Utility Management & Regulation – Lead Reviewer (24 hours).
- Mike Tamp: Senior Consultant – Reviewer (116 hours).
- Adam Homan: Strategic Consultant – Reviewer and Project Manager (198 hours).

1.7 Additional information

The Jacobs team has developed a comprehensive set of working papers throughout the review. These are sufficiently detailed to provide a high standard of evidence to support the opinions and recommendations that are included in the review report. The working papers are provided in Section 2 and Section 4 of this report.

Jacobs has applied consistent terminology and referencing in expressing its opinions and recommendations within the working papers. These are outlined below.

1.7.1 Terminology

- **Recommendation** – These are areas where Jacobs considers that the recommended actions are achievable and will have a material impact on improving asset management system effectiveness. Jacobs anticipates that Western Power will consider these in its action plan.

- **OFI (Opportunity for Improvement)** – These are areas where an aspect of the asset management system has essentially been deemed 'effective'; however the reviewers have identified an opportunity to improve. Jacobs advises Western Power to consider the OFIs, but affirms that it should be at their discretion whether they choose to address these in their action plan[4]. As such, OFIs are not included in Jacobs' recommendations summary table.

  The OFIs typically fall into three categories:

  - Document and process hygiene issues that Jacobs considers would not have a material impact on asset management system effectiveness.
  - Aspirational opportunities that would be onerous to implement and will require significant business justification.
  - Other opportunities that are likely to be beneficial, but Jacobs considers should not be externally imposed i.e. the decision should rest with Western Power whether they consider the OFI to be appropriate for their business environment.

  It should be noted that there are cases where Jacobs has identified that further action is required with respect to a previous (2012) recommendation but has considered the further action as an OFI. In accordance with the above, these are not included in Jacobs' recommendations summary table.

1.7.2 Key for embedded references

- [JR] = Jacobs Recommendation
- [PR] = Previous Recommendation
- [KPA] = Key Process Area
- [AOSF] = Area of Special Focus
- [EC] = Effectiveness Criteria

[4] It should be noted that although Jacobs considers addressing the Opportunities for Improvement (OFI) to be at the discretion of Western Power, the Economic Regulatory Authority (ERA) may still request that Western Power provide responses to them.

2. Western Power's response to previous recommendations

2.1.1 Overview

The previous asset management system review was undertaken in 2012. Western Power's Post-Review Implementation Plan (DM# 11031543) brought the findings together into twenty individual recommendations, for which it proposed thirty-nine actions intended to address each of the recommendations.

In Jacobs' view Western Power's response to the previous recommendations over the 2012-14 period demonstrates a strong and culturally embedded attitude towards continually improving the effectiveness of its asset management system. This was apparent throughout the review, and especially evident with respect to actions undertaken to address the Previous Recommendations (PR).

Jacobs' approach to reviewing the previous recommendations is as follows:

1) Assess whether further action is required against the specific recommendations based upon discussion with Western Power and evidence provided; these are assessed as either:
   - No – further action is not required.
   - Yes – further action is required.
   - Not applicable.

2) Review the issues from which previous recommendations arose in the context of Jacobs' current observations.

3) Identify opportunities for improvement (OFI) and recommendations based on Jacobs' current observations.

   It should be noted that there are cases where Jacobs has identified that further action is required with respect to a previous (2012) recommendation but has considered the further action as an OFI. OFIs have not been included in Jacobs' recommendations summary table in Section 1 of this report; consistent with the discussion within the Section 1.7.

Of the thirty-nine actions Jacobs found that:

- Thirty-two actions have been completed in full.
- Three actions were considered not-applicable to the asset management system, as observed by the Jacobs review team; typically due to process changes arising from continual improvement efforts since the last review. Jacobs has identified any opportunities for improvement and / or recommendations for the not-applicable actions by considering the original issue in the context of the strategies, systems and processes currently in effect.
- Four actions were assessed as 'Yes - further action is required' to resolve the issue; although, Jacobs notes that each of these had been partially attended to, and Western Power's intention to complete them in-full was apparent.

Table 2-1 below provides a summary of the previous recommendation assessments. The complete review of each recommendation is provided as follows:

- Recommendations / actions resolved before end of previous review period (Table 2-2).
- Recommendations / actions resolved during the current review period (Table 2-3).
- Recommendations / actions unresolved at the end of the current review period (Table 2-4). These include recommendations where actions have been assessed at 'not-applicable' or 'yes – further action is required'.

Table 2-1 : Previous recommendations assessment summary

Status	Assessment	Previous recommendation reference
Resolved before end of previous review period (Refer to Table 2-2)	Not assessed.	None.
Resolved during current review period (Refer to Table 2-3)	Completed in full.	2012/01
	Completed in full.	2012/02
	Completed in full.	2012/03
	Completed in full.	2012/04
	Completed in full.	2012/05
	Completed in full.	2012/06
	Completed in full.	2012/07
	Completed in full.	2012/10
	Completed in full.	2012/11
	Completed in full.	2012/12
	Completed in full.	2012/13
	Completed in full.	2012/15
	Completed in full.	2012/17
	Completed in full.	2012/18
Unresolved at end of current review period (Refer to Table 2-4)	Action 1 not-applicable.	2012/08
	Action 1 and 2 not-applicable.	2012/09
	Yes – further action is required.	2012/14
	Yes – further action is required.	2012/16
	Yes – further action is required.	2012/19
	Yes – further action is required for Action 3.	2012/20

2.1.2 Previous recommendations resolved before end of previous review period

Table 2-2 below provides Jacobs' review of the recommendations resolved before the end of the previous review period. This should be read in context of the actions undertaken by Western Power to resolve the identified issues – refer to the updated 2012 Post-Review Implementation Plan provided in Appendix C.

Table 2-2 : Previous Review Ineffective Components Recommendations – Resolved before end of previous review period

A. Resolved before end of previous review period				
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Date Resolved***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
None.	N/A	N/A	N/A	N/A

* As provided in the updated 2012 Post-Review Implementation Plan – *refer to Appendix C.*

2.1.3 Previous recommendations resolved during the current review period

Table 2-3 below provides Jacobs' review of the recommendations resolved during the current review period. This should be read in context of the actions undertaken by Western Power to resolve the identified issues – refer to the updated 2012 Post-Review Implementation Plan provided in Appendix C.

Table 2-3 : Previous Review Ineffective Components Recommendations – Resolved during current review period

B. Resolved during current review period				
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Date Resolved***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
2012/01	1.1 There may be an opportunity to review the framework displayed in the Network Management Plan (NMP) (e.g. Fig 2.1) to show the relationship of documents such as the Production Plans, SCI, AAs etc in the framework. 1.1 The implementation of the NMP is addressed in the Annual Work Program (AWP) and the Production Plans, however there is no ready traceability of programs noted in the NMP to tasks committed to in the production plans. 1.8 There was no clear documented evidence of document review in the 2 versions of the NMP examined in the review. There was a "Prepared by" entry, however no review/approval and no control box. Approval by the Managing Director was provided by a separate document.	[OFI] There is an opportunity to review the presentation of the Asset Management Document Framework in the NMP to show documents related to the NMP, such as the Production Plans, Statement of Corporate Intent, Access Arrangement, which are not shown in the Asset Management Document Framework. [1] There should be more visible means to identify responsibilities and commitment to tasks described in the NMP through referencing to work plan activities. [2] There should be evidence of review / approval in the controlled version of critical documents such as the NMP. There is a need to document a methodology for document review for the NMP. [6, 25]	November 2013	No – further action is not required. • The Network Management Plan revised in November 2013. The revised document was submitted and reviewed prior to and during on-site discussions with Western Power. Western Power demonstrated the structure of the plan framework and the document hierarchy, which was explicitly explored during on-site meetings. Jacobs is satisfied that these actions have been completed as indicated. No further action required. • A Summary of Asset Management Strategies table has been included in Section 7.26 of the NMP. The summary table identifies the corresponding Capex and Opex programs relating to each 'key issue and response'. • The NMP has been updated to include a Document Control section. • The Network Monitoring and Improvement section (Section 11) of the NMP documents the review process (Section 11.3).
2012/02	1.1 Processes for handover and delivery of OPEX and CAPEX work programs have been mapped and have been published on the appropriate Western Power portal (Modelpedia). Lifecycle Status Reporting and Delivery Status	Continue with the publishing of Lifecycle Status Reporting and Delivery Status Reporting processes. [11/06-1&2]	October 2012	No – further action is not required. • Western Power has provided evidence of the reporting requirements and process flows (Delivery status reporting processes, 5 June 2014, no DM reference).

B. Resolved during current review period				
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Date Resolved***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
	Reporting processes are still in progress and due to be published in October 2012.			
2012/03	1.1 It may be pertinent to review the Work Program Governance Model (WPGM) process in the Planning phase leading to Gate 3, where activities like procurement of long lead items and detailed design may take place prior to Business Case finalisation and approval. 1.1 It was noted that interpretations of the WPGM model provided at meetings showed that Business Cases are created and reviewed after the AWP. It is expected that most of the Business Case approvals would take place before finalisation of work plans and production plans and any further Business Cases would be for changes or response to changing conditions. The reverse would imply that work plans are not implemented consistently.	[OFI] Review timing of resource expenditure such as purchase of long lead items and detailed design prior to Business Case finalisation and approval. It may be appropriate to incorporate purchase of long lead items and detailed design in preliminary Business Cases or to bring forward Business Cases. [3] [OFI] Clarify the process between the Approved Work Program and the WPGM, the process leading to and from the creation of the Approved Work Program and the relationship to Business Cases. [4]	June 2013	No - further action is not required specific to the recommendation, however Jacobs has identified opportunities for improvement related to this issue. • The newly revised Work Program Governance Model was explored with Western Power during site meetings. Jacobs specifically tested the robustness of the various approval steps and approval gates through discussion with key stakeholders and observation of documentary evidence. Jacobs observes that the current framework in place is robust, with a strong focus on the staging of approvals and the relationship between the business case development and the approval gates. Gate compliance ensures that mandatory deliverable documentation is present. Without which, programs cannot be 'endorsed' to proceed to the next phase. Jacobs understands that the gate approval mechanism is systematised, and requires programmed business rules to be followed in order to obtain approval at each stage. Jacobs further explored the control of the governance process, and observed that gate approval compliance and performance was monitored, measured and reported within the business. Notwithstanding the apparent robustness of the process framework, its relatively recent inception means that some indicators for completeness and timeliness suggest that the framework is not completely bedded down. Jacobs has reviewed the gate compliance executive summary report for June 2014 (DM# 1185204). The report tracks the number of projects that were gate compliant (i.e. all required documents present) at the first pass. It shows an average gate compliance at first pass of approximately 45% - over the period from March 2014 to June 2014. It is noted that the gate compliance rate for networks projects is significantly

B. Resolved during current review period				
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Date Resolved***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
				higher, which had an average first pass gate compliance of over 60%. The average was brought down by business improvement (BI) projects which had an average of below 25%. OFI: Jacobs advises that Western Power considers periodic internal audits of compliance with the WPGM be carried out. Jacobs anticipates that this would extend further than 'first-pass gate compliance' that is currently monitored; it should audit whether non-compliant projects are passed through gates. OFI Jacobs notes that the AWP contains projects / programs that are still subject to business case development and approval. This is to be expected for projects that are included towards the end of the five- year AWP timeframe. Nevertheless, Jacobs is of the view that there should be some form of governance framework controlling whether projects are formally approved to be entered into the AWP. For example, this may be from the output of a planning report which has been endorsed, or an officially confirmed network need, etc. Jacobs advises that Western Power consider a mechanism be put in place to ensure that, at a minimum, all projects / programs included in the AWP that will incur expenditure for the first year have an approved business case and other latter-year projects or programs have an origin that is traceable through other corporate planning approval documents. This should apply to both Capex and Opex projects / programs.
2012/04	1.4, There was evidence of "Ops" (operating) costs being considered in the New Facilities Investment Test (NFIT) however there was no explicit analysis of operating costs of alternatives (e.g. Ops costs for 3 transformer years was the	There should be a more explicit and accountable analysis of lifecycle operating costs in alternative evaluations within Business Cases and in project evaluations. [5]	June 2013	No – further action is not required. • Jacobs observed that operational costs are included as a standard input for Business Case investment evaluations. The revised Investment Evaluation Model (DM# 7206870) was demonstrated and verified as including operational

B. Resolved during current review period				
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Date Resolved***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
	same as 6 transformer years). No evidence found that lifecycle costs are consistently evaluated over the entire life of the assets. 2.2 All lifecycle costs do not appear to be always evaluated. Full lifecycle costs are expected to be included in Business Cases (BC) such as in Southern River 3rd transformer project, " Southern River Capacity Improvements Business Case", where capital costs are included, as well as associated NFIT benefits, however no operating costs of transformer and feeders were sighted (e.g. the BC stated "additional benefits through improved reliability, slower asset deterioration and lower likelihood of faults, these have not been quantified due to lack of available data"). In evaluation of transmission line costs OPEX costs of insulator washing and vegetation maintenance were not sighted. The same OPEX costs were sighted in the options of installing two transformers simultaneously or staggered by two years.			costs in the investment evaluation (either algorithmically or by direct cost input). It was observed that the IEM form parts of every business investment assessment. It is noted that whilst operational costs are included in evaluation of the merits of investment decisions, full life-cycle costing appears only to be employed on a case-by-case basis where data and analysis is available to support this approach. This is particularly in relation to the decision to use alternate asset-specific technologies, e.g. new pole technologies. Jacobs observes that this approach is consistent with that adopted by utilities in other jurisdictions.
2012/05	4.2 The KPI, Pole Integrity Index (PII) measures unassisted pole failures per 10,000 poles for Transmission (TPII) and Distribution (DPII). Both were trending upwards in 2010-11. No analysis or further treatment of this KPI was evident in the section, it would be expected that the deterioration of the transmission KPI would	There should be an improvement in the accountability of KPIs in the NMP and in the referencing and traceability of investigations and actions. [7]	November 2013	No - further action is not required specific to the recommendation, however Jacobs has identified opportunities for improvement related to the issue. • Jacobs has observed that a process for the investigation, analysis and causes of KPI trends has been established; and evidence of its implementation has also been observed. However, based on the review Jacobs' view is that further

B. Resolved during current review period				
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Date Resolved***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
	be treated elsewhere however there are no references in the NMP on investigations and causes of the deterioration.			action is appropriate in this area. The articulated process appears to be relatively stand-alone and could not be readily demonstrated to fit with higher level documents. This suggests that the approach is not strongly supported by corporate procedure and scope remains for it to be culturally embedded. Notwithstanding, various documents provide evidence of the implementation of investigation, analysis and causes of KPI trends; these include: o *Overview* [and] *Detailed Investigation Process for Incidents and Trends (Function level documentation) – Interim process for use until implementation of AMST (DM# 12046249).* These process diagrams demonstrate that a mechanism to monitor, investigate, analyse and identify causes of KPI trending has been established. Western Power has advised that this is an 'interim process' that will be reviewed. However, Jacobs has not observed any documentation outlining objectives, scope or timeline for this review. o *C3-04 - Validate & Investigate Asset Incidents.* This process document covers trend analysis for incident investigations. Although, it is noted that the document does not make specific reference to KPI analysis. o *Network Management Plan (DM#11001014).* The NMP identifies KPIs and corresponding targets for asset groups and outlines strategies for poor performing KPIs. o Reports and presentations investigating causes as below. Each demonstrates a robust analytical investigation with corresponding strategic recommendations which reflect the findings. However, it is noted that the investigation reports don't appear to identify the trigger for the investigation or analysis of historical KPI trends as a matter of course.

B. Resolved during current review period				
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Date Resolved***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
				- 2012-13 pole-top fires investigation report *(DM#10968174)*. - 2012-13 distribution overhead conductors annual review (DM#11120150): - 07/13-12/13 pole failures (DM# 11885197). <u>OFI:</u> Jacobs recommends that a scope and timeline for the interim process review should be determined and documented. <u>OFI:</u> Jacobs has identified several opportunities for improvement in this area, including: o The review of the 'interim process' should streamline the process and clarify the alignment between the overview process diagram, the detailed process diagram and the underlying process documents. o That the investigation reports identify the 'trigger' for the investigation; o That the investigation process specifically identifies KPI trends to be considered as the pre-cursor to launching an investigation as opposed to only being monitored once an investigation has been triggered by some event; o That investigation reports include an analysis of historical KPI trends (regardless of whether an 'unacceptable' trend was a trigger for the investigation). • Jacobs observed that in general Western Power has improved significantly in its attention to analysing and responding to trends in performance, as evidenced in particular to the advances in the Pole asset management approaches. As a general observation however, it was not always entirely

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				evident that actions flowed from responses to performance data trends across all assets. It is noted that Western Power has identified this as an area to be addressed in its Asset Management Strategic Theme. Jacobs recommends that the general approach of monitoring performance KPI's and responding to trends through changes in behaviour and development of recovery plans should be kept under watch and assessed in the next review. Section 7.2 of the Network Management Plan (DM#11001014) summarises the objectives of Western Power's asset and incident investigation process. However, there are no references within the asset category sections to investigative reports that have informed the asset strategies. Including references to supporting investigative reports should substantiate the asset strategies. <u>OFI:</u> In cases where an incident investigation has informed the asset strategy, Jacobs advises that Western Power consider making specific references to the investigation report, or summarise the investigation findings.
2012/06	5.1 Some of the field procedures do not exist or do not have sufficient visibility: Whilst there are procedures for the management of QTs on receipt from the field, no procedure was sighted for the management of QT in the field; no procedure found in the "Work Practice Manual".	There should be a review to establish that there are appropriate procedures for core field processes. Procedure for the management of Query Trouble Reports (QTs) in the field should be created. [8]	June 2013	No – further action is not required. • Revised QT processes observed and discussed on-site. Documentary evidence provided of revised process QT recording forms.
2012/07	5.3 While the asset registers are up to date and complete, the accounting data (asset valuations) is captured in MIMS Ellipse, but not in the Asset Management systems at an asset level. Western Power should evaluate how asset	Continue with the implementation of the Integrated Strategic Asset Management (ISAM) project [9], which will create the electronic links between the Equipment Register and the Fixed Asset Register.	February 2013	No - further action is not required specific to the recommendation, however Jacobs has identified an opportunity for improvement related to this issue. • Western Power's response is noted. Relationships between the FAR and the ER noted as a work in progress. Jacobs anticipates that work continues to

B. Resolved during current review period				
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Date Resolved***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
	valuation information (fair value) should be integrated between the Financial Asset Registers and the Asset Management systems to ensure that future lifecycle replacement costs can be predicted.	[PRIP2011 11/02-1]		strengthen links between the two registers to ensure ongoing asset data integrity. Jacobs does however recognise that establishing links between disparate systems and/or revising existing systems to incorporate these links are potentially high cost/high risk projects and therefore subject to the rigours of business case justification. <u>OFI:</u> Jacobs advises that Western Power consider undertaking a review of the business merits of the opportunities to further integrate the assets information systems to identify future potential value and/or business improvement opportunity. This is linked to the Asset Management Information System AOSF.
2012/10	6.4 The procedure for the "Identification and Investigation of Unassisted Wood Pole Failures" DM7467671 does not indicate who is responsible for verification/ validation of data extracted from TCS. This has been found to take place satisfactorily in practice and the procedure should be updated to reflect the current process.	Review the "Identification and Investigation of Unassisted Wood Pole Failures" DM7467671 procedure to clarify responsibilities and update content (e.g. one of the areas for review deals with filtering of classes for data extraction). [11]	August 2013	No – further action is not required. • Jacobs understands that Western Power's systems, processes and definitions in relation to wood pole failures have evolved since the time of the previous review; such that the referenced document (DM# 7467671) is no longer applicable. Jacobs has reviewed Western Power's current investigation and testing of wood poles document (DM# 8084663) and is satisfied that the procedural steps for the classification of wood pole failures, and the accountable business areas for these steps, are outlined within this document. Jacobs has also reviewed Western Power's high level process model for failed wood pole investigations and reporting (filename: 11164679 Failed Pole Investigation Business Process Model) and is satisfied that the role (Asset System Analyst) for evidence review (including TCS data validation/verification) is defined here.

B. Resolved during current review period				
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Date Resolved***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
2012/11	6.4 Some of the classifications of pole failure such as pole leaning are not identified as unassisted. There may be a need to analyse further the causes and the risk of this type of condition: leaning may be caused by faulty foundation, a foundation is an integral part of the pole design and the pole asset and therefore should be incorporated in the definition of pole failure; leaning may result in low clearances and a hazard to the public.	[OFI] Review the classification of pole failures in terms of the whole pole asset and its design so that foundation failures are considered in pole failures. Where the cause of failure is foundation and not other factors such as high winds, pole hit etc, then that should be classified as unassisted pole failure. [12]	June 2013	No – further action is not required • Jacobs has reviewed Western Power's Policy for Managing hardwood poles (DM# 9204170), Investigation and testing of failed and selected non-failed wood poles (DM#8084663), Catalogue of Equipment Types and Definitions of Defect Severities of Distribution Overhead (DM# 1220966), Strategic Review of Pole Failure Investigations and Wood Pole Structures Asset Management Strategy (DM# 9155338) and is satisfied that leaning poles are appropriately identified and prioritised for remediation. Jacobs notes that under the current definitions in the Policy for Managing hardwood poles (DM# 9204170) a pole failure due to a faulty foundation would be categorised as an 'unassisted failure' unless the pole: 1. *Was subjected to a force exceeding that equivalent to the design wind load specifications of AS/NZS7000;* 2. *Was struck by lightning;* 3. *Was compromised by vandalism; or* 4. *Failed as a result of a fire.*
2012/12	7.1 Document registers need improvement to show consistency between the review frequency and dates of next review, the next review dates need to be updated and the registers may need to show more information on the status of the documents and their review when there are delays (i.e. If there is a postponement in a review there should be a reason given; e.g. "next review date is 19 November 2005", review had been assigned but is not yet completed). 7.1 Appoint SOCC Document Controller.	[SOCC] Continue review of "System Operation Control Room Instruction (CRI) Index" (DM7695336). This action is still in progress as several of the entries are obsolete (e.g. some of the reviews were assigned several years ago and show no closure). [23; PRIP2011 11/01-4] [OFI] [SOCC] Document registers need improvement to show consistency between the review frequency and dates of next review and should show more information on the status of	November 2012	No – further action is not required. • Jacobs notes that this role has been established and filled. • Jacobs notes that SOCC and NOCC were merged into a single operations centre with common management and control procedures. In discussion with Western Power personnel at the control centre, Jacobs explored the extent to which the new structures were appropriately governed, and whether documentation updates have been undertaken accordingly. This was confirmed, and Western Power commissioned an independent audit of this in February 2014 by SA Global (DM#11767283: ISO 9001:2008 Audit Report

B. Resolved during current review period				
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Date Resolved***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
	[Action PRIP2011 11/01-3] The SOCC Document Controller has not been engaged. Whilst contract personnel have been engaged in this function, there are still actions that need to be completed to effectively set up and manage the documentation. 9.1 SOCC's Transmission Emergency Management Plan (TEMP) quotes a NOCC Emergency Management Plan (DM2072196), however that procedure is not listed in NOCC. There is an "Emergency Management Plan for East Perth Control Centre" (DM5551897, last issue October 2011). Plan includes forms for emergency debrief checklist to be filled out post fire drill and post fire incidents. Actual application of the procedure did not have debrief information. "System Control Room Emergency Procedures" quotes the Emergency Management Plan for East Perth Control Centre" as DM367761 which appears to be a superseded version. The "Emergency Management Plan for East Perth Control Centre" (DM5551897) is not referenced in SOCC document index.	the documents and their review (e.g. If a review is not required by that date, update the date of the review to a future date, and clarify reason in comments). The next review dates should be updated if the review is not required. [14] [SOCC] Several documents assigned for review in SOCC register have been pending review for a long time and will require to be reviewed; once reviewed the register will need to be updated. [15] [OFI] [SOCC] The number of "Assigned" reviews could also be a KPI. This would highlight periods when many procedures are due for review. [PRIP 2011-11/01-1] [SOCC] Continue with the actions to effectively set up and manage document control. [PRIP 2011-11/01-3]		2014). Jacobs has reviewed the audit findings and confirms that zero non-conformances were identified.
2012/13	7.1 Two wood pole inspection procedures were viewed, each with the same electronic name and DM number but with different version number, 8i and 11B, version 11A was noted as having been	Clarify the existence of two documents with same DM number but documents are different. Determine causes and implement corrective action.[16]	March 2013	No – further action is not required. • Jacobs has reviewed the relevant documentation and is satisfied that the document has been revised with appropriate revision controls.

B. Resolved during current review period				
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Date Resolved***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
	re-issued with a different DM number. 11B is titled "Bundled Pole Inspection Procedure" on its cover, compared with "Wood Pole Inspection Procedure" for the 8i version. Version 8i and 11B are due to be reviewed in May and June 2014 respectively. There is no information on whether revisions 9 and 10 were ever issued. There are no notices on either of the documents of the existence of the other. Version 11 does not show previous revision history. A notice should be included in documents issued under this process to clarify: The status of the document, is it current, superseded, to be withdrawn? The existence of the other document. The reason for both documents and directions to the user: which procedure to use for which purpose?	If a document has been superseded an indicator showing its superseded status is included in the document and a historical reference is included on the new document. Revise applicable procedures. [17]		
2012/15	8.2 The Network Risk Issue Register does not show what actions and treatments are in place on each risk. Whilst that information may be available elsewhere, there is no readily visible traceability or link to the treatment plans, the actions, responsibilities and timing of responses. [SAOI] The register is reliant on highly skilled staff to maintain it in synchronisation with CURA and to capture all risks that are generated by the asset managers. Because of the manual intensive input the register is prone to gather small errors.	Further review and development of the network risk register should be continued and its management process should be improved in view of the limitations of the present model. [SAOI 1] There is a need to review the risk management process and the risk register to address: the traceability of treatment plans, responsibilities, response times. [19] As part of the review of the Network Risk	May 2013	No – further action is not required. • Jacobs has reviewed the Networks Risk Register (DM# 3528771) and is satisfied that: o Both the Capex and Opex programs/projects are captured in relation to each network issue. o Completion dates and cycle times for Capex and Opex programs/projects are captured. o An 'Operational Owner' has been assigned for each risk/issue.

B. Resolved during current review period				
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Date Resolved***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
	The register does not show the treatment plans and the actions. Some of the risks may be the result of clearly defined factors (e.g. design, conditions) and the current structure is not optimal for highlighting those aspects of the risks and for following up on solutions. 8.2 Interview with Transmission Operational Asset Management (OAM) section indicated that operational and maintenance staff with in depth knowledge of the asset risks and responsibilities for asset construction and maintenance were not aware of the Network Division "Network Risk Register", which indicates that there may be an opportunity to improve the annual risk analysis by including their contribution. Discussions highlighted a rising number of early faults in transformers, involvement of operational staff should highlight early any adverse operational trends.	Register there may be a need to review the interfaces and the inclusion of stakeholders that have day to day exposure to the asset operation, maintenance and field performance of assets. [20]		
2012/17	8.3 Assets such as the East Perth Control Centre should also be included in risk assessments both in terms of its operation and risks attached to the building. (A risk assessment was originally carried out for the building. The target availability of the building is 99.9%).	[OFI] The East Perth Control Centre and the building asset should also be analysed for risks. [22]	January 2013	No - further action is not required specific to the recommendation, however Jacobs has identified an opportunity for improvement related to this issue. • Jacobs has discussed this issue with Western Power and observed evidence that a risk assessment was conducted in 2011-12, which included an external review of site security. Jacobs understands that the risks were assessed and reported in May 2011 (DM# 9341887), analysed and prioritised (DM# 9385685) and actions are entered into a risk register and tracked (DM#50222474).

B. Resolved during current review period				
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Date Resolved***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
				Recommendation: Jacobs advises that a program of regular reviews of these risks be developed and implemented in the overall Business Continuity Plans for Western Power. Refer to JR: 20/2014
2012/18	9.1 Reviewer did not sight any formal: o lessons learnt and actions arising from emergency; o systematic scenario test schedule and treatment of test responses. The test of July 2011 showed that not all tests were able to be carried out due to civil works at the Head Office Emergency Control Centre (HOECC). The finding was that the HOECC could be used in an emergency however: o the question of the management of maintenance and construction at the back up facility needs to be reviewed to enable operation during emergencies and O It is not always clear how issues encountered in tests are closed, which stakeholders are involved in the assessment of the corrective actions and whether all relevant stakeholders are aware of issues. Contingency planning may relate to the failure of an asset or to a threat to an asset or its operation. The reviewer has noted that other emergencies related to the operation of the assets may have to considered because they relate to the possible disruption of service levels,	Review Contingency planning and testing at the Control Centre to incorporate the following for SOCC and NOCC: The preparation of Control Centre staff should be tested in a variety of scenarios to ensure that the staff can adequately respond to events and that, if there are shortcomings to response procedures, these are identified under test conditions, not in real life situations. Tests may include test of Pandemic contingency plan (leading to a loss of a potential 50% of Control Room staff); loss of operational phone systems etc. [24, SAOI 2, PRIP2011 11/05-1] There should be a further review of contingency plans which need to be tested to maintain staff competency and reduce the risk of failure when those plans are put into action in response to real events. Trial scenarios/role playing exercises should be enacted on an annual basis. The trials should consider different events so that the Control Centre is tested on many possible eventualities. [SAOI 2]	December 2013	No - further action is not required specific to the recommendation, however Jacobs has identified an opportunity for improvement related to this issue. • Jacobs were advised during on-site meetings that a formal training exercise that led the Emergency Management Team through various scenarios was undertaken. Western Power has subsequently provided high-level outcomes from this review including action items, which Jacobs has reviewed. <u>Recommendation</u> Jacobs recommends that a program of regular reviews of these risks be developed and implemented in the overall Business Continuity Plans for Western Power. Refer to JR: 18/2014 Refer to JR: 19/2014 Refer to JR: 20/2014

B. Resolved during current review period				
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Date Resolved***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
	e.g.: o Pandemic Contingency Plan, (loss of key staff operating the Control Centre); o Pole Top Fires Contingency Plan; o Response to Bushfire; o Manual Program Load shedding Curtailment Instruction. Viewed records of meetings however from an operational perspective, unless each of the minutes is examined there are: o no annual list of how many events had to be responded; o no rating of the quality of the response; o no measure of which actions and how many were raised, how critical and if any open. The recommendation made in the 2011 Review required that activation of contingency plans (other than BCC activation) should be recorded in a central register. The SOCC action was to develop "a system of logging tests and events relating to significant disruptions which have occurred." The system adopted was the System Disturbance Advice (SDA) system. The review found that the use of SDAs does not provide a system for recording the activation of contingency plans. The response from SOCC to the review was:	There should be a specific procedure to address: How to select the annual test scenario; Who will be advised of the test; Debriefing meeting and identification of errors and weaknesses; Recording of corrective and improvement actions in an action log and monitoring of action completion. [SAOI 3] Review the process of handling and closure of tests actions to ensure that issues are critically reviewed and by which stakeholders the shortcomings are assessed. [SAOI 5] A formal test register should be implemented to record details of the tests and actions arising from the tests. [SAOI 4]		

B. Resolved during current review period				
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Date Resolved***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
	"The System Disturbance process is on its own. This process is not part of contingency management. The system disturbance process is only to capture data". On this basis the recommendation of the 2011 Review has not been addressed. [11/05-3]			

* As provided in the updated 2012 Post-Review Implementation Plan – *refer to Appendix C.*

2.1.4 Previous recommendations unresolved at the end of the current review period

Table 2-4 below provides Jacobs' review of the recommendations unresolved at the end of the current review period. This should be read in context of the actions undertaken by Western Power to resolve the identified issues – refer to the updated 2012 Post-Review Implementation Plan provided in Appendix C.

Table 2-4: Previous Review Ineffective Components Recommendations – Unresolved at end of current review period

C. Unresolved at end of current review period			
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
2012/08	6.3 Western Power is due to develop a monthly report which tracks the date poles were inspected against the date the pole is due to be replaced for P1 and P2 condemned poles. This report will track the poles which are not replaced within the replacement target dates. Western Power will include a standard agenda item at meetings between key operational managers to discuss the report. Issues will be	Continue with actions to develop the report on P1/P2 performance to be part of the agenda at meetings between operational managers. [PRIP11/09-2] Continue with review of delays and correction of delays in rectification of P1 and P2 wood pole conditions. [10]	Not Applicable. This recommendation has been superseded through the implementation of new processes by Western Power. However, Jacobs has identified a subsequent recommendation related to this issue. • Jacobs has reviewed the Wood Pole Management Dashboard for December 2013 (DM# 11674354). Jacobs is satisfied that the December 2013 dashboard appropriately reported performance against the backlog of P1 / P2 poles. However, with the transition to a risk based approach the previous P1 and P2 timeliness targets are no longer applicable. Under Zone Based Asset Management (ZBAM) a volume of high-risk

C. Unresolved at end of current review period			
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
	highlighted and managed through the minutes of meeting. The report, when developed will form part of the Business Performance report for all distribution management and will also be reviewed by the Operations General Manager. 6.3 There are delays in achieving completion of wood pole replacements for P1 and P2 condition within the required time. The delays have been attributed to: reduction in planned outages, decreasing opportunities for replacing assets; data lag; find rate from inspections higher than replacement rate.	Continue actions to report on actual P1 and P2 delays. [PRIP 2011 11/09-1] Continue actions to identify causes of delays. Implement actions to reduce delays. [SAOI 7, 8, 9]	poles are targeted based upon available resources. This means that measuring the backlog against the resources-based target volume no longer captures the issue surrounding timeliness of pole remediation. Jacobs understands that under the new risk-based approach the highest priority categories are 'fault' poles and the second highest priority are Priority Attention Required (PAR). Faults are addressed immediately or, should this be prevented due to access restrictions, made safe and reclassified as 'Short Term Deferred' works. PAR poles have 12 week remediation targets and Short Term Deferred poles are re-assessed on a two-weekly basis until remediated. Performance against these targets is not however reported in the dashboard. Wood pole performance is now reported in the Executive Dashboard for Delivery & Public Safety, and Jacobs has reviewed this dashboard for May 2014 (DM# 12081090). Jacobs is not satisfied that the May 2014 dashboard reported wood poles remediation KPIs against timeliness targets. <u>Recommendation:</u> Jacobs recommends that Western Power introduce and monitor timeliness indicators for attending to defects. This is explored further by Jacobs under the Asset Maintenance process category and the Poles Area of Special Focus for Poles. Refer to JR: 07/2014 • Western Power has advised that all dashboard reporting is now carried out through Cognos based reports. • Jacobs has reviewed Western Power's monthly Executive Dashboard for Delivery & Public Safety reports and understands that these are available to all relevant internal stakeholders. The dashboard reports pole replacement and reinforcement outcomes against the target volumes. Jacobs understands that Western Power conducts a half yearly performance review of its wood pole performance, the findings of which are presented to all relevant internal stakeholders.

C. Unresolved at end of current review period			
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
			Jacobs has reviewed the half yearly review from July 2013 to December 2013 (DM# 11885197) and is satisfied that its content appropriately presents issues to relevant internal stakeholders. • Jacobs has reviewed Western Power's wood pole strategy (DM# 9155338) revised in June 2013. Jacobs is satisfied that it is a robustly developed approach that is appropriate given Western Power's resource constraints.
2012/09	6.3 A P1 condition identifies an asset that is not serviceable and may fail shortly, the condition was due to be rectified within 2 weeks up to 6 February 2012 and within 4 weeks from that date. No information was seen to show the grounds for extending the rectification of pole assets judged to "immediately fail" from 2 to 4 weeks. It was noted that the P1 condition required rectification within:24 hours in 2004; was extended to 2 weeks on 22 September 2010; extended to 4 weeks on 6 February 2012. 6.5 There is an inconsistency between the priority attached to condition P1, specified in the "Catalogue of Equipment Types and Definitions of Condition Severities for Distribution Overhead Lines" (DM9047586) which provides the P definitions and defects identification, versus the information on Priorities provided in the " Review of Query Trouble Reports for 1st Half of 2011/12 FY", DM9121078). For a Priority 1 condition the Catalogue specifies a turnaround of 28 days	Document the risk effects of extending the time allowed for rectification of pole assets that may immediately fail (P1 condition) from 24 hours to 4 weeks. [SAOI 10] Clarify or address the difference between the P1 target of 28 days in the "Catalogue of Equipment Types and Definitions of Condition Severities for Distribution Overhead Lines" versus the 24 hours target for Priority 1 work identified in the QT Reports process. [13]	Not Applicable. This item has been superseded through the implementation of new processes by Western Power. • Jacobs has reviewed Western Power's report (DM# 10167848) in response to this issue. In the report it is explained that the changing of wood pole replacement P1 rectification from 24 hours to 4 weeks is a result of changing the P1 terminology and definitions, and that no network risk changed as a result of the changes to P1 terminology and definitions. Jacobs notes that Western Power has since transitioned to its risk based approach which is based on the application of Western Power's Network Risk Management Tool (NRMT). • Jacobs has reviewed Western Power's report (DM# 10167848) in response to this issue. In the report it is explained that the differences result from confusion between definitions applied to the transmission and distribution networks, where the same terminology is applied but has different meanings. Jacobs notes that Western Power has since transitioned to its Zone Based Asset Management (ZBAM) approach which is based on the application of Western Power's Network Risk Management Tool (NMRT). Jacobs understands that the new approach now applies the same terminology across both the transmission and distribution networks. • Jacobs has reviewed the 2013 and 2014 revisions of the 'Catalogue of Equipment Types and Definitions of Condition Severities for Distribution Overhead Lines' *(DM#9047586 and DM# 1220966)* and is satisfied that the document has been revised appropriately. In the July 2014

C. Unresolved at end of current review period			
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
	from identification, whilst the information provided on QT Reports showed a 24 hours completion target.		version references to P1/P2 has been removed consistent with Western Powers new Fault/PAR/ZBAM approach to wood pole management.
2012/14	8.2 OPEX tasks in the Transmission Production Plan are associated with risks, e.g. Underground (UG) System Inspection required for the early detection of developing faults in the UG cables. Some of the risks do not appear in the Division "Network Risk Issues Register" (e.g. fault development in UG cables) A field "risk register number" is included in the Transmission Production Plan however the function of this field is not clear as it does not refer to the risk register.	Ensure that risks identified in the Transmission Production Plan are included in the Division "Network Risk Issues Register" and improve their cross-traceability with the register. Clarify use of Risk register numbers. [18]	Yes – further action is required. • Jacobs has reviewed the Networks Risk Register (filename: 3528771 Network Risk Issues Register) and samples from the Transmission Production Plan (DM # 10699127). Jacobs is unable to observe from the documents provided where the production plan activities specifically address the risks numerically identified in the risk register (by their Risk Number), however notes that the Network Risks are qualitatively identified. Jacobs is of the view that the entries in the Risk Register referencing back to projects and programs aimed at mitigating this risk are most likely sufficient, but the references in the AWP need to be more specific and could be improved by direct references to the Risk Register number. Jacobs affirms that whilst 'further action is required' to address the previous recommendation, it is considered a hygiene issue that will not have a material impact on the effectiveness of the asset management system. Jacobs has therefore categorised it as an Opportunity for Improvement (OFI). <u>OFI:</u> Jacobs advises that there should be a specific reference to the network risk number in the Production Plan project sheets.
2012/16	8.2 Delays in rectifying wood pole P1 and P2 conditions are not recorded in risk registers. Similar risks are recorded at a macro level: i.e. "Failure to deliver the Annual Works Program". In view of the risk of late rectification of P1	[OFI] In view of the risk of late rectification of P1 conditions it may be opportune to highlight the existence of this risk separately in risk registers so that sufficient attention and resources are available to mitigate this risk.	Yes – further action is required. • Jacobs has reviewed the 'Risk per Page' (DM# 12028547) and notes that some visibility of the risks associated with unassisted wood pole failures is identified.

C. Unresolved at end of current review period			
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
	conditions, It may be opportune to highlight the existence of this risk separately so that sufficient attention and resources are available to mitigate this risk.	[21]	However, the updates to the CURA sheet appeared to be only partially complete, with names of responsible officers missing in some cases. Also, it is unclear as to how the new risk-based pole management approach has further treated the residual risk or improved the risk profile associated with wood pole defects. Further, it is not evident how the timeliness of replacements has been considered other than to say that replacement volumes and funding are to be assured. To specifically address the issues that arise from timeliness would require a treatment with a specific treatment plan, or at least a review with this objective as a focus. The CURA worksheet has some updated references as per the action item, but Jacobs is of the view that these treatments are not reflective of current approach to managing pole risk. Jacobs has reviewed the mitigation treatments with respect to distribution wood poles extensively within the AOSF 2 – Distribution Wood Poles section of this report; and considers the updating of CURA to reflect the new approach to be a hygiene issue. Jacobs affirms that whilst 'further action is required' to address the previous recommendation, it is considered a hygiene issues that will not have a material impact on the effectiveness of the asset management system. Jacobs has therefore categorised it as an Opportunity for Improvement (OFI). <u>OFI:</u> CURA should be updated to reflect the current approach to mitigating the risks associated with distribution wood pole failures.
2012/19	9.1 The test of July 2011 showed that not all tests could be carried out due to civil works at the Head Office Emergency Control Centre. Reviewer did not see a severe weather contingency plan for NOCC.	Carry out a risk analysis of the complete suite of contingency scenarios to ensure that all likely threats to responses are systematically evaluated and appropriate responses designed. For example the current set of responses does not include the event of maintenance and construction works being performed at the back up facility.[SAOI 6]	Yes – further action is required. • Western Power conducted an emergency management risk review across a range of scenarios in 2013. Various action items and opportunities were identified, recorded and assigned. It is not clear that the review will be conducted annually as recommended. <u>Recommendation:</u> That Western Power develops an annual review policy, timetable or framework as appropriate.

C. Unresolved at end of current review period			
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
			Western Power to provide if available. This is identified further in the Business Continuity Area of Special Focus. Refer to JR: 18/2014 Refer to JR: 19/2014 Refer to JR: 20/2014
2012/20	12.1 Whist there are documented program for review and update of key documents and several documents showed review, various documents showed that their review cycles had not been maintained and no indication was available of the reasons for the delay. In some cases the due date of the next review was recorded within the document which is a requirement of the Document Management procedures, however this is not consistently applied and may be a cause for inconsistency.	There is a need to adopt a methodology defining document review cycles and maintaining them, and to apply the methodology consistently to all documentation across the board, to avoid conflict between documents and registers control information. [26] [6,14,15,16,17,23, PRIP2011 11/01-4]	Yes – further action is required. • In carrying out the 2012-14 asset management system review Jacobs found that uncertainties surrounding document revisions and control still persist within the organisation; for example: o Critical documents don't always contain document control information. o Documents with control sections do not identify the intended start and completion dates for the next review. Jacobs understands that Western Power has carried out a review of document control and record keeping functions. Jacobs has observed a presentation of the recommendations and action plan stemming from this review (DM# 11061903). A key recommendation of the review was that 'the document management system should be upgraded, simplified and automation introduced to manage controlled documents'. In response Western Power has reviewed options to upgrade their document management system to simplify and automate the review of controlled documents. In relation to the upgrade of the electronic document management system Western Power has advised that: o A preferred option is to replace the current electronic document management system with the 'OpenText Content Server', which is expected to provide the enhanced capability that is required for effective document control. o An Expression of Interest (DM#11703735) for implementation services was released and responses assessed in February 2014. o A Scope of Work (DM#11791901) was issued to three short-listed providers and the

C. Unresolved at end of current review period			
Reference (no./year)*	**(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)***	**Reviewers' Recommendation***	**Further action required (Yes/No/Not Applicable) & Details of further action required including current recommendation reference if applicable**
			responses are being assessed now (May 2014). o The upgrade is currently scheduled to commence in the second half of 2014, subject to business case development and approval. <u>OFI:</u> All documents should have a document control sections that include information on past revisions and intended start and completion dates for the next review. <u>Recommendation:</u> Jacobs recommends that a post-implementation review is carried out following the implementation of the new document management system to ensure that the document control and review issues have been addressed. Refer to JR: 15/2014

* As provided in the updated 2012 Post-Review Implementation Plan – *refer to Appendix C.*

3. Performance summary

Table 3-3 summarises Jacobs' assessment of each of the twelve key asset management processes together with the effectiveness criteria for each key component. The overall effectiveness rating for each asset management process is based on the combination of the process and policy adequacy rating and the performance rating, as defined in Table 3-1 and Table 3-2.

Table 3-1: Asset management process and policy definition adequacy rating– Audit and Review Guidelines, page 29

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 update 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 3-2: 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.
4	Serious action required	• Process is not performed, or the performance is so poor that the process is considered to be ineffective.

Jacobs' assessment of Western Power's performance against each of the key process areas and effectiveness criteria is provided in Table 3-3 below.

It should be noted that the approach taken by the Jacobs team to rate the asset management system performance is as follows:

1) Rate each asset management system deficiency that has resulted in a recommendation; this is done in consideration of the specific deficiency being considered rather than the performance of the effectiveness criteria as applied to the asset management system as a whole.

2) Combine the ratings of all deficiencies under each effectiveness criteria to rate the criteria as a whole.

   Where there is more than one deficiency related to a given effectiveness criteria, Jacobs has selected the overall lowest rating. For example, if two different issues have resulted in B3 and C2 assessments for the same effectiveness criteria, these have been combined to give an overall rating for the effectiveness criteria as C3.

   It should be noted that there are cases where the deficiency ratings have resulted in a disparity between the rating assigned to the specific deficiencies and Jacobs' observations of the effectiveness criteria as whole. In these instances the ratings have been revised to strike a balance between ensuring:

   - That the deficiency rating accurately reflects the significance of the issue that has been identified; and,
   - That the overall performance of the effectiveness criteria is reflected accurately as the deficiencies are combined for a holistic effectiveness criteria rating.

3) Where an effectiveness criteria does not have associated deficiency ratings (i.e. no deficiency has been identified that has led to a recommendation), the Jacobs' team have applied a rating in consideration of the general observations, any opportunities for improvement (OFI) that have been identified, and using professional scepticism.

4) Each of the effectiveness criteria has been assessed as discussed above, and the overall assessment for each key process area is then based upon the average of its underpinning effectiveness criteria. It should be noted that score of 0.5 has been rounded 'up' to the better rating e.g. if the average of the effectiveness criteria ratings is 2.5 Jacobs has rounded 'up' to a rating of 2.

   The Jacobs' team have considered the validity of the overall assessments in view of the above approach and are satisfied that the overall ratings for each key process area are reflective of the fieldwork observations and review findings.

Additionally, it should be noted that the ratings in Table 3-3 are based upon the effectiveness of the asset management system at the time the review was undertaken; nominally as of 30 June 2014. It does not capture 'deficiencies' resolved (either partially or fully) over the period. That is, the ratings are based on the performance, recommendations (JRs) and opportunities for improvement (OFIs) at this point in time, and resolved issues identified in Table 2-1 and Table 2-2 in Section 2, and Table 5-1 in Section 5 do not affect the ratings.

Table 3-3: Asset management system effectiveness summary

Asset Management System Component & Effectiveness Criteria	Asset management process and policy definition adequacy rating	Asset management performance rating
1. Asset Planning	**B**	**2**
1.1. Asset management plan covers key requirements	B	1
1.2. Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning	C	2
1.3. Service levels are defined	B	2
1.4. Non-asset options (e.g. demand management) are considered	B	2

Asset Management System Component & Effectiveness Criteria	Asset management process and policy definition adequacy rating	Asset management performance rating
1.5. Lifecycle costs of owning and operating assets are assessed	A	2
1.6. Funding options are evaluated	A	1
1.7. Costs are justified and cost drivers identified	A	1
1.8. Likelihood and consequences of asset failure are predicted	A	2
1.9. Plans are regularly reviewed and updated	B	1
2. Asset Creation and Acquisition	**B**	**2**
2.1. Full project evaluations are undertaken for new assets, including comparative assessment of non-asset solutions	B	2
2.2. Evaluations include all life-cycle costs	A	2
2.3. Projects reflect sound engineering and business decisions	B	3
2.4. Commissioning tests are documented and completed	A	1
2.5. Ongoing legal/environmental/safety obligations of the asset owner are assigned and understood	C	3
3. Asset Disposal	**B**	**1**
3.1. Under-utilised and under-performing assets are identified as part of a regular systematic review process	B	2
3.2. The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken	B	2
3.3. Disposal alternatives are evaluated	A	1
3.4. There is a replacement strategy for assets	B	1
4. Environmental Analysis	**B**	**2**
4.1. Opportunities and threats in the system environment are assessed	A	2
4.2. Performance standards (availability of service, capacity, continuity, emergency response, etc.) are measured and achieved	C	2
4.3. Compliance with statutory and regulatory requirements	B	2
4.4. Achievement of customer service levels	A	2
5. Asset Operations	B	2
5.1. Operational policies and procedures are documented and linked to service levels required	B	2
5.2. Risk management is applied to prioritise operations tasks	B	2
5.3. 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	B	2
5.4. Operational costs are measured and monitored	A	1
5.5. Staff resources are adequate and staff receive training commensurate with their responsibilities	A	1
6. Asset Maintenance	**B**	**2**
6.1. Maintenance policies and procedures are documented and linked	C	2

Asset Management System Component & Effectiveness Criteria	Asset management process and policy definition adequacy rating	Asset management performance rating
to service levels required		
6.2. Regular inspections are undertaken of asset performance and condition	A	1
6.3. Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule	A	2
6.4. Failures are analysed and operational/maintenance plans adjusted where necessary	B	2
6.5. Risk management is applied to prioritise maintenance tasks	B	2
6.6. Maintenance costs are measured and monitored	A	1
7. Asset Management Information System	**A**	**1**
7.1. Adequate system documentation for users and IT operators	C	1
7.2. Input controls include appropriate verification and validation of data entered into the system	B	1
7.3. Logical security access controls appear adequate, such as passwords	A	1
7.4. Physical security access controls appear adequate	A	1
7.5. Data backup procedures appear adequate and backups are tested	A	1
7.6. Key computations related to licensee performance reporting are materially accurate	A	1
7.7. Management reports appear adequate for the licensee to monitor licence obligations	A	1
8. Risk Management	**B**	**2**
8.1. Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system	C	3
8.2. Risks are documented in a risk register and treatment plans are actioned and monitored	B	2
8.3. The probability and consequences of asset failure are regularly assessed	A	2
9. Contingency Planning	**C**	**3**
9.1. Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks	C	3
10. Financial Planning	**A**	**1**
10.1. The financial plan states the financial objectives and strategies and actions to achieve the objectives	A	1
10.2. The financial plan identifies the source of funds for capital expenditure and recurrent costs	B	2
10.3. The financial plan provides projections of operating statements (profit and loss) and statement of financial position (balance sheets)	A	1

Asset Management System Component & Effectiveness Criteria	Asset management process and policy definition adequacy rating	Asset management performance rating
10.4. The financial plan provide firm predictions on income for the next five years and reasonable indicative predictions beyond this period	B	2
10.5. The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services	A	1
10.6. Significant variances in actual/budget income and expenses are identified and corrective action taken where necessary	A	1
11. Capital Expenditure Planning	**A**	**1**
11.1. There is a capital expenditure plan that covers issues to be addressed, actions proposed, responsibilities and dates	A	1
11.2. The plan provides reasons for capital expenditure and timing of expenditure	A	1
11.3. The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan	A	1
11.4. There is an adequate process to ensure that the capital expenditure plan is regularly updated and actioned	B	2
12. Review of asset management system	**A**	**1**
12.1. A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current	B	2
12.2. Independent reviews (e.g. internal audit) are performed of the asset management system	A	1

4. Observations

4.1 Review approach

Table 4-1 provides an overview of the general review approach applied as appropriate by the Jacobs team. These are discussed in greater detail with respect to each key process area and area of special focus.

Table 4-1: Review Approach

Review Approach and Details	Jacobs Response
• Interviews with relevant personnel.	Refer to Appendix A – Interview schedule.
• Sources of information used to assess effectiveness.	Refer to Appendix B – Document list.
• Review procedures performed to assess effectiveness.	The Jacobs team performed the following review procedures as appropriate to assess effectiveness: • Review of Preliminary information. • Presentations from key process owners. • Interviews with key process staff interactively with presentations. • Deeper exploration of processes, procedures and systems as appropriate. • Follow-up discussions with key process owners to clarify observations and findings. • Review of detailed information provided. • Requests for follow-up details and evidence of processes. • Ongoing discussions with Western Power review team to clarify findings and seek additional information as appropriate. • Field meetings with process staff at EPCC and Kewdale depot.
• Reviews of systems and/or procedures that were performed during the audit or review.	Systems and procedures demonstrated and interrogated include, but are not limited to: • Ellipse (Equipment register) – specifically explored at the Kewdale depot; looking at links between assets, work orders, associated financial information and work histories. • Query Trouble (defect reporting system) – specifically explored at Kewdale depot; followed through the procedure of incoming QTs, work scheduling and incorporation of QTs into the combined maintenance program. • Work Scheduling Management System (WSMS) – specifically explored at Kewdale depot; following the process of scheduling works and selection of appropriately qualified crews. • Combined maintenance – specifically explored at Kewdale depot; exploring the programing and management processes, observing plans in preparation and incorporation of differing elements including CBRM and QTs. • Geographical Information System (GIS) – specifically interrogated during asset information meeting; explored the operation of the system and interrogated links between GIS and the equipment register (Ellipse). • PowerOn Fusion (distribution network management system) and XA (transmission network management system) – specifically explored at EPCC; observing operation and interrogating on emergency and contingency management situations. • Investment Evaluation Model (IEM) – walked through operation during Capex meeting; interrogating on operation and incorporation of Opex and whole-of-life costs. The model template was also provided and reviewed. • Risk Assessment Tools (Wood Poles and Transformers) – models provided and reviewed with further questioning. • Condition Based Risk Management (CBRM) – models provided and reviewed with further questioning.

	• Network Risk Management Tool (NRMT) – process as applied to distribution wood poles scrutinised in detail from start to finish, and followed up with further questioning and information requests • Transformer condition assessments – condition assessment procedures and process documents scrutinised in detail. The processing and management of condition assessment information (including inspection sheets and condition monitoring data and reports) observed and interrogated during Kewdale depot visit.

The observations of the Jacob's team over the course of the review are provided separately with respect to the twelve key asset management processes and the areas of special focus in Table 4-2 and Table 4-3.

4.2 Key asset management process observations

Table 4-2 below provides the key findings, the overall level of effectiveness demonstrated by Western Power over the 2012-14 period, and references to the recommendations for the twelve key asset management processes.

Table 4-2: Key Asset Management Processes – Observations

Asset Management Process	Observations
1. Asset Planning	• Process: Asset planning strategies are focused on meeting customer needs in the most effective and efficient manner (delivering the right service at the right price). • Outcome: Integration of asset strategies into operational or business plans will establish a framework for existing and new assets to be effectively utilised and their service potential optimised.
• Key findings of the review fieldwork.	<u>Overview</u> • Western Power has adopted an integrated approach to its asset planning (and asset creation) activities. This approach is outlined in its Network Investment Strategy (NIS) (DM#7314528) which provides: - An over-arching roadmap of the purposes of Western Power's investment approach; - The broad corporate objectives it hopes to achieve with the investment; - The investment planning and implementation framework employed; - Governance arrangement. • Overall, the NIS discusses high-level concepts and process, how these overlap and integrate, and how the network investments are targeted to achieving the desired network outcomes. • The NIS is supported by a comprehensive suite of related investment planning and governance processes, including: - Strategic Investment Framework (SIF), which is focussed on ensuring projects and programs that compete for resources (capital or otherwise) are weighted against each other on the basis of addressing corporate risk and/or the meeting of corporate objectives. - Network Risk Management Tool (NRMT) and other risk assessment tools, which are aimed at ensuring that candidates for investment within programs are appropriately prioritised in accordance with network risk and the achievement of business outcomes. - Work Program Governance Model (WPGM), which ensures appropriate controls, and investment decision making and implementation from planning through to the delivery stages of the investment program. • In addition to this, various other plans exist that provide an overview of Western Power's approach to asset planning. In particular, the Network Management Plan (NMP) (DM#11001014) provides an asset-centric view of the condition, capability, and performance of the network assets as a whole, and key asset groups. It also outlines the Asset Management Framework implemented within Western Power and articulates Western Power's asset management principles and methodologies. <u>General Observations</u> • The overall approach adopted by Western Power for Asset Planning displays a high degree of sophistication and an understanding of the need to coordinate, integrate and optimise asset investment planning activities.

Asset Management Process	Observations
	• The embedding of a governance framework in this approach ensures that Western Power has the ability to manage and control the network investments through their entire lifecycle. Active management of the planning and creation stages of the life-cycle is recognised as vital to ensuring the "right" investment decisions are made. • Western Power indicated that asset renewal needs are outlined in the NMP. Jacobs acknowledges that this is the case at an asset category level. Western Power indicated that the SIF approach, as detailed in the NIS, outlines at a high-level how asset renewal needs are coordinated and planned in conjunction with network development needs. The Transmission Network Development Plan (TNDP) spells out over a ten year period the total network development investment requirement, incorporating investments driven by both asset condition and network capability. As such, it demonstrates to an extent the coordinated investment approach that is outlined in the NIS. Notwithstanding this, it was difficult for Jacobs to gain insight into the total asset renewal driven investment requirements of the business through these documents. In particular, it is not clear whether Western Power can articulate an overall asset renewal strategy, and the extent to which there is a hierarchy in its approach to asset renewal planning that allows for the development of an optimised asset renewal driven investment portfolio. It is unclear whether Western Power has a long term view of the total asset renewal expenditure requirement, or is able to demonstrate how renewal needs for "child" assets roll up in a coordinated way that would lead to an overall renewal plan for a parent asset. For example, being able to demonstrate the planning how the confluence of replacement needs for individual assets in a substation such as circuit breakers, transformers, auxiliary equipment, secondary systems and civil infrastructure may lead to the need to plan for the replacement of the substation as a whole. • Western Power's SIF and associated risk assessment tools (such as the NRMT)are centred on ensuring linkages exist between network investment and the generation of business outcomes, and in particular network risk. Whilst much of the discussion with Western Power confirmed this, and it was clearly evident in relation to the Wood Pole Management Strategy, it was not clear how this manifests in relation to other investment decisions. In particular and the extent to which risk of each identified need was objectively quantified, and whether network investments were specifically prioritised on this risk basis was not clear. Western Power has advised that the broadening of this approach to apply to other asset groups is part of their ongoing development of this framework. • Related to this are the actions associated with Recommendations 2012/14 and 2012/16 from the previous review. The documentation provided by Western Power as evidence that these recommendations have been addressed are insufficient in Jacobs view to demonstrate that there is a clear linkage between the treatment of network risk as an outcome of the investment proposed or undertaken. In particular, Jacobs is unable to observe where the specific network risks (identified by their risk number) are noted on the Approved Works Program (AWP) summary sheets. The references in the Risk Registers appear general, albeit with guidance given, as some detail on the projects and programs is aimed at addressing that risk. Jacobs is of the view that the entries in the Risk Register are most likely sufficient, but the references in the AWP need to be more specific and could be improved by direct references to the Risk Register number. • Notwithstanding the approach outlined above, Jacobs was unable to observe how the SIF approach yielded an overall improvement in network performance. Long-term objectives for essential performance indicators such as reliability, network capability and security, risk profile and financial performance etc. do not appear to have been articulated and linked through to the actual investments over the long term. • The basis for determining whether network investment is required is undertaken by Western Power in accordance with its licence condition requirements for supply security and reliability. These are largely deterministic and define the standards by which network capacity constraints are identified. • Service levels are defined in the NIS and in the NMP. The NIS defines the performance standards for the network as a whole, and the NMP articulates performance outcomes and re-investment needs for individual asset classes. However, Jacobs was unable to observe how long-term objectives for these service levels were developed, whether they were informed by particular strategic business objectives, or the extent to which they reflect community and stakeholder expectations. • Western Power has various processes for considering non-network options. These are facilitated through the application of the Demand Management (DM) Screening Tool in accordance with the associated

Asset Management Process	Observations
	guideline. • Western Power also considers other non-network options such as remote stand-alone generation schemes where the economics of network reinforcement render non-network options more viable. An example of this is the Gnowangerup Feeder (Ravensthorpe Power Station) islanding project (DM#667221) developed as an alternative for network reinforcement. • Individual investment cases include an assessment of either generic operational costs for the life of the asset (or the timeframe of the assessment as the case may be). Various option comparisons include the impacts of life-cycle costs. These may be done on a standard per-unit basis, or have direct unique operational costs included where these are known and can be foreseen. • Life-cycle costs and other costs associated with projects are comparatively assessed as a part of Western Power's comprehensive Investment Evaluation Model (IEM). The IEM is a spreadsheet based tool which was demonstrated to Jacobs during on-site meetings. • Jacobs observed that the funding for various projects and programs is provided through the Access Arrangement and State Government budgetary allowances. In cases where asset investment needs have arisen mid-period of an Access Arrangement, Western Power has explored options such as seeking additional funding (as in the example of poles defect management), or through reprioritisation of existing projects and programs to release funds. Jacobs observes that the SIF facilitates the adjustment of investment priorities on the basis of meeting organisational objectives and balancing risk. Jacobs observes that this is a mature and sound process. • Western Power demonstrated that they have a detailed cost estimation process for both major transmission projects and distribution works projects. Documents provided in evidence of this for the Shenton Park project include DM #8444711 SP Convert Voltage & Reinforce Dist Nwk (Distribution works) and DM#9755427 Establish New Shenton Park (SPK) Estimate Report. • Western Power has developed and adheres to an annual planning calendar which highlights key steps in the annual network and asset planning cycle, linked to the corporate planning timetable. This timetable outlines the cyclic pattern of key reviews. The calendar (and the associated planning cycle) is referenced in several key planning documents such as the NIS and the NMP. • Jacobs observed that the long term development plans for the network are reviewed and updated on an annual basis in accordance with its timetable. • At present Western Power does not have an overarching asset management strategy document which outlines an approach for each lifecycle stage. The NMP identifies the Asset Management Framework 'building blocks' as being applicable to all stages of the asset lifecycle. However, although high-level information was presented it is evident that the finer details of Asset Management Framework and Strategic Theme are not yet fully established. Jacobs understands that Western Power is continuing work to develop the scope and detail within the asset management strategic theme.
• The overall level of effectiveness demonstrated by the licensee.	• Jacobs is of the view that overall Western Power has a robust and well-governed Asset Planning methodology. Jacobs was able to observe that the process is rigorously followed and managed to ensure appropriate outcomes are created in accordance with business imperatives. Opportunities for improvement do exist in the area of establishing long-term performance objectives for the network, and better understating and integration of long-term asset replacement needs. • Jacobs has assigned this process area an overall rating of B2.
• Recommendations and OFIs.	<u>Recommendations</u> • JR: 01/2014 Rating: B1 KPA: 1. Asset Planning EC: Asset management plan covers key requirements At present Western Power does not have an overarching asset management strategy document which outlines an approach for each lifecycle stage. Jacobs recommends that there should be an overarching asset management strategy applicable to all

Asset Management Process	Observations
	network assets which considers each stage in the asset lifecycle e.g. plan, design, build, operate, maintain, renew, dispose. • JR: 02/2014 Rating: C2 KPA: 1. Asset Planning EC: Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning It was difficult for Jacobs to gain insight into the total asset renewal driven investment requirements of the business. In particular, it is not clear whether Western Power can articulate an overall asset renewal strategy, and the extent to which there is a hierarchy in its approach to asset renewal planning that allows for the development of an optimised asset renewal driven investment portfolio. It is unclear whether Western Power has a long term view of the total asset renewal expenditure requirement, or is able to demonstrate how renewal needs for "child" assets roll up in a coordinated way that would lead to an overall renewal plan for a parent asset. For example, being able to demonstrate the planning of how the confluence of replacement needs for individual assets in a substation such as circuit breakers, transformers, auxiliary equipment, secondary systems and civil infrastructure may lead to the need to plan for the replacement of the substation as a whole. It is recommended that Western Power establish a long term view of the total asset renewal expenditure requirement that integrates renewal needs across the range of asset classes and is able to demonstrate how renewal needs for "child" assets roll up in a coordinated way to an overall renewal plan for a parent asset (for example, circuit breakers and transformers into substation renewal, etc). The long-term renewal plan should be coordinated and articulate renewal needs across the whole asset base, and include high-level planning data such as renewal expenditure modelling, "renewal" to "development" overlap synergies, and long-term objectives for overall asset and network health. • JR: 03/2014 Rating: B2 KPA: 1. Asset Planning EC: Service levels are defined Service levels are defined in the NIS and in the NMP. The NIS defines the performance standards for the network as a whole, and the NMP articulates performance outcomes and re-investment needs for individual asset classes. However, Jacobs was unable to observe how long-term objectives for these service levels were developed, whether they were informed by particular strategic business objectives, or the extent to which they reflect community and stakeholder expectations. It is recommended that Western Power establish clear long-term objectives for the key performance measures such as SAIFI, SAIDI, supply security standards etc., and provide a sharp focus for the investment program through this. These objectives may be along the lines of maintaining current standards but at higher efficiency levels, or may be targeted, for example, by increasing performance standards for rural areas whilst maintaining standards for urban areas, etc., and should be clearly linked to overall business strategic plans and objectives. <u>OFIs</u> • Jacobs is of the view that the entries in the Risk Register referencing back to projects and programs aimed at mitigating this risk are most likely sufficient, but the references in the AWP need to be more specific and could be improved by direct references to the Risk Register number. Jacobs affirms that this whilst this issue constitutes "Further Action Required" in relation to recommendations 2012/14 and 2012/16, it is considered to be an Opportunity for Improvement (OFI).
2. Asset Creation and Acquisition	• Process: Asset creation/acquisition means the provision or improvement of an asset where the outlay can be expected to provide benefits beyond the year of outlay. • Outcome: A more economic, efficient and cost-effective asset acquisition framework which will reduce

Asset Management Process	Observations
	demand for new assets, lower service costs and improve service delivery.
• Key findings of the review fieldwork.	• Western Power has a comprehensive asset creation and development process that includes an integrated approach to identifying the needs for investment and developing solutions to addressing those needs. Asset creation requirements are unfolded in the context of long-term strategic development plans for both the transmission and distribution networks. These plans cover the overall network development (e.g. DM# 9993078 TNDP Transmission Network Development (10 year) Plan 2012-13, DM#9397876 Distribution Network Development (5 Year Plan) 2012), as well as long-term developments in specific load areas (e.g. DM#10328532 Bunbury Load Area Long Term Network Development Plan, DM#0073840 Long-term Network Development Plan-East Perth and CBD). • Individual Asset Creation projects are identified as an outcome of the longer-term asset planning process in accordance with imminent needs (such as asset condition, network capacity and capability, or network performance compliance). The migration of a need to a project is governed through the various approval gates in accordance with the requirements of the Work Program Governance Model (WPGM). Business cases for the creation of an individual asset (e.g. Shenton Park Substation, Planning Report DM#10323058 Final Report Planning Shenton Park Reinforce, DM#10253623 Business Case Shenton Park Zone Substation) include the consideration of various network and non-network options, the latter in accordance with the Demand Management (DM) Screening Tool. • The various framework documents reviewed recognise the need for Western Power to undertake the assessment of demand management and other non-network options when developing network investment plans. Jacobs was able to observe discussion around such initiatives in individual planning documents and business cases. Further, Jacobs observed the DM Screening Tool and associated User Guide, which it understands facilities the identification of non-network initiatives at the option development stage of the asset planning process. Jacobs also observed that officers involved in the development of specific asset creation plans were trained in Western Power's DM and non-network obligations, the principles of non-network option identification, the use of the enabling planning tools. Notwithstanding this, whilst it was clear that the consideration of non-network options formed part of the planning process, Western Power's strategic intent in this area was not strongly evident. Jacobs was unable to observe a Demand Management or Non-Network solution policy framework or strategy that would normally be expected in order to drive behaviours in this regard. • Various tests need to be satisfied prior to an asset creation project being approved, included the New Facilities Investment Test and the Regulatory Investment Test where appropriate. These tests validate (or otherwise) the benefits of the proposed investment in accordance with current Access Arrangement and other market regulatory requirements. • Jacobs inquired as to whether project post-implementation reviews (PIR) were undertaken. These are necessary in order to validate that: o Asset creation activities were conducted in accordance with original plans; o Cost variations were actively managed in accordance with the original project plans; o Expected outcomes were delivered; and o Opportunities for improvement were identified for feedback into the asset creation process. Western Power demonstrated that PIRs are conducted for Board approved projects, and an annual report is provided to the Board accordingly. (DM#11689575 PIR Board Approved Projects January 2014). Further, samples of WPGM 'gate compliance' reports for individual projects/programs (undertaken post-project) prepared for the Board were also provided for review. Notwithstanding this, Jacobs did not see evidence that comprehensive PIRs were in fact undertaken for all Board-approved projects and programs. Further, Jacobs is of the view that there may be some projects that fall below the Board approval threshold that are worthy of PIR due to the nature or complexity. Jacobs is of the view that a more formal approach to the identification of projects that require a PIR should be developed (that includes high-significance non-Board approved projects or programs), and that a PIR plan be developed that ensures that these are conducted as required. • Individual investment cases include an assessment of either generic operational costs for the life of the asset (or the timeframe of the assessment as the case may be). Various option comparisons include the

Asset Management Process	Observations
	impacts of life-cycle costs. These may be done on a standard per-unit basis, or have direct unique operational costs included where these are known and can be foreseen. • Life-cycle costs and other costs associated with projects are comparatively assessed as part of Western Power's comprehensive Investment Evaluation Model (IEM) which was demonstrated to Jacobs during on-site meetings. • In addition, life-cycle costs form part of the merit evaluation associated with the introduction of new asset types. For example, in exploring issues around pole replacements, Western Power explained how ongoing maintenance costs were factored into the selection of pole technologies selected instead of wood poles (such as steel, concrete or composite materials). • Western Power demonstrated the approach used in developing new asset projects from planning through to implementation. Projects are developed using the Network Investment Excellence (NIX) framework that adopts a multi-disciplinary team-based approach to identifying options to address a need, and in the detailed project development. In the example provided (Shenton Case ZS establishment and distribution network redevelopment), the following suite of documents demonstrates the approach taken: - Planning report: DM#10323058_FINAL_REPORT_PLANNING_SHENTON_PARK_REINFORCE - Business Case: DM#10253623_Business_Case_Shenton_Park_zone_substation - Project Estimates: DM#9755427_Establish_New_Shenton_Park_(SPK)_Estimate, and - DM#8444711_SP_CONVERT_VOLTAGE_&_REINFORCE_DIST_NWK - Project Planning Definition: DM#8922253_PPD_Shenton_Park_T0348702_for_A2_Est - Project Planning Report: DM#8758588_PPR_Shenton_Park _ - Project Management Plan: DM#10366019_zone_substation_Shenton_Park_Proj_Manage_Plan - Project Deliverability Checklist (Distribution only): DM #10584239 Deliverability checklist Shenton Park Conversion • Jacobs explored Western Power's approach to the management of strategic spares (at a whole-of-plant level). Whilst it was clear that Western Power had intent around this issue and facilities to acquire and manage strategic plant spares, it is not clear the extent to which this was actively planned and managed in accordance with a policy framework that governed issues such as the identification, acquisition, management, and deployment of strategic spares for key items of electrical plant.
• The overall level of effectiveness demonstrated by the licensee.	• Western Power has a comprehensive asset creation and development process that includes an integrated approach to identifying the needs for investment and developing solutions to addressing those needs (including non-network solutions). Asset creation requirements are unfolded in the context of long-term strategic development plans for both the transmission and distribution networks. • Jacobs has assigned this process area an overall rating of B2.
• Recommendations and OFIs.	<u>Recommendations</u> • JR: 04/2014 Rating: B2 KPA: 2. Asset Creation and Acquisition EC: Full project evaluations are undertaken for new assets, including comparative assessment of non-asset solutions Whilst it was clear that the consideration of non-network options formed part of the planning process, Western Power's strategic intent in this area was not strongly evident. Jacobs was unable to observe a Demand Management or Non-Network solution policy framework or strategy that would normally be expected in order to drive behaviours in this regard. It was not clear whether there exists within Western Power a specific Demand Management (DM) Strategy, and the extent to which this is actively pursued as a separate corporate activity with its own objectives, management framework, and performance measurement. Jacobs is of the view that DM initiatives tend only to be actively considered when done so with deliberate corporate intent and are resourced accordingly. Jacobs recommends that Western Power articulate its intentions regarding Demand Management and Non-

Asset Management Process	Observations
	Network solutions through a specific policy and associated strategy, and should consider developing high-level targets for DM programs or outcomes if practicable. • JR: 05/2014 Rating: C3 KPA: 2. Asset Creation and Acquisition EC: Ongoing legal/environmental/safety obligations of the asset owner are assigned and understood Jacobs explored Western Power's approach to the management of strategic spares (at a whole-of-plant level). Whilst it was clear that Western Power had intent around this issue and facilities to acquire and manage strategic plant spares, it is not clear the extent to which this was actively planned and managed in accordance with a policy framework that governed issues such as the identification, acquisition, management, and deployment of strategic spares for key items of electrical plant. Jacobs recommends that a strategic spares policy be developed that specifically spells out the types of risks being addressed, the appropriate level of spares to be kept, location and spares access arrangements, and a spares management regime (e.g. rotation through the live network, retention periods, maintenance arrangements, etc.) This policy should also give consideration to access, transport arrangements and define boundaries around acceptable time-to-site in order to better define storage requirements. • JR: 14/2014 Rating: B3 KPA: 2. Asset Creation and Acquisition EC: Projects reflect sound engineering and business decisions Western Power demonstrated that post-implementation reviews are conducted for Board approved projects, and an annual report is provided to the Board accordingly. (DM#11689575 PIR Board Approved Projects January 2014). Further, samples of WPGM 'gate compliance' reports for individual projects/programs (undertaken post-project) prepared for the Board were also provided for review. Notwithstanding this, Jacobs did not see evidence that comprehensive PIRs were in fact undertaken for all Board-approved projects and programs. Further, Jacobs is of the view that there may be some projects that fall below the Board approval threshold that are worthy of PIR due to their nature, scale, or complexity. Jacobs recommends that a more formal and comprehensive approach to undertaking PIRs be developed. This would include a framework to facilitate a broader identification of projects that require a PIR (that includes high-significance non-Board approved projects or programs), and that a PIR framework (including a plan) be developed that ensures that these are conducted as required and that actions and learnings are agreed upon, formally tacked and are used to inform improvements in project governance and project execution.
3. Asset Disposal	• Process: Effective asset disposal frameworks incorporate consideration of alternatives for the disposal of surplus, obsolete, under-performing or unserviceable assets. Alternatives are evaluated in cost-benefit terms. • Outcome: Effective management of the disposal process will minimise holdings of surplus and underperforming assets and will lower service costs.
• Key findings of the review fieldwork.	• The Transmission Network Development Plan (TNDP), Distribution Network Development Plan (DNDP), Network Management Plan (NMP) and project / program business cases systematically identify issues, and assess options to determine whether an asset should be replaced due to performance or compliance issues, or retired due to redundancy (where there is no anticipated future use), etc. (DM# 11226237, DM# 9397876, DM # 8649705, DM# 9087909, DM# 811378). • A Lifecycle Asset Management Plan (LCMP) has been developed for each asset class. Jacobs has reviewed selected strategies for asset classes which detail the specific criteria for replacing assets (DM# 8893851, DM# 11841698, DM# 9155338). The strategy document for transmission power transformers (DM# 8893851) considers options for retaining transformers for strategic spares or redeployment elsewhere on the network.

Asset Management Process	Observations
	• The NMP identifies strategies for issues currently affecting assets. It considers each asset class through a discussion of the asset type and population, failure modes and impact, age and condition, performance, any asset creation, maintenance and spares strategies, followed by individual strategies for each issue that has been identified. Although the business cases reviewed showed that asset renewal decisions are based upon cost / benefit analyses, the full scope of decision criterion is not always apparent within the NMP. It is noted that referencing is made to LCMPs and business cases however references to additional strategies are also included in the asset-class discussions (e.g. creation, maintenance, spares strategies etc.) and it is not clear where these have come from. It is noted that references do not always include identifiers and relevant incident investigations that have informed the strategies are not provided. • Western Power's Work Practice Manual (DM# 6999451) and Asset Disposal Guidelines (DM# 2802557) detail comprehensive procedures to be followed to safely and responsibly dispose of assets, and achieve value for money outcomes once the decision to dispose of an asset has been made. • Jacobs understands that the TNDP, DNDP, NMP, LCMPs, Work Practice Manual and Asset Disposal Guidelines are reviewed and updated annually. <u>Underperformance</u> • Under performing assets are systematically considered though Wester Power's NMP (DM# 11001014) and underlying processes. The NMP identifies the required performance levels for asset classes, assesses the performance outcome for the previous year, and identifies any gaps in performance. It highlights issues for asset classes and outlines strategies to address underperformance. • Jacobs notes that while asset performance appears to be considered in the annual NMP revisions, it was not clear what emphasis the review process places on validation and re-evaluating the performance KPIs and targets that are used to assess asset performance. It is noted that KPI review is not specified within the scope of the Network Management Plan Review (Period: 1 July 2014 – 30 June 2019) (DM# 12028950). • Outside the NMP, Western Power has an 'interim process' for incident investigations that looks at specific performance issues as they arise. The process is not limited to investigating isolated events, but can be triggered by a broad range of issues related to asset underperformance. The incident investigation process documents (DM# 12046249, DM# 12120488) identify the following triggers for incident investigations: - Network incidents recorded by the Trouble Call System (TCS). - KPI results. - Trend data. - System disturbance reports. - Query Trouble (QT) and Request for Repair (RFR). - Notification from network operators. - Inspections defects data. - Other information sources. The individual process documents appear appropriate as reviewed; however, Jacobs had difficulty discerning the alignment between the process diagrams and the underlying documents. Jacobs notes that the current incident investigation process is an 'interim process' and Western Power has advised that it will be reviewed as part of the Asset Management Strategic Theme project. Although, it was not observed that a specific timeline and scope for this review has been established. • Jacobs has reviewed a sample of incident investigation reports and follow-up reviews (DM#10968174, DM#11120150, DM# 11885197, DM# 11831030) and considers these examples to demonstrate robust analytical investigations to identify the causes of poor performance. They outline strategic recommendations to address poor performance which reflect the findings of the investigations. <u>Underutilisation</u> • Asset utilisation is considered through the planning process and redundant assets are identified for decommissioning within the scope of network development, or through customer requests for connection/disconnection. A systematic and holistic approach for considering and optimising the use of underutilised assets is evident throughout the planning documents that have been reviewed, including:

Asset Management Process	Observations
	- Annual Planning Report. - Transmission Network Development Plan (TNDP) (DM# 9993078, DM# 11226237). - Distribution Network Development Plan (DNDP) (DM# 9397876). - Load area long-term strategies (DM# 8381133). • Processes for identifying underutilised assets were evidenced in business cases for programs and projects which: - Remove assets as they are made redundant by other network development projects (DM#10253623)). - Remove decommissioned assets where it is determined that they will no longer be required (DM# 9811378).
• The overall level of effectiveness demonstrated by the licensee.	• Based on the review Jacobs is satisfied that the reasons for poor performance and underutilisation are critically examined and corrective action or disposal is undertaken appropriately as part of a systematic review process. Asset strategies are developed as appropriate and disposal alternatives are effectively evaluated. Notwithstanding, some recommendations and opportunities for improvement have been identified as referenced in the cell below. • Jacobs has assigned this process area an overall rating of B1.
• Recommendations and OFIs.	<u>Recommendations</u> • JR: 06/2014 Rating: B2 KPA: 3. Asset Disposal EC: Under-utilised and under-performing assets are identified as part of a regular systematic review process Jacobs notes that while asset performance appears to be considered in the annual NMP revisions, it was not clear what emphasis the review process places on validation and re-evaluating the performance KPIs and targets that are used to assess asset performance. It is noted that KPI review is not specified within the scope of the Network Management Plan Review (Period: 1 July 2014 – 30 June 2019) (DM# 12028950). Jacobs recommends that review of the performance KPIs and targets be formalised within an appropriate review process. <u>OFIs</u> • Jacobs notes that the current incident investigation process is an 'interim process' and Western Power has advised that it will be reviewed as part of the Asset Management Strategic Theme project. Although, it was not observed that a specific timeline and scope for this review has been established. Jacobs recommends that a scope and timeline for the interim process review should be determined and documented. • Although the business cases reviewed showed that asset renewal decisions are based upon cost / benefit analyses, the full scope of decision criterion is not always apparent within the NMP. It is noted that referencing is made to LCMPs and business cases however references to additional strategies are also included in the asset-class discussions (e.g. creation, maintenance, spares strategies etc.) and it is not clear where these have come from. It is noted that references do not always include identifiers and relevant incident investigations that have informed the strategies are not provided. It is recommended that referencing to all LCMPs, strategies, and business cases be made clearer, and not included selectively. • The individual 'interim process' documents for incident investigations appear appropriate as reviewed; however, Jacobs had difficulty discerning the alignment between the process diagrams and the underlying documents. Jacobs advises that the review of the interim process should streamline the process and clarify the alignment between the overview process diagram, the detailed process diagram and the underlying process documents.
4. Environmental Analysis	• Process: Environmental analysis examines the asset system environment and assesses all external factors affecting the asset system. • Outcome: The asset management system regularly assesses external opportunities and threats and takes

Asset Management Process	Observations
	corrective action to maintain performance requirements.
• Key findings of the review fieldwork.	• Opportunities and threats in the system environment can arise at a corporate and network level. Jacobs has observed that these are routinely assessed at multiple levels within the structure of the organisation. From an asset management perspective, specific examples observed by Jacobs where opportunities and threats within the system environment are assessed include (but are not limited to): o The Strategic Investment Framework (SIF) (DM# 8777244) – the SIF assesses opportunities and threats in the total system business environment from the top down. It ensures that asset management decisions for network investment projects and programs consider the impact on risk for factors such as safety, customer impacts, financial impacts, and community impacts. It ensures that the opportunities and threats to those assessment areas, as impacted by asset management investment decisions, are judged against their respective criteria in an objective manner. o Risk management processes – the risk management processes effectively assess opportunities and threats in the system environment from the bottom up. They ensure that asset management decisions for each asset consider safety, supply, legal, reputation, environment and financial risks, and hence the opportunities and threats associated with those risks are considered as relevant. o The Work Program Governance Model (WPGM) and Framework – provides a formal mechanism to ensure that the required processes have been performed. o The Network Management Plan (NMP) (DM# 11001014) – the NMP considers opportunities and threats in the system environment in general. It sets individual performance KPIs for asset classes based on performance standards, regulatory compliance, achievement of customer service levels, etc. o The Transmission Network Development Plan (DM# 9993078, DM# 11226237) – the TNDP considers opportunities and threats in the system environment in general. It identifies network issues and constraints based on performance standards, regulatory compliance, and achievement of customer service levels. o The Distribution Network Development Plan (DM# 9397876) – the DNDP considers opportunities and threats in the system environment in general. It identifies network issues and constraints based on performance standards, regulatory compliance, and achievement of customer service levels. o Incident investigations – incident investigations are triggered by situations that threaten the system environment. The incident investigation reports identify and assess opportunities and threats in the system environment. o Asset strategy documents – asset strategy documents are developed for selected asset classes including for transformers (Transmission DM# 8893851, Distribution DM# 11841698) and Wood Poles (DM# 9155338). The strategy documents outline appropriate methods for managing assets, based on analysis of opportunities and threats in the system environment. o Business case documents – business case documents ensure that all network expenditure is based upon an assessment of opportunities and threats to the system environment, through consideration of specific circumstances, cost / benefit analyses, and the application of the SIF and risk management processes. o Extreme event procedures/guidelines/strategies (e.g. bushfire management, pandemic/epidemic guideline, business continuity plan) – these documents ensure that procedures are in place to manage rare events that pose a significant threat to the system environment. • Performance, compliance and customer service are tracked and reported through a number of mechanisms. Achievement against the service standard reports, capacity, business continuity, emergency response, regulatory compliance and customer service are summarised below. It should also be noted that Western Power generates a number of ‘dashboard’ and ‘executive dashboard’ reports which collate and present performance information; these are accessible to relevant stakeholders for monitoring performance across the business. • A key monthly dashboard used to report on safety – including wood pole performance – is the Executive Dashboard – Delivery & Public Safety. This dashboard is discussed further in the Area of Special Focus (AOSF) 2. Distribution Wood Poles observation section of this report. The Executive Dashboard (example from May 2014 - DM# 12081090) reports on the following performance parameters:

Asset Management Process	Observations
	o Distribution wood pole inspections activity volumes against target; o Transmission wood pole inspections activity volumes against target; o Distribution wood pole reinforcements activity volumes against target; o Transmission wood pole reinforcements activity volumes against target; o Distribution wood pole replacements activity volumes against target; o Transmission wood pole replacements activity volumes against target; o Rural pole replacements and reinforcements activity volumes against target; o Dx and Tx Pole Failures quantities, Monthly and YTD actuals; o Dx and Tx - Conductor Failures Monthly and YTD actuals; o Ground Fire Incidents, Monthly and YTD actuals; o Electric shock incidents, Monthly and YTD actuals; o Notifiable incidents (serious injury, serious damage), Monthly and YTD actuals: Jacobs is of the view that this is a comprehensive reporting dashboard covering a range of performance indicators which are expected to provide an appropriate overview of the performance of key network assets and safety performance factors. It also gives insight into WP's performance in managing those assets and related safety factors. Notwithstanding this, Jacobs notes several issues and potential limitations with the current dashboard structure which, if addressed, would better represent public safety risk profiles to relevant stakeholders and provide greater insight into WP's performance in managing public safety performance. In this respect, Jacobs notes the following: o The summary page uses 'traffic-light' flags to highlight the performance of each category. A number of categories are flagged green (Acceptable - On or above target or below threshold) even though the target has not been met – including distribution wood pole inspections, distribution wood pole reinforcements, transmission wood pole reinforcements. . In Jacobs' view ensuring that categories are flagged correctly would give a clearer representation of risk profiles to relevant stakeholders. o Rural poles are included on the summary page; however, no YTD targets are set for rural poles and there are no charts included on rural poles in the report. Jacobs understands that rural poles are considered higher consequence; where, for example, pole failures have an increased likelihood of causing a bushfire. In Jacobs' view specific reporting of performance across high consequence areas would give a clearer representation of risk profiles to relevant stakeholders. o Pole reinforcements and replacements report planned volumes against actual volumes. This doesn't capture the timeliness of pole remediation efforts. In Jacobs view specific reporting against timeliness of pole remediation efforts would give a clearer representation of risk profiles to relevant stakeholders. o Pole failure rates are measured against a Distribution Pole Integrity Index (DPII) and Transmission Pole Integrity Index (TPII), where Western Power has applied a target of 1 in 10,000 p.a. Jacobs notes that there is no universally accepted (or generally accepted) industry standard for pole failures. As such it is unclear whether a comparison against this target is appropriate, or whether such a comparison effectively represents the level of risk associated with the actual number of pole failures. • Service standards: Western Power produces an annual Service Standard Benchmark Report (DM 9079088). The report tracks Western Power's performance against benchmarks and targets in accordance with Western Power's Access Arrangement. The 2012/13 report shows that: o In accordance with its Access Arrangement Western Power had one category exceeding its service standard benchmark (SSB): - Distribution: SAIFI, Rural Long (SSB 4.51, Actual 4.91). o In accordance with its Access Arrangement Western Power had four categories exceeding its service standard target (SST): - Distribution: SAIFI – Rural Long (SST 4.06, Actual 4.91), SAIDI – Rural Long (SST 582.2, Actual 685.4). - Transmission: System Minutes Interrupted – Radial (SST 1.9, Actual 2.3), Average Outage Duration –

Asset Management Process	Observations
	Rural Long (SST 698, Actual 866). • Capacity: The Western Power Corporate Monthly Performance Report (example, June 2013(DM# 10986579) provides an overview of Western Powers performance against targets for a variety of investment programs, asset management objectives, and general organisational performance. Jacobs considers the report to provide a useful snapshot of monthly performance that is complete and fit for purpose. It reports on the following areas: o Overview: includes YTD over / under Budget; including Capex (and Opex. o Safety, including : - Transmission safety programs (Capex and Opex); - AA3 Transmission safety programs: including Totex; YTD Act, FY F3, AA3 FD. - Distribution safety programs (Capex and Opex); - Distribution safety programs AA3: including Totex; YTD Act, FY F3, AA3 FD. - Distribution wood pole management programs; - Customer service safety programs (Capex and non-recurring Opex);. - Wood pole failures: included in contents but omitted from the actual report. o Critical project performance (expenditure and schedule); o Service standard and incentive framework, included in contents but omitted from the actual report. o Divisional overviews: - Transmission: includes Capex YTD and Opex YTD spend and reasoning for going over/under budget. - Distribution: includes Capex YTD and Opex YTD spend and reasoning for going over/under budget. - Customer Service: includes Capex YTD and Opex YTD spend and reasoning for going over/under budget. o Indirect costs, including trends of indirect costs as a proportion of total AWP expenditure. o Environment, community & approvals: summary on status of approvals submitted and likely approvals, noise mitigation projects timeframes and environmental clean-up profiles and other areas of focus. o AWP current year pipeline overview, including forecast vs. budget. • Continuity: Western Power carries out reviews of its Backup Control Centre (BUCC) and tracks review actions. Western Power's Business Continuity Plan outlines Maximum Allowable Outage Times (MAO) for each of its critical processes. There were no breaches within the 2012-14 period. • Emergency response: Western Power carries out reviews following network operation escalation events (DM#10550188). Actions from these reviews are tracked. • Regulatory compliance: Western Power reports and tracks statutory and regulatory breaches through its breach register. The breach register includes information on how the breach was identified, a summary of the breach, remediation strategy, and due date. Western Power has provided an extract of the asset management system related breaches for the 2012-14 period. This extract shows that Western Power is tracking the resolution of, or has resolved, breaches in relation to: o Code of Conduct for the Supply of Electricity to Small Use Customers 2010 (WA). o Electricity Industry (Network Quality and Reliability of Supply) Code 2005. o Electricity Industry (Obligation to Connect) Regulations 2005. o Electricity Act 1945 (WA). o Technical Rules. o Electricity Industry Metering Code 2005. o Electricity (Supply Standards and System Safety) Regulations 2001 (WA). o Wholesale Electricity Market Rules 2004 (WA). o Electricity Industry Customer Transfer Code 2004 (WA).

Asset Management Process	Observations
	• Customer service levels: Customer service is covered by the Code of Conduct for the Supply of Electricity to Small Use Customers 2010 (WA) and the Electricity Industry (Network Quality and Reliability of Supply) Code 2005. Western Power tracks its customer performance using the breach register as outlined above. In addition, Jacobs has observed the following reports which are produced to review customer service performance: o Code of Conduct for the Supply of Electricity Small Use Customers – Record Keeping 2012/13. o Western Power: Annual Reliability and Power Quality Report (1 July 2012 – 30 June 2013). o 2012/13 Network Quality and Reliability of Supply Code Audit. Jacobs' notes that Schedule 1 of the Electricity Industry (Network Quality and Reliability of Supply) Code 2005 identifies "information to be published". It should be noted that Jacobs has not undertaken an audit to verify whether Western Power has published all information as required under this schedule.
• The overall level of effectiveness demonstrated by the licensee.	• Based on the review Jacobs is satisfied that opportunities and threats in the system environment are assessed, and the performance standards, regulatory compliance and customer service levels are measured. Notwithstanding, some opportunities for improvement have been identified as referenced in the cell below. • Jacobs has assigned this process area an overall rating of B2.
• Recommendations and OFIs.	<u>Recommendations</u> • JR: 07/2014 Rating: C2 KPA: 4. Environmental Analysis EC: Performance standards (availability of service, capacity, continuity, emergency response, etc.) are measured and achieved Jacobs recognises that Western Power's approach to the management of wood poles has significantly evolved over the 2012-14 period. However, Jacobs considers that the reporting mechanisms (Executive Dashboard – Delivery & Public Safety and Western Power Corporate Monthly Performance Report) have not been revised consistent with the new approach. In Jacobs view this means that the risks profiles associated with wood poles are no longer being accurately reflected in the dashboard reports. Jacobs recommends that the reports be revised consistent with the new approach such that risk profiles are accurately represented to stakeholders. Specific areas that should be considered include: o Pole remediation for all risk categories (Fault-Short Term Deferred/PAR/ZBAM); including volumes, failures and timeliness. o Pole remediation with respect to Western Power's high consequence areas (i.e. bushfire zones etc.); including volumes, failures and timeliness. • JR: 08/2014 Rating: B2 KPA: 4. Environmental Analysis EC: Compliance with statutory and regulatory requirements Western Power is reporting pole failures against the 'target' of 1 in 10,000 in accordance with its pole management policy and strategy. It is unclear how this target was derived, and therefore whether a comparison against this target is appropriate. It is further unclear whether such a comparison is an effective representation of the level of risk associated with the number of pole failures, particularly given that Western Power now prioritises its pole replacements on the basis of risk impact. Jacobs recommends that Western Power seek guidance from Energy Safety and the ERA on appropriate pole failure targets for reporting purposes. <u>OFIs</u> • Jacobs notes that the red/amber/green flags marking performance against targets are not always accurate

Asset Management Process	Observations
	in the safety dashboard. Jacobs advises that Western Power ensure that the flags are correct so that risk profiles are not misrepresented. • Jacobs notes that some sections of the monthly performance report are included in the contents but omitted from the actual report. Jacobs advises that Western Power ensure that relevant elements are reported as appropriate.
5. Asset Operations	• Process: Operations functions relate to the day-to-day running of assets and directly affect service levels and costs. • Outcome: Operations plans adequately document the processes and knowledge of staff in the operation of assets so that service levels can be consistently achieved.
• Key findings of the review fieldwork.	• This area strongly linked to contingency planning and business continuity planning. See also notes under Review Area 9: Contingency Planning • NOCC and SOCC have joined to become the EPCC since the last review (September / October 2013). They exist in a single control room, albeit with different operational jurisdictions and distinct network operating areas within the control centre. • Operations are governed under a single leadership team to ensure integrated operations planning and activities, and to simplify chain of command relationships. • Operations are enabled by asset management information systems and their integration with network management systems; PowerOn Fusion (for Distribution,) and XA/21 (for Transmission). • Overall operations of the centre and coordination of operational activities are undertaken by a control room Team Leader. • Western Power's activities on a day to day basis are influenced to an extent by business continuity plans, and procedures, emergency management protocols, and contingency plans. • Jacobs understands that operational procedure documentation has been developed and refreshed as part of NOCC/SOCC integration process, and the documentation independently audited for quality and consistency. See notes in Recommendation 2012/12. With respect to the effectiveness criteria Jacobs observed the following: o Network Operations is ISO 9001:2008 certified and maintains its certification by auditing and continually improving its Quality Management System. Jacobs has confirmed that all documentation associated with the operation procedure and operations centre management procedures was recently audited following the operational merger of the control centres. o Western Power commissioned an independent audit of this in February 2014 by SA Global (DM#11767283: ISO 9001:2008 Audit Report 2014). Jacobs has reviewed the audit findings and confirms that zero non-conformances were identified (Refer to Recommendation 2012/12). o Document status is managed through the Document Control Register (within the central document records system on the corporate information portal "Busbar"). Jacobs has observed a number of documents through the register including: - Feeder Loads and Network Security (DM# 10002295). - General Switching Requirements (DM# 10073030). - Example Schedules (DM# 10002494). - Protection (DM# 10002406). - Private Co-Generation (DM# 10002431). - Control (DM# 10002459). - Testing and Commissioning (DM# 10002483). - Network Switching Incident Data – Formulas and Calculations to Support Reporting (DM# 9476682). - Private Parallel Generators – General Operating Guidelines (DM# 1530887). - Ravensthorpe Distribution Guideline to Support SOP 238 (DM# 11386338).

Asset Management Process	Observations
	- Ravensthorpe Islanded Distribution Network Operating Instruction (DM# 6698165). - Royal Perth Hospital (RPH) Co-Generation Standard Operating Procedure (DM# 1530884). - Guidelines for CSA Customers (DM# 4495322). - Switching of Feeders with Voltage Regulators (DM# 7325775). - SCADA Alarm/Event Handling (DM# 1194898). • The operations centre monitors performance against its procedural requirements (dispatch activities, plant and equipment availability, network availability, overall network operational health checks). The following reports are produced which Jacobs has observed as linking to required service levels: o Monthly report on dispatch activities (Magnaview Report). o Monthly Network Health Report (e.g. April report DM# 10475389) o Monthly and YTD Transmission Service Standard Benchmarks report (DM#8853156) o System Disturbance Incident Reports. (e.g. from incident on 19 Nov 2013 for a major transmission line and transformer trip - DM#11527254) • Jacobs has observed evidence that risk management is applied to prioritise operations tasks. However, Jacobs observed that network operations did not feature strongly within Western Power's suite of Risk Management Framework documents. Jacobs did not observe a high level risk management document governing asset operations. The effects of this were most evident with respect to emergency situations rather than routine asset operation (refer to key process area 9. Contingency Planning). • Specific examples of prioritising of operations by risk are as follows: o Jacobs has observed that identified risks are documented in risk registers. Jacobs has sampled the Network Planning and Operations Risk Register (DM# 10307129). It identifies the risks, and includes a risk assessment, risk owners, related documents, and treatment plans with a monitored status and due dates. Jacobs notes that the risk assessments are structured in accordance with the Risk Assessment Criteria document. o Incident responses are prioritised by Control Centre based on Trouble Call System (TCS) logs and analysis of events using capability of the Distribution Management System (DMS) and the Transmission Management System (TMS). Incidents are prioritised according to information conveyed to the Call Centre. Jacobs has reviewed the Fault Response Group Process Map (DM 71371078) that is used to prioritise faults. Jacobs understands that operational response crews will always attend site to ensure it is safe to public. Operational crews will carry out repair work immediately where possible. However, more complex works are 'short term deferred' to the relevant district. o Jacobs understands that high-consequence incidents such as electric-shock or fire are fast tracked through the call system. o Jacobs understands that short-term deferred works must be carried out within two weeks by the district. Priority Attention Required (PAR) works should be carried out within the next works scheduling cycle (max. 12 weeks). o Resources are dispatched according to priority and proximity/zone. o Philosophy of incident response prioritisation captured in Document G245 (DM# 8482502), with Public Safety the highest priority, then depending upon the situation by other network and social impact priorities, such as: - Critical feeders. - Sewerage pumps. - Hospitals. - Nursing homes. - Waters pumps (fires). - Environmental hazards. - Communications centres. - Life support customers.

Asset Management Process	Observations
	• Jacobs has spent time interviewing process owners and operators of Western Power's TMS (XA/21), DMS (PowerOn Fusion), Geographical Information System (GIS), Asset Register (Ellipse), Query Trouble (QT) and Work Scheduling systems. During these sessions Jacobs gained an understanding of how they are controlled and operated and did not identify any issues that raised concern. • Jacobs specifically explored the linkages through to other asset information systems (GIS and Ellipse) in order to ensure integrity of information from single-sources of truth through to operating personnel. Jacobs notes that structure of the Ellipse equipment register (in particular) limits its ability to be an effective register for transmission assets, and consequently a separate equipment register is used for this purpose. In general the DMS is linked through to the GIS and Ellipse (on a 24hr batch refresh basis) and the XA/21 is linked through to a separate transmission system equipment register by a combination of automated and manual links. Jacobs observes that this is not uncommon amongst utilities. • Jacobs has confirmed that these systems include links to relevant asset information as required, viz: o Type. o Location. o Material. o Plans of components. o Condition information. o Current operational status. o Financial information. Jacobs observed that the linkages for the distribution network are more robust and integrated than those for the transmission network, largely due to the limitations in the structure of the transmission equipment registers, which is a feature observed in other jurisdictions. • Every dispatch generates a work order directly from Ellipse (asset-linked where appropriate or possible) in order to ensue cost tracking of operation activities (both planned and unplanned). Work orders are linked to an incident ID which ensures that all costs are appropriated effectively. All staff record hours against work order number in their timesheets. • Jacobs has observed that: o A 'training matrix' is developed for all operating centre staff that aligns job requirements with training needs, and tracks status of training currency. o Individual officer's training plans are captured and recorded as part of the Human Resources (HR) management system ("Strive" Performance Management Framework). o Every two years a field switching operator must demonstrate evidence of competency. The Learning Management System (LMS) is used to manage currency of competencies. The LMS automatically notifies managers at six, three and one month intervals at the lead up to a subordinate's currency expiring. o There is automatic screening of employee competency and currency as tasks are assigned. This prevents tasks from being assigned to staff without current competencies. o In accordance with the scope of the review plan, Jacobs did not specifically undertake a detailed review of all organisational training records. Through interviews with key training staff Jacobs understands that the approach observed with respect to field switching is applied across the organisation to ensure that all field operational staff are appropriately trained and qualified for the tasks associated with their roles. Jacobs observed an organisational commitment to this process and did not observe any shortcomings in intent, process or records for the area investigated, and was satisfied that the area did not require further investigation.
• The overall level of effectiveness demonstrated by the licensee.	• Based on the review Jacobs is satisfied that day-to-day asset operation is carried out effectively; with policies and procedures documented against service levels, evidence of risk management in effect, strong control of business operations through various systems including financial control, and a cultural emphasis on appropriate training and qualifications. • Jacobs has assigned this process area an overall rating of B2.
• Recommendations	Recommendations

Asset Management Process	Observations
and OFIs.	• JR: 16/2014 Rating: B2 KPA: 5. Asset Operations EC: Risk management is applied to prioritise operations tasks Jacobs has observed evidence that risk management is applied to prioritise operations tasks. However, Jacobs observed that network operations did not feature strongly within Western Power's suite of Risk management Framework documents. Jacobs did not observe a high level risk management document governing asset operations. Jacobs recommends that the Risk Management Framework include network operations.
6. Asset Maintenance	• Process: Maintenance functions relate to the upkeep of assets and directly affect service levels and costs. • Outcome: Maintenance plans cover the scheduling and resourcing of the maintenance tasks so that work can be done on time and on cost.
• Key findings of the review fieldwork.	• The asset maintenance key process has strong links to AOSF 2 – Distribution Wood Poles and AOSF 4 Transformers. These sections consider inspection, condition assessments and maintenance with respect to these assets in greater detail (where the approaches to these assets are reflected across all distribution and transmission assets). • Jacobs observed that annual production plans for Distribution and Transmission works are produced. These production plans provide details on projected activity levels and projected costs of maintenance against a back drop of previous year's expenditure performance. The plans also provide contextual information around expenditure levels such as overall State Government budget allowances and Access Arrangement allowances. Planning of future maintenance costs is undertaken within these contextual boundaries. • Jacobs observed that Western Power's approach to transmission and distribution maintenance is well documented, actively monitored, and managed to achieve desired asset management and network performance outcomes. Inspections of all assets are routinely undertaken in accordance with Western Power's maintenance policies and standards. Progress against inspection requirements is reported in various performance reports (both executive dashboards for high level reporting and detailed performance reports on compliance with functional requirements and for quality assurance). <u>Transmission Maintenance</u> • Jacobs observed in detail the implementation of the asset maintenance management system through its visit to Kewdale Transmission Depot and discussions with various process owners and process officers. In particular, Jacobs was able to observe the end-to-end process of the transmission asset inspection regime and the instigation and close-out of Query Trouble (QT) requests. In general, the systems and processes appeared robust, well organised, traceable, and rigorous. • Jacobs has reviewed the current Combined Maintenance Scheduling and Execution Guideline (DM#8269010). This document outlines at a high-level the various steps in developing the Combined Maintenance program for each year, and the various actions that need to be taken to ensure that the program is effectively managed. It is observed that this document covers the basic steps and approaches rather than articulate a complete project management framework. • Maintenance schedules for particular plant items have been adjusted to facilitate the establishment of the Combined Maintenance five-yearly schedules. It is understood that Western Power has reached the end of the first five-year cycle for the assets under this maintenance regime coinciding with the end of the 2012-14 asset management system review period. • The Combined Maintenance process combines routine periodic maintenance on the assets as well as addressing outstanding QT maintenance requirements. Jacobs understands that this process was implemented in order to leverage efficiencies from coordinated site-mobilisation and by optimising maintenance opportunities through alignment (across different asset types) with common network outages. Western Power explained that this approach has also served to maintain guaranteed service levels and meet customer needs regarding major outage planning and coordination. • It is noted Combined Maintenance creates a major maintenance project at each transmission site.

Asset Management Process	Observations
	Conceivably, this requires detailed project planning covering, o detailed project timetabling; o clear specification of work packets; o skills and human resource coordination; o plant and equipment scheduling; o inventory and materials supply planning; o network outages; o activity and site coordination; o cost tracking; o Change control management; o clear and traceable progress reporting, and; o post-implementation reviews (PIR) leading to effective issues management and process improvement. It should be noted that Jacobs has observed a comprehensive review of the combined maintenance program, which considers a broad range of performance outcomes and 'lessons learnt'. It is noted however that this single review should be considered in the context of the discussion on the broader application of PIRs within Western Power provided with respect to KPA 2. Asset Creation and Acquisition. • In demonstrating the process, it was evident that these project planning activities are undertaken for each site undergoing Combined Maintenance, and are coordinated with other sites where combined maintenance activities are being simultaneously undertaken. • Jacobs observed the officers involved with the development and planning of Combined Maintenance program as being diligent, thorough and capable in undertaking the required planning and resource coordination. Notwithstanding this, it appeared that project management principles appear to be implemented in an "informal manner", and that the coordination of activities tended to be planned manually rather than through a specific project management framework or system. Jacobs is of the view that given the extent of coordination activities and the dependence on the approach by Western Power to gain efficiencies in its maintenance works, the current project management discipline potentially presents a strategic risk. • Western Power advised that the Combined Maintenance framework is currently under review and further development, building upon the experience obtained through the first 5-year cycle. Jacobs understands that a new Combined Maintenance framework document is being prepared which will outline the principles and approach currently implemented incorporating identified improvements. Jacobs is of the view that this framework should reflect a formal project management discipline, covering off the above issues and ensuring the business is placed on a sustainable footing to manage the maintenance works program in this manner into the future. This will be particularly important as the maintenance scheduling and time frames are varied through the adoption of a condition based risk management (CBRM) approach to transmission plant maintenance. • Managing Combined Maintenance depends heavily on a single officer with casual backup available. On enquiry it was understood that other officers with sufficient background and experience have acted in the role and/or have been trained through a 'shadowing' mechanism. Jacobs observes that whilst commendable, this lacks the formality required to support such a vital process. • In order to implement the Combined Maintenance program, Western Power reviewed its scheduled invasive maintenance cycles for major transmission plant, aligning these for various plant types where possible. This has resulted in two major maintenance periods being executed; 5 years for all major plant and auxiliary equipment (transformers, circuit breakers, secondary system etc.), and 2½ years for particular types of power transformer tap-changers, where experience has shown them to require more frequent maintenance. The specific maintenance activities required at any substation is adjusted during the project planning phase to reflect any recent maintenance activities required due to fault or QT activities. • It may be prudent for Western Power to undertake a full cost-benefit analysis of the impacts of CBRM on the efficiencies of the Combine Maintenance approach in order to ensure that value is not diminished and to identify opportunities to target CBRM to where the impact is greatest. This may mean retaining some time-

Asset Management Process	Observations
	based maintenance approaches for some plant in order to retain a minimum activity base for each site around which high-impact CBRM activities can be factored in, thus optimising the efficiencies gained from each approach. Distribution • Jacobs reviewed Western Power's current approach to managing defects, including the High Risk Defect Workflow Process for (Priority Attention Required) Defects, the Zone Based Asset Management (ZBAM) process, the associated Equipment Catalogue for the identification and naming of defects, and various inspection and maintenance performance reports. Examples of the documentation reviewed by Jacobs include: o ZBAM Implementation Guideline (DM# 11138009). o Bundled Pole Inspection Instructions (DM# 5449945). o Policy for the management of Hardwood Poles (DM# 9204170). o Poles Structures Asset Management Strategy (covering poles, foundations, cross-arms and insulator fittings. (DM# 9155338). • Western Power has adopted a new risk-based approach to the management of pole defects and the implementation of the ZBAM approach to distribution maintenance works programming and delivery. It is understood that this new approach commenced in January 2014, with the previous 'traditional' prioritised defect approach remaining in place until that time. • The new approach was introduced in response to the competing parameters of financial constraints, resource limitations, and a ballooning number of defective poles identified through the pole inspection regime. This is evidenced by Western Power's defect rectification performance as provided in the Pole Management dashboard of December 2013 (DM#11674354) which clearly shows that whilst inspection performance was on target, defect rectification rates and timeliness indicators for reinforcements and replacements were deteriorating. • Jacobs has reviewed the new risk-based approach to managing pole defects, and notes it as being sophisticated and innovative from an industry point of view. Notwithstanding this, areas of concern with this approach exist with the adoption of deterministic benchmark for the timeliness of rectifications (notionally 12 weeks) and the initial allocation of resources for attendance to Faulted poles and Priority Action Required (PAR) defects (notionally 20% of resource capability). Western Power monitors the performance of its Pole Inspection and Defect Rectification program and reports this through the revised Executive Dashboard Report (DM# 2079533). This revised report is largely volumetric, reporting achieved defect rectification volumes and other distribution maintenance activities against target volumes. Jacobs observes that this reporting approach is not referenced against the demand for the volume of work required or the timeliness required, but is only referenced against pre-determined 'achievability' volumes. • With respect to the 'timeliness to rectify' indicator, Jacobs observes that performance against the 12 week benchmark is monitored, although not reported in the dashboard. Jacobs is of the view that the lack of focus on improving timeliness removes a potential driver for improving volume capability and overall delivery efficiency. Further, it is noted that the absence of any timeliness indicator for the activities monitored in the dashboard implies that Western Power may not be focussing sufficient attention to improving deliverability capability across the broad range of distribution asset maintenance activities. • Additionally, whilst Jacobs considers the ZBAM approach to be a rigorous methodology for prioritising non high-risk poles, it was not clear what timeframes are in place to ensure that low-severity defects will eventually be treated. Jacobs considers that the lack of an escalating mechanism to ensure that low-severity defects will eventually be treated may be a gap in the methodology. Notwithstanding this potential gap, Jacobs considers the ZBAM approach to apply a rigorous and sophisticated methodology to prioritise poles for remedial treatment.
• The overall level of effectiveness demonstrated by the licensee.	• Jacobs observes that Western Power has established robust maintenance management frameworks in order to better deliver the transmission and distribution maintenance programs with greater efficiency. Jacobs commends in particular the move towards Combined Maintenance for transmission works as well as Zone Based Asset Management (ZBAM) for distribution works, the latter with a prioritisation mechanism focussed on managing risk.

Asset Management Process	Observations
	• Jacobs has assigned this process area an overall rating of B2.
• Recommendations and OFIs.	Recommendations • JR: 09/2014 Rating: B2 KPA: 6. Asset Maintenance EC: Risk management is applied to prioritise maintenance tasks Jacobs observes that for its transmission assets Western Power plans to migrate away from a time-based routine maintenance approach to a Condition Based Risk Management approach where the nature of the plant and the condition data available facilitates this. This has the potential to impact the project planning and implementation phases of the Combined Maintenance program, and may introduce risks in the effectiveness of the Combined Maintenance approach, especially in the light of the observations regarding the project management aspects of the Combined Maintenance program. Jacobs recommends that a review be undertaken of the merits of adopting a broad CBRM approach in the light of the Combined Maintenance framework. This would be aimed at: o Assessing the impacts of CBRM on the efficiencies of combined maintenance; o Ensuring an orderly migration plan from time-based maintenance to condition and risk based maintenance across the asset base; o The Combined Maintenance Framework is adjusted to reflect the impacts of the CBRM approach, and that the project management structures are in place to accommodate this; and o That CBRM remains targeted to the areas of greatest impact. • JR: 10/2014 Rating: C2 KPA: 6. Asset maintenance EC: Maintenance policies and procedures are documented and linked to service levels required The 12 week PAR benchmark was selected on the maximum reasonable time to rectify a defective pole based on the pragmatic issues such as the time to schedule access (up to 6 weeks) and the time to plan the work (up to a further 6 weeks). There is performance monitoring against this benchmark, and the reasons for not achieving this timeframe for some poles are investigated and understood. Nevertheless, it was not evident to Jacobs whether this benchmark was in itself a focus for performance improvement, whether it generated an appropriate risk-management outcome, and whether strategies were being considered to facilitate improvement in this benchmark. Jacobs is of the view that Western Power should exercise a demonstrable focus on improving defect rectification times, not just for poles but across all of its distribution maintenance activities (where practicable). Issues that may frustrate the achievement of benchmarks (and benchmark improvement) may be considered to develop a suite of sub-benchmarks, for example time to rectify for access constrained poles versus access available poles. • JR: 11/2014 Rating: B2 KPA: 6. Asset maintenance EC: Risk management is applied to prioritise maintenance tasks Jacobs notes that, in general, Western Power displayed the broad application of project management principles to the planning and implementation of its Combined Maintenance program for transmission assets (in particular substation assets). Whilst Jacobs observed that the approach was sophisticated, well-understood, and well-embraced within Western Power, it is believed that some risks with the approach exist. These mainly relate to a degree of informality in the project management approach, and the fact that the Combined Maintenance program was largely planned and managed by one subject matter expert. Jacobs recommends that project management disciplines are formally implemented, and that Western

Asset Management Process	Observations
	Power considers the more formal provision of project planning and management support, perhaps through the formation of a permanent Combined Management Project team. The creation of this team would need to be underpinned by process and procedure documentation, team resource planning, and succession planning. • JR: 12/2014 Rating: B2 KPA: 6. Asset maintenance EC: Risk management is applied to prioritise maintenance tasks Jacobs considers the Zone Based Asset Management (ZBAM) approach to be a rigorous methodology for prioritising non high-risk poles. However, it was not clear what timeframes are in place to ensure that low-risk defects will eventually be treated. Jacobs recommends that Western Power consider whether firm time limits are appropriate for low-risk defects, and whether defect escalations are appropriate after specified time periods have lapsed. • JR: 15/2014 Rating: B2 KPA: 6. Asset Maintenance EC: Maintenance policies and procedures are documented and linked to service levels required The transition to Fault / Priority Attention Required (PAR) / Zone Based Asset Management (ZBAM) represents a significant change to Western Power's approach to managing its distribution assets. Jacobs recognises that the approach applies an enhanced degree of scientific rigour that is expected to have significant benefits. Jacobs recommends that a post-implementation review be scheduled at an appropriate time once the outcomes can be effectively considered against the original objectives.
7. Asset Management Information System	• Process: An asset management information system is a combination of processes, data and software that support the asset management functions. • Outcome: The asset management information system provides authorised, complete and accurate information for the day-to-date running of the asset management system. The focus of the review is the accuracy of performance information used by the licensee to monitor and report on service standards.
• Key findings of the review fieldwork.	• This area is strongly linked to AOSF 1: Asset Management Information System, which considers the upgrades to the asset management information system over the 2012-14 period in greater detail. • Western Power has an integrated asset management information system that in general links geo-spatial (locational) asset data with technical asset data. Several different systems exist that share information links through the use of key asset identifiers. These systems are used not only to capture, warehouse, and disseminate information, but also to provide an organisational source of truth for key operational data. • The primary systems involved in the data collection and management process for the network include: o Ellipse (for asset records and work order management). o ESRI GIS (SPIDA) for geo-spatial records. o An Oracle-based Equipment and Works Data warehouse (primary data repository). o Cognos reporting tool (for customised data interrogation and reporting). • In addition to this various other systems exist to facilitate the capture and inputting of data into the system, including (but not limited to): o MicroStation – CAD tool for preparation of network designs with electronic upload linked directly into the GIS. o Mobile Inspector (for the field recording and direct upload of asset condition data). o Aeropower Asset Management System for transmission line inspection records, associated to the

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	transmission line aerial patrol and inspection process. • Transmission network assets have unique electrical and network topology characteristics that define them as opposed to being primarily defined by their geo-spatial presence. In recognition of this, the transmission asset characteristics are held in various separate systems such as: o Transmission Line System (TLS) for detailed technical data records of transmission network elements. o Asset Management Portal for major plant technical data. • It was noted that the information captured and managed through Western Power's Asset Management Information System processes is also vital to the day-to-day network operations, where for example, the Distribution/Outage Management System (PowerOn Fusion) draws on the network topology from the GIS system through 24 hour batch updates. The network topology of the transmission system, due to its complexity is held and managed separately in the XA system governed by the Operations group. • Jacobs observed that since the previous asset management system review Western Power has moved to enhance the level of systems integration. Jacobs understands that this is to ensure that asset management information is warehoused centrally in order to assure its integrity, longevity and accessibility. Associated with this integration is the centralised governance of data capture and quality management processes, including documentation control, procedure development, and data quality management. • All asset information processes are managed in accordance with a published Data Governance Framework (DM#11928675), although Jacobs understands that this is currently under review. Jacobs observes that Western Power has a 'cradle-to-grave' philosophy of managing asset information, ensuring that the creation and collection of asset information is initiated at an asset's inception, and retained in perpetuity. • It was observed that Western Power has a strong focus on not only ensuring data for new assets is captured at key steps in the assets creation and life-cycle, but that legacy asset data is assessed for quality, integrity and is cleansed accordingly. Automation and integration of data creation processes is linked to asset creation processes (e.g. the CAD (MicroStation) to GIS for new distribution assets and the Mobile Inspector technologies for field capture and upload of current asset inspection and condition data). • Physical and logical security of the asset information system is managed through a variety of controls and procedures targeted to the risk being controlled. • Physical security of the asset information assets is managed through facilities management security processes. Data centres access is controlled through a higher level of access standards requiring swipe-card and/or finger-print recognition verification in accordance with approved access rights and/or needs basis. • Logical security (systems access and data access) is managed through IT security processes. System access is granted and managed by permission of key asset information process owners. System access is provided in line with role requirements and approved by process owners/ leaders. Access for key systems (including Ellipse) is reviewed quarterly and access to systems is automatically removed when employees leave Western Power. Passwords are changed quarterly. • Reporting of asset data quality and integrity is provided through asset information performance dashboards reporting on a range of indicators. The reporting regimes mainly address distribution system assets data quality/integrity/timeliness, which represents the higher level of data activity. • Transmission system asset data (especially asset condition and test data) is the least accessible information and tends to be stored in separate or standalone systems largely due to the inability of existing equipment register systems to structurally accommodate this type of data or the specialist nature of the data (e.g. test report). Jacobs observes that this is typical across the industry. This may not have been a problem in the past when the Operational Asset Management (OAM) group was located with the Transmission Maintenance group at Kewdale, however the distinct functional and structural separations of these groups may result in this becoming an asset management performance inhibitor and potentially a risk to effective management of the transmission assets. • Jacobs observed that asset information did not feature strongly within Western Power's suite of Risk management Framework documents. Jacobs did not observe a high level risk management document governing asset information.
• The overall level of	• Jacobs is satisfied that Western Power demonstrated a sophisticated and cohesive approach to developing

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effectiveness demonstrated by the licensee.	and implementing its Asset Management information systems, and that this was focussed on servicing the current and emerging business needs. In particular, the recent renewal, integration, and upgrade of the Asset Management information capability appears to have significantly enhanced Western Power's asset management performance in key areas, mitigated or removed historical asset information integrity risk areas, and provided the opportunity for Western Power to improve the quality and integrity of its asset information. • Jacobs has assigned this process area an overall rating of A1.
• Recommendations and OFIs.	Recommendations • JR: 16/2014 Rating: B1 KPA: 7. Asset Management Information System EC: Adequate system documentation for users and IT operators Jacobs observed that asset information did not feature strongly within Western Power's suite of Risk Management Framework documents. Jacobs did not observe a high level risk management document governing asset information. Jacobs recommends that the Risk Management Framework include business information systems. • JR: 17/2014 Rating: C1 KPA: 7. Asset Management Information System EC: Adequate system documentation for users and IT operators Jacobs understands that an Asset Data quality framework is currently under development. Data management quality and performance indicators are tracked and routinely published in various asset information dashboards (either pertaining to generic data quality and timeliness standards, or relating to data quality requirements of asset management process owners). It is not clear however how this information is used to drive performance improvement at the current development stage of the asset information management system. Western Power does not appear to have a demonstrable long-term strategic plan for asset information management, and there does not appear to be long-term stated objectives for improving data quality, data integrity, and timeliness. Recommendations include: o It is recommended that Western Power undertake a strategic review of asset information requirements for the business and establish long term objectives for key process areas as well as system integration needs. This could be achieved by preparing an Asset Information strategic plan, recognising that high quality data is an enabler for asset management performance improvement. o Western Power should specifically consider as part of this strategic review the need for better gathering and integration of transmission asset condition data (and associated test data) to ensure ready access to this information. This is particularly pertinent given the separation of the Operation Asset management group from the day-to-day management of the asset maintenance activities undertaken managed from the Kewdale depot.
8. Risk Management	• Process: Risk management involves the identification of risks and their management within an acceptable level of risk. • Outcome: An effective risk management framework is applied to manage risks related to the maintenance of service standards.
• Key findings of the review fieldwork.	• Throughout the review Jacobs noted a strong cultural awareness of the importance of understanding and assessing risks when making asset management decisions. This was especially evident in the transition to the risk based approach of managing distribution assets and the continuing work to enhance Western Power's risk management tools for individual asset groups. A strong emphasis on safety and bushfire risk management was evident at all levels.

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	• Jacobs found that the document hierarchy and structure of the risk management system demonstrated a clearly articulated approach from the top down. • Western Power has a high-level risk management policy (RMP) (DM# 3842495) which defines a consistent approach to risk management that is intended to be applied to all aspects of the business. The policy overarches three risk management frameworks; these are: o The Enterprise Risk Management Framework (ERMF) (DM# 3861477): Jacobs understands that this covers corporate risks such as insurance and Western Power's licence to operate. o Project Risk Management Framework (PRMF) (DM# 9937853): Jacobs understands that this covers specific project delivery risks such as contracts, project delays and safe works delivery. o The Network Risk Management Framework (NRMF) (DM# 6592239): Jacobs has reviewed the NRMF and its underlying documents and processes in detail. It focuses on network planning and management and has strong links to network investment. • Jacobs notes that the NRMF also identifies a Corporate Risk Management Framework (CRMF) (DM# 3861477); however, there is no reference to the CRMF within the RMP. The CRMF establishes the principles of risk management consistent with ISO 31000:2009 Risk Management – Principles and Guidelines. Western Power has advised that the current version is dated from June 2011 and the revision was commenced in mid-2013 but was interrupted by the restructure in November 2013. Jacobs understands that the Framework is currently being updated by the new Risk function. • Notably omitted from the suite of framework documents was the specific inclusion of network operations (including contingency planning) and asset information systems. • The Risk Assessment Criteria (DM# 6242606) define high level parameters for risk likelihood and consequence that are used to ensure risk assessments can be applied consistently at all levels of the risk management system. The consequences are categorised as safety, environment, legal/compliance, customers, reputation and financial exposure. • The NRMF is key to managing risks associated with the asset management system and is closely aligned with the Network Investment Strategy (NIS) (DM# 7314528). Essentially, at a high level the network risks are defined as uncertainty over the achievement of network objectives; uncertainty that the network will: o Meet customer requirements for performance and value e.g. customer demand, network capacity, power quality, network integrity. o Comply with statutory obligations e.g. compliance with current and anticipated future statutory requirements. o Enable customer flexibility and choice e.g. take-up of new technologies, future customer demand, market challenges. o Enable a competitive electricity market and enactment of energy policy e.g. compliance with market rules, changes in market rules, changes in energy policy. The NRMF also establishes the overarching risk management process consistent with the elements of the ISO 31000:2009 approach that the NRMF is intended to cover. • The Network Risk Management Procedure (DM# 6592701) sits under the NRMF and details procedures consistent with the higher level documents. o It defines the context and roles/responsibilities. o High-level network risks are identified through workshops and assessed though a generic Risk Review Template (DM# 8994519) to populate the Network Issues Risk Register (DM# 3528771). o The general procedure of assessing risk is defined consistently with the higher level documents. It is noted that the document makes reference to Network Risk Management Tool (NRMT). However, Jacobs understands that the NRMT is only applied to selected asset groups and that a number of risk assessment tools are used throughout Western Power which are not included. Jacobs had difficulty clearly identifying the full scope of risk assessment tools and to which asset classes each is applied. o A high level approach to risk evaluation and prioritisation is described. This has potential to be elaborated upon with references to specific procedural approaches; this could include for example: - Risk registers being used to evaluate identified risks, identify owners and treatment plans.

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	- The SIF being used to evaluate and prioritise projects and programs. - Risk assessment tools being used to evaluate and prioritise assets within programs. • Jacobs has observed that identified risks are documented in risk registers and risk assessments are structured in accordance with the Risk Assessment Criteria document. Jacobs has reviewed risk register samples including the Network Issues Risk Register and the Network Planning and Operations Risk Register (DM# 10307129). These identify the risk, and include a risk assessment, risk owners, related documents, and treatment plans with a monitored status and due dates. • Jacobs understands that all risk registers are linked via a risk ID to Western Power's 'CURA' risk database. Jacobs has reviewed a sample of risks from the CURA database (DM# 12028547, DM# 12081103, DM# 12081104). Each contains a two-page summary of each risk and includes: o General information: a description of the risk, how and where it arises, linked KPIs. o Risk assessment: causes, impacts, consequences, a risk assessment matrix, residual risk rating. o Risk mitigation: risk owners, controls and control owners, risk treatments including due dates, status monitoring and owners. • Jacobs understands that all risks are reviewed annually as a minimum requirement. Additionally, they are reviewed ad-hoc as changes to the nature of the risk become apparent. Jacobs has reviewed 64 samples from the Network Issues Risk Register and the Network Planning and Operations Risk Register. Of these only 3 were identified with a 'Risk Assessment Date' of over 12 months prior to Jacobs' preliminary information request in May 2014. Although, it is noted that each of these three had been assessed in the first quarter of 2013. • Jacobs has reviewed a sample of risk mitigation treatments including the Bushfire Mitigation Plan (DM # DM# 11077941) and the Pole-Top File Mitigation Strategy (DM# DM11851565) and considers these to be appropriate. • Western Power uses a number of risk assessment tools to assess risks with respect to individual asset types. These tools are an integral element of Western Power's risk based asset management approach for distribution assets. These are also used to trigger out-of-schedule maintenance of transmission assets. Jacobs has reviewed: o The Network Risk Management Tool (NRMT) (DM# 10656927, DM# 11031408, DM# 12119341): The NRMT is now applied to a number of distribution assets and Jacobs understands that models are being developed to cover all distribution assets. Jacobs has reviewed the general risk assessment and evaluation methodology, the consequence model and the technical implementation for distribution wood poles. Also, Jacobs notes that while the high-level NRMT consequence methodology is aligned with the Risk Assessment Criteria (DM# 6242606) document, the consequence criteria defined within the technical manual for wood poles appeared inconsistent. o Jacobs notes that Western Power has had the NRMT externally reviewed in detail. Jacobs has reviewed the associated report (DM12155466) and understands that Western Power is in the process of refining the tool in accordance with the recommendations. Jacobs has observed evidence of Western Power's commitment to continually refining it risk evaluation tools to ensure that they are calibrated as accurately as possible to produce risk scores reflective of the overall risk levels. Jacobs expects that Western Power will persist with its observed practice of continually refining its risk evaluation tools. o Transmission pole-top fires and wood poles risk assessment models (DM# 8945297, DM# 10276033): Jacobs considers these to be a reasonable risk assessment approach; however they do not appear to assess risks consistently with the Risk Assessment Criteria (DM# 6242606) document. o Power transformer Condition Based Risk Management (CBRM) tool (DM# 4384485): Again, Jacobs considers this to be a reasonable risk assessment approach; however they do not appear to assess risks consistently with the Risk Assessment Criteria (DM# 6242606) document.
• The overall level of effectiveness demonstrated by the	• Throughout the review Jacobs noted a strong cultural awareness of the importance of understanding and assessing risks when making asset management decisions. This was especially evident in the transition to the risk based approach of managing distribution assets and the continuing work to enhance Western

Asset Management Process	Observations
licensee.	Power's risk management tools for individual asset groups. A strong emphasis on safety and bushfire risk management was evident at all levels. Jacobs found that the document hierarchy and structure of the risk management system demonstrated a clearly articulated approach from the top down, risks are documented and monitored and regularly assessed. Notwithstanding, some opportunities for improvement have been identified as referenced in the cell below. • Jacobs has assigned this process area an overall rating of B2.
• Recommendations and OFIs.	Recommendations: • JR: 16/2014 Rating C3 KPA: 8. Risk Management EC: Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system Western Power has a high-level risk management policy (RMP) (DM# 3842495) which defines a consistent approach to risk management that is intended to be applied to all aspects of the business. The policy overarches three risk management frameworks; these are: o The Enterprise Risk Management Framework (ERMF) (DM# 3861477): Jacobs understands that this covers corporate type risks such as insurance and Western Power's licence to operate. o Project Risk Management Framework (PRMF) (DM# 9937853): Jacobs understands that this covers specific project delivery risks such as contracts, project delays and safe works delivery. o The Network Risk Management Framework (NRMF) (DM# 6592239): Jacobs has reviewed the NRMF and its underlying documents and processes in detail. It focuses on network planning and management and has strong links to network investment. Notably omitted from the suite of risk management framework documents was the specific inclusion of network operations and asset information systems. Jacobs recommends that the Risk Management Framework include network operation (including contingency planning) and business information systems. OFIs • Jacobs has reviewed the transmission pole-top fires and wood poles risk assessment models, as well as the power transformer Condition Based Risk Management (CBRM) tool. Jacobs considers these to be a reasonable risk assessment approach; however they do not appear to assess risks consistently with the Risk Assessment Criteria (DM# 6242606) document. Also, Jacobs notes that while the high-level NRMT consequence methodology is aligned with the Risk Assessment Criteria (DM# 6242606) document, the consequence criteria defined within the technical manual for wood poles appeared inconsistent. Jacobs observes that the overall risk framework covers broad range organisational risks, and that the NRMF (and the NMRT) are aimed at applying the corporate risk philosophy to network-specific issues. Jacobs is satisfied that the interpretation of the corporate risk framework as it is applied to network risks is appropriate, but advises that Western Power consider stronger alignment of the risk assessment tools with the Risk Assessment Criteria document to ensure transparency of its application. • Jacobs notes that the NRMF also identifies a Corporate Risk Management Framework (CRMF) (DM# 3861477); however, there is no reference to the CRMF within the RMP. Jacobs advises that the Risk Management Policy should be revised to include the Corporate Risk Management Framework. • It is noted that the Network Risk Management Procedure (DM# 6592701) makes reference to Network Risk Management Tool (NRMT). However, Jacobs understands that the NRMT is only applied to selected asset groups and that a number of risk assessment tools are used throughout Western Power which are not included. Jacobs had difficulty clearly identifying the full scope of risk assessment tools and to which asset classes each is applied.

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	Jacobs advises that Western Power should clearly articulate the scope of risk assessment tools that are used and to which asset classes each is applied. • A high level approach to risk evaluation and prioritisation is described within the Network Risk Management Procedure (DM# 6592701). This has potential to be elaborated upon with references to specific procedural approaches; this could include for example: o Risk registers being used to evaluate identified risks, identify owners and treatment plans. o The SIF being used to evaluate and prioritise projects and programs. o Risk assessment tools being used to evaluate and prioritise assets within programs. Jacobs advises that Western Power should clearly define its evaluation and prioritisation procedures.
9. Contingency Planning	• Process: Contingency plans document the steps to deal with the unexpected failure of an asset. • Outcome: Contingency plans have been developed and tested to minimise any significant disruptions to service standards.
• Key findings of the review fieldwork.	• Jacobs reviewed Western Power's approach to contingency planning at its East Perth Control Centre (EPCC). Western Power was able to demonstrate an emergency management response framework that articulates a hierarchy of responses subject to the size and nature of the contingency. • Jacobs has observed and reviewed specific contingency and emergency management plans that have been prepared for the following scenarios: o Bushfire Management. o Pandemic. o Pole-top fires. • In addition to the above, Jacobs observed Western Power's Emergency Management framework which includes organisational, structural and operational responses to the effective management of an emergency scenario. Further, Jacobs was able to observe that Western Power had engaged independent expert advice to coach the leadership team through several trial emergency management scenarios in order to test plans, the robustness of responses, and identify opportunities for improvement. Jacobs observed that action plans from these test scenarios were developed and in some cases closed out. • Whilst Western Power has a demonstrable contingency planning process in place, Jacobs observed that this process does not appear to cover a comprehensive range of exogenous risks and contingencies which may impact Western Power's emergency management responses under some conditions. In particular, Jacobs observed that there did not appear to be a formal process of environmental scanning and review that allowed for exogenous contingencies to be methodically identified and planned for, or that allowed for the formalisation of response activity coordination with other related utilities or emergency service organisations. • Jacobs is of the view that Western Power should actively consider and develop response plans for a broad range of contingencies, as given by way of example in the list below. These are by no means exhaustive but are provided as an indication of the range of issues that should be considered: o Simultaneous loss of transmission and widespread distribution due to a single event (storm and or bushfire); review network topology where this may be a susceptibility due to local environmental factors or network topology. o Credible (although unlikely) multiple transmission network contingencies; Common-mode or simultaneous failures of key elements. o Widespread generation loss or network islanding scenarios; Jacobs recognises that this is not necessarily in Western Power's jurisdiction, but plans will be required to manage community requirements nonetheless. o Widespread interruptions to major load centres (e.g. Perth CBD). • Jacobs notes that whilst some vulnerability and emergency management response reviews were recently undertaken, evidence was not observed which demonstrated that regular reviews of such response plans are planned. Jacobs would recommend that such reviews be undertaken at a frequency commensurate with the nature of the scenario and the likelihood of its occurrence in recognition of the changes in the network

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	over time. • Through reviews of existing contingency plans and through interviews and discussion with officers at EPCC, it became clear that third-party impacts were only 'operationally' factored into contingency plans, rather than being pro-actively considered in the development of the plans themselves. However, Jacobs notes that Western Power has a priority restoration framework that guides these decisions. Nevertheless, Jacobs is of the view that Western Power should actively consider and factor third-party impacts into its contingency and emergency response plans. Issues such as social infrastructure impact and restoration prioritisation should be actively considered. This in particular applies where Western Power's response plans actively rely upon the availability of this infrastructure, such as mobile phone capability and fuel supply. In this respect, whilst not an exhaustive list, contingency plans should actively consider restoration of supply to vital infrastructure such as: o Water supply. o Sewage systems. o Food supply. o Traffic Management and Public Transport o Mobile telephones and emergency services telecommunications. o Hospitals (coordination with Department of Health and routine testing of standby generation capability). o Fuel supply (Supply to Kwinana refinery, bulk supply terminals, and local supplies). • In addition to the above, contingency plans will need to actively consider the coordination of responses with other utilities. In this respect, protocols should be established with other emergency service departments and social-infrastructure service providers, including: o Police. o Fire Brigade. o Ambulance and Hospitals. o State Emergency Service (SES). • This should not only include management of supply restoration on a priority basis, but also consider operational issues such as relieving emergency officers standing by fallen wires, 'make-safe' protocols, etc. In this respect Jacobs notes that Western Power has a program in place where suitably qualified, trained and equipped staff are utilised in the event of such incidents to relieve other emergency services personnel from stand-by and make-safe activities. • Jacobs observed that network operations (including contingency planning) did not feature strongly within Western Power's suite of Risk management Framework documents. Jacobs did not observe a high level risk management document governing asset operations (including contingency planning).
• The overall level of effectiveness demonstrated by the licensee.	• It is noted that since the previous review Western Power has displayed a strong focus on identifying key network and systemic risks to the networks business as a whole, and has actively sought to develop plans to address those risks, and to test the plans through independent reviews and the conducting of contingency 'games'. Jacobs notes that the issues identified in the last review have largely been addressed in accordance with the actions listed in the action plan. Notwithstanding this, Jacobs is of the view that Western Power does not display a comprehensive level of preparedness through a likely range of direct risk scenarios that may affect the network, and has not systematically identified third-party risks that may affect Western Powers ability to appropriately respond to a foreseeable contingency. In this regard Jacobs considers that there are opportunities to improve in this process area. • Jacobs has assigned this process area an overall rating of C3.
• Recommendations and OFIs.	<u>Recommendations</u> • JR: 16/2014 Rating: C3 KPA: 9. Contingency Planning EC: Contingency plans are documented, understood and tested to confirm their operability and to cover

Asset Management Process	Observations
	higher risks Jacobs observed that network operations (including contingency planning) did not feature strongly within Western Power's suite of Risk management Framework documents. Jacobs did not observe a high level risk management document governing asset operations (including contingency planning). Jacobs recommends that the Risk Management Framework include network operations (including contingency planning). • JR: 18/2014 Rating: C2 KPA: 9. Contingency Planning EC: Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks Jacobs observed that contingency planning does not appear to be widespread across all major foreseeable risks and contingencies that the network may be subject to. In particular Jacobs observed that there did not appear to be a formal structure that provided for contingencies to be methodically identified and responded to. Given that Western Power has jurisdictional responsibilities for both Transmission and Distribution, it is foreseeable that widespread network events could simultaneously occur in such a manner that could confound the ability of the Emergency Management Team to effectively prioritise responses and act accordingly. Jacobs' recommendations are as follows: o That Western Power consider and develop response plans for a broad range of contingencies , as given by way of example in the list below. These are by no means exhaustive but are provided as an indication of the range of issues that should be considered: - Simultaneous loss of transmission and widespread distribution due to a single event (storm and or bushfire); review network topology where there may be a susceptibility due to local environmental factors or network topology. - Credible (although unlikely) multiple transmission network contingencies; Common-mode or simultaneous failures of key elements. - Widespread generation loss or network islanding scenarios; Jacobs recognises that this is not necessarily in Western Power's jurisdiction, but plans will be required to manage community requirements nonetheless. - Widespread interruptions to major load centres (e.g. Perth CBD). • JR: 19/2014 Rating: C3 KPA: 9. Contingency Planning EC: Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks Jacobs understands that in the event of a significant network event, third-party impacts tended to be 'operationally' factored into restoration responses on the basis of a Restoration Priority Framework. It was not clear the extent to which specific priorities and response plans in accordance with this framework are overtly factored into contingency plans. In this respect Jacobs is of the view that Western Power should actively consider and factor into its contingency and emergency response plans issues such as social infrastructure impact and restoration prioritisation. This should not only include management of supply restoration on a priority basis, but operational issues regarding relieving emergency officers standing by fallen wires, 'make-safe' protocols, etc. In this respect Jacobs notes that Western Power has a program in place where suitably qualified, trained and equipped staff are utilised in the event of such incidents to relieve other emergency services personnel from stand-by and make-safe activities. Jacobs recommends that Western Power consider and factor into its contingency and emergency response

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	plans for a broad range of issues such as social infrastructure impacts and restoration prioritisation. This in particular applies where Western Power's response plans actively rely upon the availability of this infrastructure such as mobile phone capability and fuel supply. In this respect, contingency plans should actively consider the restoration of supply to vital infrastructure such as the examples listed below, noting that this list is not exhaustive: - Water supply. - Sewage systems. - Food supply. - Traffic Management and Public Transport - Mobile telephones and emergency services telecommunications. - Hospitals (coordination with Department of Health and routine testing of standby generation capability). - Fuel supply (Supply to Kwinana refinery, bulk supply terminals, and local supplies). Active consideration should be given to the Management and review of Western Powers' mobile radio capability, and the management and coordination of a fleet of mobile generators in order facilitate their rapid deployment to vital locations and key third party infrastructure sites. This would also include agreeing on supply connection standards for such assets. In addition to the above, contingency plans will need to consider the coordination of responses with other utilities. In this respect, protocols should be established with other emergency service departments and social-infrastructure service providers, including the examples listed below. These are by no means exhaustive but are provided as an indication of the range of issues that should be considered. - Police. - Fire Brigade. - Ambulance and Hospitals. - SES. These should be reviewed and tested on a routine basis – see PR: 20/2014. • JR: 20/2014 Rating: B1 KPA: 9. Contingency Planning EC: Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks Jacobs notes that whilst some vulnerability and emergency management response reviews were recently undertaken, evidence was not observed that regular reviews of such response plans are planned. Jacobs recommends that such reviews be undertaken at a frequency commensurate with the nature of the scenario and the likelihood of its occurrence in recognition of the changes in the network over time.
10. Financial Planning	• Process: The financial planning component of the asset management plan brings together the financial elements of the service delivery to ensure its financial viability over the long term. • Outcome: A financial plan that is reliable and provides for the long-term financial viability of the services.
• Key findings of the review fieldwork.	• Western Power's financial plan is articulated through its Strategic Development Plan (SDP) (DM# 10674865). The SDP provides a comprehensive financial plan that is supported by underlying financial models (DM# 7403159) and (DM# 11741615). o The scope of the SDP is to: - Outline Western Power's strategic direction over the next five years. - Include economic and financial objectives. - Contain operational targets. - Describe how those objectives and targets will be achieved; providing the projects, activities and

Asset Management Process	Observations
	initiatives that represent the execution of strategy. - Assess the financial capacity to fund the expenditure program. o The purpose of the SDP is to: - Enable Western Power to act in accordance with prudent commercial principles and make a profit consistent with maximising its long-term value; to discharge its functions and responsibilities from s61 of the Electricity Corporations Act 2005. - Ensure statutory obligations of Division 1 of the Act under Part 5 regarding Provisions about accountability. - The 2013/14 SDP was submitted to the Minister on 30 April 2014; s88 of the Act requires draft SDP to be submitted 2 months before the next financial year. • Jacobs understands that there is a thorough process used to produce the SDP. Evidence observed by Jacobs indicates that this process has been followed. • Section 2 of the SDP outlines Western Power's financial planning objectives. It identifies KPIs for each objective and its planned investments (actions) to achieve the objectives. These are presented within the context of the broader strategic direction and strategic initiatives. The objectives, KPIs and investments are summarised as follows: o Safe - Objective: to reduce harm to people, property and the environment. - KPIs: Total Reportable Injury Frequency Rate (TRIFR) – Western Power is targeting year-on-year reductions 2012/13 to 2016/17. Public Safety Incidents – Western Power is targeting year-on-year reductions from 2013 to 2016. - Planned investments: Total Capex to achieve the KPIs / objectives, under programs for pole management, conductor management, bushfire management, connection management and streetlight safety management. o Reliable - Objective: Western Power will seek to deliver the service that it promises to customers and stakeholders. - KPIs: Supply Unavailability – Western Power's target is to maintain the current average supply unavailability per customer per annum. Number of Interruptions – Western Power's target is to maintain the current average interruptions greater than 60 seconds per customer per annum. - Planned investments: Total Capex from 2013/14 to 2016/17 to achieve the KPIs / objectives, under programs for service – reliability related (regulatory compliance, reliability and asset replacement), security (thermal management, voltage and fault management), growth (transmission customer driven, transmission capacity expansion, distribution customer driven, gifted assets, distribution capacity expansion and Mid-West Energy Project (MWEP)) and government initiatives (state underground power program and Perth waterfront). o Affordable - Objective: Over the next five years, Western Power will maintain the average annual growth of the cost per connection - KPIs: Cost per Connection – Western Power's target is to maintain the average growth of cost per connection (total operating costs, depreciation and borrowing costs. - Planned investments: Total Capex from 2013/14 to 2016/17 to achieve the KPIs / objectives, under programs for metering (including smart meter) and business support and IT. • Jacobs understands that the sources for funding Western Power's capital expenditure and recurrent costs were planned along the following basis: o Forecasted recurrent costs are funded by revenue. o Capital expenditure is funded by a mix of revenue, customer contributions and borrowings. • The SDP includes Profit & Loss statements and the Balance Sheet for the five year period covered by the SDP.

Asset Management Process	Observations
	• The SDP provides firm predictions on income for the five year period that it covers; however, it does not provide predictions beyond this period as per the effectiveness criteria. Longer term predictions are considered within Western Power's Regulatory Revenue Model (DM# 7403159) and Long Term Financial Model (DM# 11741615). • "The SDP provides for the operations and maintenance, administration and capital expenditure requirements of the services. It details: o Operating and capital expenditure plans. o Expenditure line items, such as maintenance and customer service. o Provides commentary discussing the strategic rationale of expenditure & operating, regulatory and funding risks. • Western Power monitors actual / budget income and expenses through its reporting mechanisms, including those listed below. Jacobs' has observed evidence that significant variances are considered and corrective action is identified as necessary. o Monthly Treasury Report (DM# 12048363) – documents actual cash flow against forecast and revised funding requirements, provides analysis of performance and commentary on revised projections. o Consolidated Monthly Performance Report (DM# 11978653) – performance against internal forecast and budget, volumetrics and dollars, past performance highlighting future risks and opportunities. o Comprehensive Business Performance Report (CBPR) (DM# 11960930) – compares actuals against forecasts for the P&L, Balance Sheet and Cash Flow Statement, prepared monthly and consolidates inputs from across the business, reviewed and approved by the CFO and consideration by the Executive team.
• The overall level of effectiveness demonstrated by the licensee.	• Jacobs found that the SDP demonstrated a strong approach to financial planning that is culturally embedded at Western Power. Notwithstanding, there are opportunities for Western Power to improve its performance against the effectiveness criteria, as outlined in the cell below. • Jacobs has assigned this process area an overall rating of A1.
• Recommendations and OFIs.	<u>Recommendations</u> • None. <u>OFIs</u> • Jacobs found that the position of the SDP within the overall planning process could be more clearly articulated, including its alignment with: o The funding approvals process; and, o The Work Program Governance Model (WPGM). Jacobs advises that Western Power should clearly present the relationship of the SDP within the: o Overall planning process. o Funding approvals process. o WPGM. • The SDP provides firm predictions on income for the five year period that it covers; however, it does not provide predictions beyond this period. Longer term predictions are considered within Western Power's Regulatory Revenue Model (DM# 7403159) and Long Term Financial Model (DM# 11741615). Western Power my wish to consider including longer term predictions within the SDP; possibly as an appendix.
11. Capital Expenditure Planning	• Process: The capital expenditure plan provides a schedule of new works, rehabilitation and replacement works, together with estimated annual expenditure on each over the next five or more years. Since capital investments tend to be large and lumpy, projections would normally be expected to cover at least 10 years, preferably longer. Projections over the next five years would usually be based on firm

Asset Management Process	Observations
	estimates. • Outcome: A capital expenditure plan that provides reliable forward estimates of capital expenditure and asset disposal income, supported by documentation of the reasons for the decisions and evaluation of alternatives and options.
• Key findings of the review fieldwork.	• A number of documents relate to Capex planning at Western Power as shown in the high-level Capex planning process. The process results in a multi-stage planning approach which begins with long term network planning, and increases in focus closer to expenditure dates as current issues are incorporated, works are prioritised, funding and delivery constrains are captured etc. High level planning is captured through the ten-year Transmission Network Development Plan (TNDP) (DM# 9993078, DM# 11226237) and the five-year Distribution Network Development Plan (DM# 9397876). The 'Capex Plan' is ultimately articulated within the Approved Works Program (AWP) (DM# 10252187), which feeds the annual production plans for the transmission and distribution networks. Jacobs has observed that the issues to be addressed, actions proposed responsibilities and dates are appropriately discussed in varying granularity as relevant within each of these documents. • The AWP covers a five year period of network related expenditure and reconciles for available funding; which Jacobs understands is significantly *'less than the forecasted expenditure approved in the AA3 determination'*. It outlines the yearly capital and maintenance expenditure for each project / program across the period. • Responsibilities for each expenditure item are captured in the annual Production Plans – Transmission Production Plan (TPP) and Distribution Production Plan (DPP). Jacobs has reviewed the 2013/14 DPP (DM# 10035615) which identifies project sponsors and managers for Capex and Opex projects. • The TNDP, DNDP, Network Management Plan (NMP) (DM# 11001014) and underlying business plans discuss the issues that are to be addressed by each expenditure item, thereby putting the timeframe for expenditure in context. The AWP reconciles the proposed project / programs against available funding in accordance with the SDP, prioritising works and expenditure through the application of Western Power's Strategic Investment Framework (SIF) (DM# 8777244) and stakeholder workshops. Tipping points such as forecasted demand growth etc. are also discussed. The steps in the process to reconcile the works program in accordance with available funding are detailed below. In Jacobs' view the approach is reasonable and likely to result in an effective rationalisation of the 'unconstrained AWP'. 1. *The expenditure level in the AA3 determination was used as a starting point (note this was … lower than Western Power proposed in its response to the ERA's draft decision).* 2. *Any additional changes since the AA3 determination were then included, such as expenditure related to new business cases, updated unit rates and changes in strategy. This 'Unconstrained AWP' resulted in an* [expenditure] *increase…* 3. *The Strategic Investment Framework (SIF) was applied to the "Unconstrained Works Program" to establish a prioritised list of projects and programs.* 4. *A series of workshops were then held with key stakeholders from across the business. The aim of these was to identify where efficiencies could be achieved and which programs could be deferred with the least impact on customer, network, service and safety outcomes. A series of 'production principles' were developed to help assess the impact of proposed deferrals, focusing on two main themes:* *- 'Efficiencies' – adjustments for changes to the unit rates of volumetric programs and/or a top-down % expenditure reduction required to bring the unconstrained AWP down to the AA3 determination level;* *- 'Risk appetite' – adjustments based on the risk* *…* *The steps taken to this point resulted in a revised AWP aligned to the AA3 determination (… less than the AA3 Draft Decision Response).*

Asset Management Process	Observations
	The next stage was to align the AWP to the funding levels set in the SDP. This was achieved in the following manner: 1. *The capital works program was adjusted to reflect the five categories of capital expenditure that are in the SDP…* [Safety, Security, Growth, Service and Government Initiatives]. *…* 2. *The SIF was then applied to the programs contained in each of these to determine a list of projects prioritised by network risk and impact on the AA3 commitments.* 3. *Key stakeholders were then re-engaged to ensure that further deferrals would carry the least impact on customer, network, service and safety outcomes.* *…this approach … shows the overall impact….* (Approved Works Plan 2013/14 to 2017/18, pages 22-23, DM# 10252187) • THE AWP is developed with input from the NMP, NDP and Access Arrangement. The AWP reconciles the projects and programs in consideration of funding and delivery constraints. The AWP provides high level discussion on the risk factors associated with project / program trade-offs and deferrals. Jacobs has reviewed the complete project list included in Appendix G of the AWP against the Summary of Asset Management Strategies (Section 7.26 of the NMP) which identifies the Capex Programs (Asset Replacement & Regulatory Compliance) and Opex Programs against the key issues identified for each asset class. In this review Jacobs did not identify any inconsistencies not discussed in the AWP. • Western Power has a number of mechanisms in place to ensure that the Capex plan is appropriately updated and actioned, including: o The AWP is reviewed and updated on an annual basis. In this review the works program is recalibrated based on the application of the SIF and stakeholder workshops. o Updates to the Capex plan within the year of delivery are undertaken via the quarterly re-forecasting process. o Performance is monitored through YTD forecasting and review meetings and documented in the Monthly Financial Report. • In general Jacobs found that the alignment of the high-level planning process could be more clearly articulated, including its alignment with: o The funding approvals process; and, o The Work Program Governance Model (WPGM). • Jacobs has noted (refer to Jacobs' commentary on Western Power's response to PR: 2012/3) that the AWP contains projects / programs for which no business case has been developed. • With respect to the WPGM, it was noted (refer to Jacobs' commentary on Western Power's response to PR: 2012/3) that ongoing attention is required to ensure the WPGM framework requirements are fully complied with over time. Jacobs has also noted (refer to Jacobs' commentary on Western Power's response to PR: 2012/3) that there is poorer first-pass gate compliance for Business Improvement (BI) projects than for Network projects. In general it was observed that the culture towards governance of BI projects did not appear as embedded as it is for Network projects. This was evident in that a Post Implementation Review (PIR) report was not produced for the upgrade of the asset management information system within the period; Jacobs would expect this to have occurred during the 'benefits realisation' phase of the WPGM.
• The overall level of effectiveness demonstrated by the licensee.	• Jacobs found that Western Power demonstrated a strong approach to Capex planning that is culturally embedded. Notwithstanding, there are a couple of opportunities for Western Power to improve its performance against the effectiveness criteria, as outlined in the cell below. • Jacobs has assigned this process area an overall rating of A1.
• Recommendations	<u>Recommendations</u>

Asset Management Process	Observations
and OFIs.	• None. OFIs • In general Jacobs found that Jacobs found that the alignment of the high-level planning process could be more clearly articulated, including its alignment with: o The funding approvals process; and, o The Work Program Governance Model (WPGM). Jacobs advises that Western Power should clearly present the alignment of the high-level planning process within the: o Funding approvals process. o WPGM. • Jacobs advises that Western Power considers periodic internal audits of compliance with the WPGM be carried out. Jacobs anticipates that this would extend further than 'first-pass gate compliance' that is currently monitored; it should audit whether non-compliant projects are passed through gates. • Jacobs notes that the AWP contains projects / programs that are still subject to business case development and approval. This is to be expected for projects that are included towards the end of the five- year AWP timeframe. Nevertheless, Jacobs is of the view that there should be some form of governance framework controlling whether projects are formally approved to be entered into the AWP. For example, this may be from the output of a planning report which has been endorsed, or an officially confirmed network need, etc. Jacobs advises that Western Power consider a mechanism be put in place to ensure that, at a minimum, all projects / programs included in the AWP that will incur expenditure for the first year have an approved business case and other latter-year projects or programs have an origin that is traceable through other corporate planning approval documents. This should apply to both Capex and Opex projects / programs.
12. Review of asset management system	• Process: The asset management system is regularly reviewed and updated. • Outcome: Review of the Asset Management System to ensure the effectiveness of the integration of its components and their currency.
• Key findings of the review fieldwork.	• The asset management system is periodically reviewed at the direction of the ERA. Review of the 2012-14 period is being carried out by Jacobs. This report is the output of the 2012-14 review. • Western Power carries out periodic reviews of targeted elements of its asset management system, as well as informal reviews as required. Reviews can be triggered by: o Formal review: As a part of a time based review, triggered by a significant change in obligations etc. o In response to findings: Identified from audits, reviews, incidents, etc. o Ongoing: Addressing gaps or opportunities for improvement during the course of routine implementation, through formal and informal feedback loops. • All of Western Power's controlled documents are required to undergo a periodic formal review. Jacobs' has reviewed the high-level process for formal reviews and considers it to be appropriate. Jacobs has observed evidence of its implementation throughout the course of the review. Examples of formal reviews include: o Annual Update of Network Management Plan, Annual Planning Review, Wood Pole Management Strategy. o State of The Infrastructure Report. o Annual Planning Cycle; AWP including Quarterly Review and Updates, in response to State Budget Cycle. o Performance Management; Annual Performance Report to ERA, Monthly Performance Report (internal). o Licence Asset Management System Review and Performance Audit. • Although Jacobs observed widespread evidence of various elements of the asset management system being reviewed, it is understood that system wide reviews that look at the asset management system holistically are not carried out internally. Jacobs did not observe any evidence of Western Power carrying out internal audits of their system. However, in 2013 Western Power engaged AMCL to carry out a review of

Asset Management Process	Observations
	their asset management system. This review essentially measured the maturity of Western Power's asset management system against the requirements of PAS-55 and ISO 55001. Jacobs recognises that further progression along the PAS-55/ISO 55001 maturity pathway is an extensive undertaking. • In carrying out the 2012-14 asset management system review Jacobs found that the document hierarchy and map could not be clearly defined by Western Power. In general, this meant that Jacobs had difficulty in readily identifying where each document sat within the document hierarchy. • The Network Management Plan ((NMP) (DM# 11001014) is reviewed and updated annually. The review process is outlined within the NMP monitoring and improvement section (Section 11). The 2013-18 NMP supersedes the 2012-17 NMP. Jacobs has also reviewed the scope for the Network Management Plan Review (Period: 1 July 2014 – 30 June 2019) (DM# 12028950) which is currently underway. • Jacobs understands that a number of controlled documents are routinely reviewed and updated similar to the NMP. However, Jacobs has noted (2012/20) that uncertainties picked up in the 2012 review surrounding document revisions and control still persist within the organisation; for example: o Critical documents don't always contain document control information. o Documents with control sections do not identify intended start and completion dates for the next review. • Jacobs notes that Western Power is planning to upgrade its document management system in the latter half of 2014 (currently out for tender); and address shortcomings in document review controls within this project.
• The overall level of effectiveness demonstrated by the licensee.	• Jacobs found that the Western Power demonstrated a strong approach to asset management system reviews that is culturally embedded. Notwithstanding, there are opportunities for Western Power to improve its performance against the effectiveness criteria, as outlined in the cell below. • Jacobs has assigned this process area an overall rating of A1.
• Recommendations and OFIs.	<u>Recommendations</u> • JR: 15/2014 Rating: B2 KPA: 12. Review of asset management system EC: A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current Jacobs notes that Western Power is planning to upgrade its document management system in the latter half of 2014 (currently out for tender); and address shortcomings in document review controls within this project. Jacobs recommends that a post-implementation review is carried out following the implementation of the new document management system to ensure that the document control and review issues have been addressed – as per the document control OFI detailed below. <u>OFIs</u> • Jacobs understands that a number of controlled documents are routinely reviewed and updated similar to the NMP. However, Jacobs has noted (2012/20) that uncertainties picked up in the 2012 review surrounding document revisions and control still persist within the organisation; for example: o Critical documents don't always contain document control information. o Documents with control sections do not identify intended start and completion dates for the next review. Jacobs advises that: o Western Power outlines and monitors all reviews that are required for each of its asset management system documents, processes and systems. o All documents should have a document control sections that includes information on past revisions and intended start and completion dates for the next review. • Jacobs did not observe any evidence of Western Power carrying out internal audits of their asset management system. Jacobs advises that Western Power should consider whether internal audits of its asset management system are appropriate.

Asset Management Process	Observations
	• In carrying out the 2012-14 asset management system review Jacobs found that the document hierarchy and map could not be clearly defined by Western Power. In general, this meant that Jacobs had difficulty in readily identifying where each document sat within the document hierarchy. Jacobs advises that: o The asset management system document hierarchy be simplified and clearly articulated. o Each document should clearly show where it fits within the hierarchy.

4.3 Areas of special focus

Table 4-3 below provides the key findings and references to the recommendations for the areas of special focus.

Table 4-3 : Areas of Special Focus – Observations

Asset Management Process	Observations
AOSF 1. Asset Management Information System • Key findings of the review fieldwork.	• Assessment of the performance of the new asset management information systems that have been introduced since the 2012 review. • Particular areas of focus are: how well the systems are integrated with other asset management systems, data quality, quality of the system documentation, and reporting capability. • As noted in the KPA: 7. Asset Management Information System review, Western power has undertaken and largely completed a comprehensive information system integration project since the previous review. Jacobs understands that this systems renewal project covered, amongst other things: o The replacement of the outdated GIS system with a new ESRI system (the source of truth for locational data and geo-spatial attributes for the asset base). o The integration of this new GIS with the Ellipse Equipment register, with the latter being the sources of truth for asset specific details, including parent-child asset relationships based on parent asset location (mainly poles). o The ability to 'drill' into asset records through a web-based interface for ease of access across Western Power's operational centres. o Live and batch-based upload of asset maintenance and inspection data from the field, using the Mobile Inspector application and-field deployed 'Toughbook' asset record capture devices. o Integration of new network designs through a CAD to GIS integration facility, thereby minimising data upload effort and translation errors for new network connections. o Daily batch transfers of the live-connected distribution network topology through to the Distribution Management System (PowerOn Fusion) used in day-to-day operational control of the network in the East Perth Control Centre (EPCC) and at other locations. o Automatic asset-specific linking and issue of service work orders (as appropriate) as an output from the mobile inspection system integration through to the equipment register. o Tighter quality control over maintenance and inspection reporting outcomes due to the dictionary-based standards for identifying and prioritising defects, programmatically embedded in the Mobile Inspector system. o The ability to readily develop routine and ad-hoc reports maintenance performance and data quality reports direct from the data warehouse based on using the Cognos reporting tool. o The ability to develop and manage a suite of overall data quality and data management process reports in order to monitor and improve Asset Information processes across the business. • Jacobs observed the capability of the integrated system through direct demonstration by subject matter experts, particularly in relation to the linkages between the GIS, the Equipment Register, and the Work Order system. Jacobs was unable to observe linkages through to the Mobile Inspector system, but did assess the Mobile Inspector framework in the areas of defects dictionary and the recording of defects in Ellipse. • Jacobs was also able to observe the live operation and effectiveness of the web-based geo-spatial asset interrogation facility (SPIDA Web). Further, through discussion with operators during field visits the use of the integrated system as part of day to day network operations and the linkages between the asset information system and the network operating system was explored. Jacobs was satisfied that the systems were robustly integrated, and that the data required for day-to-day operational asset management activities is readily available through these corporate systems. • The newly integrated system has improved data capture quality and data capture timeliness. Western Power reported to Jacobs the following observed improvements: o The mobile inspection field data capture solution (Mobile Inspector) was introduced in June 2012 and has improved timeliness of data capture from 90 days to less than one day;

Asset Management Process	Observations
	o Data capture is automated thereby removing several previous data-transfer touch points, and reducing the potential for error; o Data validation occurs in an automated manner at the time of data collection; o Geo-spatial asset information processing and update efficiency has improved significantly (Western Power quotes up to 120%) due to improved functionality of the SPIDA system, automation of standard functions (such as attribute populating), creation of libraries for complex asset structures, and other functionality enhancements; o The improvements identified by Western Power are consistent with that which Jacobs has observed as being achieved in other utilities. Jacobs confirms that these represent significant improvements over asset information management process flows compared to less integrated legacy systems. • Western Power has developed an Asset Management Information Governance Framework as part of the systems integration project and is in the process of its continuing development. It is aimed at managing asset data quality throughout its full lifecycle. The framework focuses attention on timeliness, integrity, and system capability. • An Equipment and Works Data Warehouse has been developed that provides a single source of truth for all asset information. This warehouse is the repository for the asset information accessed through the integrated systems outlined above (SPIDA, Ellipse, etc). Western Power demonstrated to Jacobs that the Equipment and Works Data warehouse has provided the ability to develop reports which seamlessly connect asset management systems, and provide the ability to track asset information over time. • As a consequence of this enhanced capability, asset performance dashboards are able to be created to inform asset managers of the quality and integrity of the asset class and of the information retained pertaining to that asset. Western Power advised and were able to demonstrate that dashboards currently exist for the following distribution assets: o Distribution Transformers. o Drop Out Fuses. o Pole Top Switches. o Disconnectors. o Reclosers. o Sectionalisers. o Regulating transformers. o Ring Main Units. Dashboards are created in accordance with the asset managers requirements for managing the assets. • Western Power advised that the Asset Management Information System has continued to be enhanced since its inception and since the previous reviews. Enhancements include: o Ability to develop reports which seamlessly connect with asset management systems. o Improved accessibility to asset defects and inspections information. o Improved accessibility to land feature information where assets are located e.g. environmentally sensitive areas (ESA), local government areas (LGA), fire zones, etc. o Improved accessibility, scheduling and quality of reporting using corporate reporting tools. o Ability to monitor asset information quality over time. o Improved geo-spatial representation and access to asset data through enhancements to SPIDA. o Automation of the Dial Before You Dig underground assets search process. • Jacobs observed that whilst individual implementation plans for various modules of the integrated system existed, an overall strategic plan for the integration was not evident. It would normally be expected that such a complex project would have a high-level over-arching plan, or perhaps be influenced by a strategic plan for Asset Management Information. Jacobs is of the view that, based in part on the experience of its review team, such a comprehensive

Asset Management Process	Observations
	systems renewal and integration project is complex and risky, with issues such as cost escalation, applications interfacing, data quality, and organisational culture potentially creating some of the highest risks to successful implementation. Western Power's apparent success in undertaking this project is commendable. • Further, it would normally be expected that a comprehensive post implementation review (PIR) would be conducted to assess the effectiveness of the implementation of the project against key objectives articulated in the strategy or the plan. In particular, a post implementation review should be conducted to assess the following: o The extent to which expected outcomes were achieved; o The actual costs of the project and how they compared to budget estimates; o Issues identified (an issues register including close-out progress); and o Reviews on data quality and system performance outcomes. o Outstanding functionality requirements and opportunities for future development • Western Power demonstrated that it has a comprehensive set of documentation covering both legacy and new asset information system procedures. The full list of documents is provided in the Asset Information Review Criteria Information Pack (DM# 6540570) provided to Jacobs in the course of this review. The documents are controlled through Western Power's Document Management processes and available for user access through the "Busbar" portal. Responsibility for managing document content and currency rests with the asset management process owners for transmission assets, but rests with the data governance group for distribution assets. Jacobs observes that this is typical as the transmission asset information procedures tend to be specialised and generate a lower volume of more specialised activity associated with specific plant parameters. Distribution asset information activity levels however are typically high, with procedures tending to be more system and data capture process-oriented rather than being asset-oriented. Jacobs observes that in recognition of this, many of the distribution information asset capture processes are semi-automated, with library and routine-based algorithms employed to speed up the data capture processes. This also has the added benefit of improving data-quality by ensuring asset information rules are embedded in the system. • Jacobs specifically explored the issue of data quality and integrity during on-site discussions with key personnel involved in the development and ongoing management of the newly integrated asset management information system. Western Power demonstrated and explained the implementation and ongoing development of its Asset Information Governance Framework. This includes a newly developed Data Quality Metrics Framework (DM# 3767315) which outlines processes for testing data integrity, timeliness and cleansing and defines quality standards to an extent. Jacobs understands this framework to be the subject of ongoing development, where data quality measures and standards will continue to be developed and refined over time in accordance with business needs. • Asset information dashboards are also prepared in accordance with the needs of asset managers in order to provide feedback to the key stakeholders on data integrity issues and to drive improvement in data capture process performance. Consistent with this Western Power were able to demonstrate various reports in relation to key data performance measures. Samples of the reports reviewed included: o Data completeness dashboard for transformers and wood poles. o Equipment and Works Data warehouse Health Dashboard. o Asset Performance Dashboards as required by asset managers (Jacobs specifically requested and reviewed the distribution transformers and poles dashboards). o Scheduled data cleansing reports. o Data Timeliness reports (including "field to office" reports, "aged" data reports, etc.). o Ad-hoc data integrity and quality reports using the Trillium reporting tool. o Ad-hoc asset specific reports such as asset quantities, asset defect's, etc developed on a needs basis using the Cognos reporting tool.

Asset Management Process	Observations
	• Jacobs observed that Western Power was attentive to data quality management, with various data quality management reports provided for system-level quality issues and detailed asset management quality issues as noted above. In general, the level of governance on data quality was observed to be consistent with that observed amongst other utilities, with the governance framework and dashboard reports triggering quality improvement and rectification activities where required. Jacobs was satisfied that Western Power's approach in this respect was consistent with good industry practice, and did not observe any significant risks in this area that had not already been identified and treated`.
• Recommendations and OFIs.	Recommendations • JR: 15/2014 It would normally be expected that a comprehensive post implementation review (PIR) would be conducted to assess the effectiveness of the implementation of the asset management system upgrade project against key objectives articulated in the strategy or the plan. In particular, a PIR should be conducted to assess the following: o The extent to which expected outcomes were achieved; o The actual costs of the project and how they compared to budget estimates; o Issues identified (an issues register including close-out progress); o Reviews on data quality and system performance outcomes; and o Outstanding functionality requirements and opportunities for future development. Jacobs recommends that a comprehensive review of the Asset Management Information System integration project be undertaken. This should include (but not be limited to) an overview of costs compared to budget, gap analysis of implemented specification to original specification, a review of changes and the change control process, observable benefits compared to originally expected benefits, and outstanding issues and action plan to resolve them. • JR: 17/2014 Jacobs observed that whilst individual implementation plans for various modules of the integrated Asset Management Information system existed, an overall strategic plan for the integration was not evident. It would normally be expected that such a complex project would have a high-level over-arching plan, or perhaps be influenced by a strategic plan for Asset Management Information. Jacobs is of the view that such a comprehensive systems renewal and integration project is complex and risky, with issues such as cost escalation, applications interfacing, data quality, and organisational culture potentially creating some of the highest risks to successful implementation. Jacobs recommends that Western Power develop a Strategic Plan for its Asset Management Information Systems and data. This plan should include a review current state of the systems and where Western Power is placed along the strategic journey. It should also include a long-term vision for the systems and outline an understanding of the likely costs, benefits, and timeframes for achieving the vision.
AOSF 2. Distribution Wood Poles	• Assessment of the processes, and the related supporting documentation, used to manage Western Power's distribution wood poles and prioritise poles for remedial treatment. • A particular area of focus is whether the process documentation used to manage pole replacement/reinforcement is complete and fit for purpose.
• Key findings of the review fieldwork.	• Western Power has made significant advancements in its strategic management of wood poles over the 2012-14 period; particularly with respect to the prioritisation of wood pole remedial works. Over the period Western Power's strategic approach has matured from a simple condition based priority ranking system to a more widely considered risk based prioritisation approach. The previous approach mapped defect severity scores to an overall priority rank from P1 to P4 which was linked to time based remediation targets. In risk terms this approach effectively prioritised pole remediation using defect severities as an approximation of the failure probability. The new approach prioritises pole remediation through overall risk scores which are determined in

Asset Management Process	Observations
	consideration of: o A more rigorous assessment of the likelihood of failure, which combines defect severities with general attributes such as age and type, and also consider environmental factors such as wind loading etc. o An assessment of the consequences of failure, considering factors such as line criticality and bushfire zones. It is apparent, and has been widely reported, that Western Power's population of wood poles has been in a poor condition overall, and that Western Power have been struggling to manage the volume of remedial works required over the 2012-14 period. At the beginning of the 2012-14 period Western Power had a significant backlog of wood poles. According to Western Power's report to the Authority (DM# 10352362, Letter to ERA – Wood Pole Replacement Backlog, 12 April 2013) *'the forecast volumes of unserviceable wood poles (requiring remedial treatment) for the AA3 period is approximately 369,000, with almost 80% of these poles already classified as unserviceable on the basis of a desk top assessment of attributes'.* Jacobs understands that Western Power has insufficient capacity to remediate the large volume of poles in poor condition within the nominal timeframes, and *'at 30 June 2012 Western Power had 31,444 poles for replacement in backlog. This was the total volume of poles identified as needing replacement through the inspection process (i.e. poles classified as P1, P2 and P3), not just poles in urgent need of replacement.'* (DM# 10352362). The key driver for Western Power's efforts to improve its strategic approach was due to these high volumes of poles that require treatment; Jacobs understands that the figures above mean that around half of Western Power's wood pole population have previously been identified as in poor condition. This has resulted in an unachievable volume of pole remediation works based on Western Power's available resources. The risks associated with this were compounded by the limited ability within the P1-P4 approach to prioritise the highest risk poles for remediation within the achievable volumes. The improved risk based approach now provides a means to prioritise the higher risk poles for remediation within the achievable volumes. In Jacobs' view the prioritisation of poles under the risk based approach is a significant improvement in the management of wood pole remedial works compared to the simple condition based P1-P4 approach. • Jacobs has reviewed Western Power's processes and supporting documentation relating to wood pole management and prioritisation of remedial treatment; particularly focussing on whether the wood pole management and prioritisation documentation is complete and fit for purpose. The overall strategies and processes for managing wood poles are outlined in Western Power's Policy for Management of Hardwood Poles (DM# 9204170) and the Wood Pole Structures Asset Management Strategy (DM# 9155338). These documents detail the implementation of the risk based approach above, the key element being the prioritisation of wood poles for remedial action based upon risk scores. Jacobs considers that the strategy demonstrates a relatively mature approach and that over time its effective implementation is likely to assist in mitigating the risks associated with the large volume of poor condition wood poles that remain in service throughout Western Power's network. Key observations with respect to the process of prioritising wood pole remediation works are discussed below. • Defect identification – Western Power carries out routine inspections of its wood pole assets on 4 yearly inspection cycles. Defects are identified and assigned a severity rating based upon guidance within the Catalogue of Equipment Types and Definitions of Defect Severities for Distribution Overhead Lines (DM# 9047586, DM# 12141229). Jacobs has reviewed this document and considers it to be comprehensive and its application likely to lead to appropriate wood pole condition assessments. • Investigation and analysis – a key input evident in the approach is the findings and recommendations of investigation analyses and reviews that Western Power have undertaken to understand the causes of failures affecting the wood pole population. Jacobs has reviewed the 2012 wood pole failure investigation report (DM# 10305548) and the 2013 review (DM# 118851978). Jacobs considers that

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	these documents demonstrate a robust analytical approach to investigating causes and trends in wood pole failures. Jacobs also observed that the findings of these investigations are: o Considered in the context of the strategy document (Half Yearly Strategic Review of Pole and Tower Asset Failure Investigations 1st July 2013 – 31st December 2013, page 9, DM# 11885197). o Evident in the Wood Poles Risk Assessment Tool (DM# 10276033) and the severity ratings assigned to wood pole defects within the equipment catalogue. • Likelihood of failure – likelihood of failure analysis is a two pronged approach which is based on desk-top analysis and field based inspections: o Firstly, Western Power assesses whether the pole is at risk of unassisted failure and in need of reinforcement. This is based on condition assessments and attributes of the pole. Jacobs has reviewed Western Power's Serviceability Assessment Model (SAM) for Wood Poles (DM# 6662107) and considers it to demonstrate a robust scientific approach to assessing the serviceability of wood poles. The output of the SAM is a pole Health Index (HI). o Once the serviceability of the pole is assessed and a HI is established via the SAM the likelihood of failure is then calculated within Western Power Network Risk Management Tool (NRMT) for wood poles. This combines the HI with location and exposure data to determine the overall likelihood of failure. Again, Jacobs considers this to be a robust scientific approach. • Consequence of failure – this is based on consideration of expected losses, including: o Safety. o Bushfire. o Customer Supply. Jacobs considers the consequence of failure assessments to be a reasonable approach that is applied scientifically. However, it is noted that it does not appear to capture all of the consequence criteria defined in Risk Assessment Criteria (DM# 6242606). • Risk scores – these are calculated based upon the combination of the likelihood and consequences of failure, as detailed within the NRMT technical manual, Risk Model – Distribution Wood Poles (DM# 12119341). In Jacobs' view this demonstrates a strong scientific approach; overall, the reviewers have not seen this level of rigour applied to assessing risk associated with wood pole failure by other Australian power utilities. • Identification of remedial Action – Jacobs has reviewed the Identifying Remedial Action Procedure (DM#9389199) for wood poles and considers this to be appropriate and consistent with the higher-level process and strategy. • Prioritise remedial action – Jacobs has reviewed the Prioritising Remedial Action Procedure (DM# 12006447) for wood poles and considers this to be appropriate and consistent with the higher-level process and strategy. Jacobs has also reviewed the Optimised Maintenance Rules for Distribution Overhead Network (DM# 10580804). Jacobs' considers these to be a robust approach to ensuring that the poles that represent the highest risk to the network are prioritised. Notwithstanding, Jacobs has identified areas which may require closer consideration: o There is conflicting terminology between documents which may lead to confusion. The terms 'high-priority defect poles', 'Priority Action Required (PAR) poles' and 'Sniper poles' are used in different documents and all seem to describe high-risk wood poles. o Jacobs also notes that there appears to be some slight inconsistencies between the definitions for each, as detailed below. There is potential that this could lead to assets being incorrectly categorised for treatment. - *The High Risk Defect Workflow Process for (Priority Attention Required) defects (DM# 11060064) refers to 'High risk defects are those with identified S1 defects, plus an NRMT Pole Consequence Score of >9000'.* - *The ZBAM implementation document for 2013/14 (DM# 11138009) identifies high risk defects as:* ➢ *All* [distribution assets]*: S1, S2, S3 defects in areas of geographical risk reduction focus*

Asset Management Process	Observations
	(Toodyay, Ballingup, Yanchep). S1, S2 High Likelihood Firestarter defects in Extreme or High bushfire risk areas. ***PLUS*** ➢ *Poles: S1 defect and NRMT Wood Pole Model consequence score > 9,000.* ➢ *Plant & equipment: RFRs with risk score > 200 (see DM# 10972398 – currently under trial so may be subject to change)* - The Optimised Maintenance Rules for Distribution Overhead Network (DM# 10580804) define high-risk defects as: ➢ *Areas of geographical risk reduction focus – Toodyay, Ballingup, Yanchep high risk wood poles,* ➢ *Wood poles with "high likelihood firestarter" defects as defined in Bushfire Mitigation plans for Extreme and High bushfire risk areas,* ➢ *RFR "Request for repair" work on poles with assets that have failed in service leaving residual network risk (e.g. certain transformers or secondary systems), and* ➢ *Highest risk wood poles ranked by the Network Risk Management Tool above a consequence score of 9,000.* o The 'Pareto Principle' has been applied to allocate resources between high-risk (Sniper, PAR, high-priority) poles and poles to be managed via 'Zone Based Asset Management' (ZBAM). This means that 20% of resources are allocated to addressing high-risk poles and 80% to addressing ZBAM poles. Jacobs considers that this seems like a reasonable starting point; however this should be revaluated as the new approach continues. • The above also applies to the PAR classification and other risk assessment criteria. In general, all specific risk prioritisation criteria should be periodically reviewed for appropriateness based on outcomes. Jacobs understands that the overall strategic approach to prioritise and implement remedial actions once risk scores have been assigned is as discussed below. The approach individually targets the highest risk poles in the network, and then prioritises non high risk poles to be programmatically remediated based upon the combined risk of all distribution assets in the area. Jacobs considers that this approach can reasonably be expected to address the highest risk poles, and then prioritise the remainder based on risk while gaining efficiencies associated with area based programs. Essentially, wood poles are placed into one of three categories based upon their risk score as described below. o Fault – poles that are at risk of imminent failure are assessed through the 'faults' process. Jacobs understands that this requires the inspector to remain on site until an emergency crew arrives. An assessment is made as to whether an immediate outage is required to remediate the pole. In many cases the pole can be reinforced in service and then a risk assessment undertaken post-reinforcement. Jacobs understands that faults are addressed immediately or, should this be prevented due to access restrictions, made safe and reclassified as 'Short Term Deferred' works. Short Term Deferred poles are re-assessed on a two-weekly basis until remediated. o Sniper / Priority Action Required (PAR) – high risk poles (not at risk of imminent failure) are addressed through the PAR process. PAR poles are identified for inclusion within the next work program. Western Power's crews operate on a six week program, which means that the typical worst case scenario is twelve weeks for a PAR pole to be remediated i.e. a work order is received at the beginning of a six week program but cannot be scheduled until the end of the next six week program. o Zone based Asset Management (ZBAM) – poles not categorised as faults or PARs fall into the 'hopper' with all other distribution assets. These are then treated through ZBAM which identifies areas to be targeted for defect maintenance (defects are identified based on routine inspections that operate on four year cycles) based on: - Zone risk score. - Assets with defects in the zone. - Bushfire defects in the zone.

Asset Management Process	Observations
	- Presence of other planned projects in the zone (e.g. Capacity Expansion, Long Bays, Substandard Clearance, Recloser Replacement). Jacobs considers the ZBAM approach to be a rigorous methodology for prioritising non high-risk poles. However, it was not clear what timeframes are in place to ensure that low-risk defects will eventually be treated. • Jacobs has reviewed the remedial action implementation process outlined in the strategy document, which made references to the Approved Works Program (AWP) (DM# 9155338) and production plans. No evidence of inconsistency was observed. • Reporting and outcomes realisation – Western Power's risk based approach to wood pole management appears to be well thought through by industry standards. Jacobs recognises that the new approach is in the early stages of implementation (having come into effect in January 2014). Jacobs considers that some thought should now be put into realigning the reporting and outcomes realisation assessments with the new approach. Some key observations are as follows: o As a legacy and nature of Western Powers works programming structure the times for remediating PAR poles is nominally 12 weeks. Jacobs has not observed any investigation that concludes that this timeframes is appropriate, or whether it should be improved. o Jacobs has reviewed the Wood Pole Management Dashboard for December 2013, which reported performance against the backlog of P1 / P2 poles as appropriate under the P1-P4 approach. However, Jacobs' considers that the reporting against wood poles has not been revised effectively in light of the new risk-based approach which was introduced in January 2014. Jacobs has reviewed two current reports and observes the following: - Executive Dashboard for Delivery & Public Safety: Jacobs has reviewed the May 2014 Executive Dashboard for Delivery & Public Safety (DM# 12081090) which is the primary mechanism that Western Power now uses to report on wood pole performance. Jacobs notes that this dashboard continues to report against volumes; although, as P1 and P2 poles are no longer applicable it now reports volumes of planned works against the actual volumes that were achieved. In Jacobs' view this method of reporting does not effectively capture the timeliness of pole remediation. This is because measuring the volumes achieved against volumes planned simply highlights works delivery discrepancies, which are typically minor issues associated with weather delays and restricted site access. It does not give an indication of the timeliness to remediate the population of high risk poles. . Performance against Fault-Short Term Deferred/PAR/ZBAM timeliness targets is not reported in the dashboard. - Unserviceable Wood Pole Report: Jacobs has observed the monthly 'Unserviceable Wood Pole Report' for June 2014 (DM# 12153093) which continues to report against P1/P2 poles, showing a backlog of 10,427 P1/P2 poles. Jacobs notes that the intended audience for this report is the ERA, aimed at tracking the previously reported backlog of poles requiring remediation identified during the 2012 AMS review. Jacobs notes however that these poles are a now a small subset of the total number of wood poles requiring treatment, and given that the new risk-based approach is applied to prioritising pole defect remediation, these poles are no longer rated as P1 and P2, but are now categorised based on overall risk. This means that they are dispersed between the following categories as appropriate: ➢ Poles at immediate risk of failure are addressed through the 'Faults' and 'Short Term Deferred' process. ➢ The highest risk poles (not at risk of immediate failure) are addressed through the PAR process. ➢ The remaining lower risk defective poles are addressed through the ZBAM optimisation approach. In this context, the continued reporting of the previously identified pole backlog is not reflective of the new risk-based approach to pole defect management and may indeed be moot. Notwithstanding this, as with the Executive Dashboard this reporting method does not give an

Asset Management Process	Observations
	indication of the timeliness to remediate the population of high risk poles which Jacobs does consider to be imperative.. Further, performance against Fault-Short Term Deferred/PAR/ZBAM timeliness targets is not reported in the report. o Jacobs also notes the below with respect to the Executive Dashboard – Delivery & Public Safety for May 2014 (DM# 12081090). In Jacobs view these should be considered by Western Power in view of better representing risk profiles to relevant stakeholders. - The summary page uses 'traffic-light' flags to highlight the performance of each category. A number of categories are flagged green (Acceptable - On or above target or below threshold) even though the target has not been met – including distribution wood pole inspections, distribution wood pole reinforcements, transmission wood pole reinforcements. In Jacobs' view ensuring that categories are flagged correctly would give a clearer representation of risk profiles to relevant stakeholders. - Rural poles are included on the summary page; however, no YTD targets are set for rural poles and there are no charts included on rural poles in the report. Jacobs understands that rural poles are considered higher consequence; where, for example, pole failures have an increased likelihood of causing a bushfire. In Jacobs' view specific reporting of performance across high consequence areas would give a clearer representation of risk profiles to relevant stakeholders. - Pole failure rates are measured against a Distribution Pole Integrity Index (DPII) and Transmission Pole Integrity Index (TPII), where Western Power has applied a target of 1 in 10,000 p.a. Jacobs notes that there is no universally accepted (or generally accepted) industry standard for pole failures. As such it is unclear whether a comparison against this target is appropriate, or whether such a comparison effectively represents the level of risk associated with the actual number of pole failures. • Jacobs notes that Western Power has had the NRMT externally reviewed in detail. Jacobs has observed the review report (DM12155466) and understands that Western Power is in the process of refining the tool in accordance with the recommendations. Jacobs has observed evidence of Western Power's commitment to continually refining it risk evaluation tools to ensure that they are calibrated as accurately as possible to produce risk scores reflective of the overall risk levels. Jacobs expects that Western Power will persist with its observed practice of continually refining its risk evaluation tools.
• Recommendations and OFIs.	<u>Recommendations</u> • JR: 07/2014 Jacobs recognises that Western Power's approach to the management of wood poles has significantly evolved over the 2012-14 period. However, Jacobs considers that the reporting mechanisms (Executive Dashboard – Delivery & Public Safety and Western Power Corporate Monthly Performance Report and Unserviceable Wood Pole Report) have not been revised consistent with the new approach. In Jacobs view this means that the risks profiles associated with wood poles are no longer being accurately reflected in the reports. Jacobs recommends that the reports be revised consistent with the new approach such that risk profiles are accurately represented to stakeholders. Specific areas that should be considered include: o Pole remediation for all risk categories (Fault-Short Term Deferred/PAR/ZBAM); including volumes, failures and timeliness. o Pole remediation with respect to Western Power's high consequence areas (i.e. bushfire zones etc.); including volumes, failures and timeliness. • JR: 08/2014 Western Power is reporting pole failures against the 'target' of 1 in 10,000. It is unclear whether a comparison against this target is appropriate, or whether such a comparison effectively represents the level of risk associated with the number of pole failures. Jacobs recommends that Western Power seek guidance from Energy Safety and the ERA on appropriate pole failure targets for reporting purposes. • JR: 10/2014

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	As a legacy and nature of Western Power's works programming structure, the timeframe for remediating PAR poles is nominally 12 weeks. Jacobs has not observed any investigation that concludes that this timeframes is appropriate, or whether it should be improved. Jacobs recommends that Western Power should investigate the appropriateness of the 12 week PAR remediation timeframe to assess whether it is appropriate, and whether there is scope for its improvement. Additionally, Western Power should consider the monitoring and reporting of time to remediate 'Faulted' and 'Short-Term Deferred' Poles. • JR: 12/2014 Jacobs considers that ZBAM approach to be a rigorous methodology for prioritising non high-risk poles. However, it was not clear what timeframes are in place to ensure that low-risk defects will eventually be treated. Jacobs recommends that Western Power consider whether firm time limits are appropriate for low-risk defects, and whether defect escalations are appropriate after specified time periods have lapsed. • JR: 15/2014 The 'Pareto Principle' has been applied to allocate resources between high-risk (Sniper, PAR, high-priority) poles and poles to be managed via 'Zone Based Asset Management' (ZBAM). This means that 20% of resources to addressing high-risk poles and 80% to addressing ZBAM poles. Jacobs considers that this seems like a reasonable starting point; however this should be revaluated as the new approach continues. The above also applies to the PAR classification and other risk assessment criteria. In general, all specific risk prioritisation criteria should be periodically reviewed for appropriateness based on outcomes. Jacobs recommends that: o A post implementation review should be carried out with respect to the Fault/PAR/ZBAM approach. o This should also consider the re-evaluation of categorisation and risk assessment criteria such as the PAR classifications and the 20:80 split of resources between high-risk poles and ZBAM. <u>OFIs</u> • Jacobs considers the consequence of failure assessments to be a reasonable approach that is applied scientifically. However, it is noted that it does not appear to capture all of the consequence criteria defined in Risk Assessment Criteria (DM# 6242606). Jacobs advises that the NRMT models should align with the Risk Assessment Criteria document. • There is conflicting terminology between documents which may lead to confusion. The terms 'high-priority defect poles', 'Priority Action Required (PAR) poles' and 'Sniper poles' are used in different documents and all seem to describe high-risk wood poles. Jacobs advises that Western Power should adopt consistent terminology with respect to high-risk poles. • Jacobs notes that the red/amber/green flags marking performance against targets are not always accurate in the safety dashboard. Jacobs advises that Western Power ensure that the flags are correct so that risk profiles are not misrepresented.
AOSF 3. SOCC & NOCC Business Continuity	• SOCC and NOCC business continuity. This involves a closer examination of the actions taken to address the recommendations from the 2012 review, as well as providing an overall assessment of the effectiveness of the SOCC and NOCC emergency plans
• Key findings of the review fieldwork.	***Recommendation 2012/17 - EPCC Risks*** *Assets such as the East Perth Control Centre should also be included in risk assessments both in terms of its operation and risks attached to the building.* <u>Action:</u> • Include EPCC Centre in risk assessments

Asset Management Process	Observations
	Western Power's response: • The building risks were assessed and reported in May 2011: Security Risk Assessment and Vulnerability Analysis at the East Perth Control Centre, DM# 9341887 o 2011 Property Security Report by Campbell & Campbell o 2011 AAA Property Risk & Insurance Report Dec 2011 (DM#9976215) • The risks were analysed and prioritised: EPCC Risk Report – Risk Matrix Qualitative Analysis Prioritised DM# 9385685 • The actions entered in the Risk Register and tracked: East Perth Building Risk Register DM# 5022474 Jacobs Review Refer to PR: 2012/17 commentary. Whilst Jacobs is satisfied that the action taken was sufficient, Western Power would need to ensure that the risks are routinely reviewed and updated accordingly. Jacobs notes that evidence provided of the review is dated 2011. It would be prudent to reassess these risks, particularly in the light of recent organisational changes that have led to changes in the management arrangements for the operations centre. Jacobs recommends that a routine formal risk re-assessment program be implemented for the EPCC in line with Western Power's general facilities management responsibilities. ***Recommendation 2012/18 –Emergency Management Planning*** *Review Contingency planning and testing at the Control Centre to incorporate:* • *Control Centre Staff Scenario Testing to include non-network issues such as pandemic, telephone unavailability, etc* • *Routine testing of identified contingency plans through annual exercises* • *Develop test procedures and protocols* • *Develop and implement action plans from test learnings* • *Monitor progress through action plan implementation and formal close-off procedure.* Actions: • Update Emergency Management Plan for East Perth Control Centre. • Develop the East Perth Control Centre Business Continuity plan to be aligned to the Western Power Business Continuity management framework. • Establish a formal test register to record details of tests and management of actions arising there from. Western Power's response: • Scenario Risk Workshop conducted by the Corporate Risk Group in 2013 (DM#10889856) • The Emergency Management Plan (DM#2072196) was reviewed to align with Australasian Inter-service Incident Management System (AIIMS) guidance and a Contingency Framework has been incorporated to summarise the relevant contingency procedures (DM#11031378). • Furthermore an implementation plan (DM#10611155) was compiled to facilitate the roll-out and ensure that all the actions are signed off by end of December 2013. • Truscott Crisis Leaders was tasked to train and assess 13 EPCC staff with as EMT members on 28 November 2013. The activity consisted of a workshop followed by three desktop exercises (covering different scenarios) which provided the opportunity for incremental improvements in systems, facilities and individual confidence as well as assessment of individual competency against a range of EMT roles. A report was issued with recommendations to improve the Planning, Facilities and EMT Process (DM#11593215) and 13 certificates of attainment were issued. • The Business Continuity Plan for East Perth (DM#11253034) based on the corporate Western Power BCP template produced by Risk was compiled and approved by the Executive Manager Network Planning and Operations, signed off in January 2014. • A register for Significant Emergency events and actions has been created to record actions taken and facilitate follow-up. (DM# 10550188). • Management Action 2012/18 Signoff Sheet (DM#10288155)

Asset Management Process	Observations
	Jacobs Review • Refer to PR: 2012/18 commentary. Jacobs is satisfied that the training, identification of issues and action item responses by Western Power for this recommendation have been addressed. However, Jacobs is of the view that Western Power has not rigorously identified all reasonably foreseeable contingencies that would form the basis of the Emergency Management Response planning and testing exercises. Additional actions in this regard are addressed in the asset management system review KPA: 9. Contingency Planning. ***Recommendation 2012/19 – Contingency Planning*** *Carry out a risk analysis of the complete suite of contingency scenarios to ensure that all likely threats to responses are systematically evaluated and appropriate responses designed.* Actions: • Conduct annual Emergency Management Risk Review Workshop to review the updated Emergency Management Plan for East Perth Control Centre. Western Power's response: • Workshop was held at East Perth on 24 June 2013 including all the relevant stakeholders. All the possible scenarios were brainstormed and evaluated to determine the likelihood and potential impacts. It was summarised on the Fishbone diagram (DM#10890378) where items in red indicated highest impact and green lowest impact. • The scenarios were summarised and current procedures/contingency plans identified (DM#10889856). Several gaps were identified and actions were summarised (DM#10930546). • The Emergency Management Plan (DM#2072196) was reviewed to align with AIIMS guidance. An implementation plan (DM#10611155) was compiled to facilitate the roll-out and ensure that all the actions can be signed off by end of December 2013. • Workshop was held on 28 November 2013 with the objective to cover three different Emergency scenarios and apply the guidelines provided by Emergency Management Manual to ensure business continuity. It was facilitated by Truscott Crisis Leaders and members of the EMT were exposed to the roles as per AIIMS guidelines. A report was issued with feedback/recommendations (DM#11593215). Jacobs Review Jacobs observed that notwithstanding actions arising from the previous review being implemented, an opportunity for improvement continues to exist in the contingency planning area. Jacobs failed to observe a systematic and comprehensive approach to scenario planning, as noted in the asset management system review KPA: 9. Contingency Planning. The main recommendations flowing from this observation are repeated here: • Jacobs is of the view that Western Power should actively consider and develop response plans for the following range of contingencies. These are by no means exhaustive but are provided as an indication of the range of issues that should be considered: o Simultaneous loss of transmission and widespread distribution due to a single event (storm and or bushfire); review network topology where this may be a susceptibility due to local environmental factors or network topology. o Credible (although unlikely) multiple transmission network contingencies; Common-mode or simultaneous failures of key elements. o Widespread generation loss or network islanding scenarios; Jacobs recognises that this is not necessarily in Western Power's jurisdiction, but plans will be required to manage community requirements nonetheless. o Widespread or sustained interruptions to major load centres (e.g. Perth CBD). • Western Power should actively consider and factor into its contingency and emergency response plans issues such as social infrastructure impact and restoration prioritisation. This in particular applies where Western Power's response plans actively rely upon the availability of this infrastructure, such as mobile phone capability and fuel supply. In this respect, contingency plans should actively consider the restoration of supply to vital infrastructure such as:

Asset Management Process	Observations
	o Water supply. o Sewage systems. o Food supply. o Mobile telephones and emergency services telecommunications. o Hospitals (coordination with Department of Health and routine testing of standby generation capability). o Fuel supply (Supply to Kwinana refinery, bulk supply terminals, and local supplies). • Contingency plans should actively consider the coordination of responses with other utilities. In this respect, protocols should be established with other emergency service departments and social-infrastructure service providers, including: o Police. o Fire Brigade. o Ambulance and Hospitals. o State Emergency Service (SES). This should not only include management of supply restoration on a priority basis, but operational issues regarding relieving emergency officers standing by fallen wires, 'make-safe' protocols, etc. In this respect Jacobs notes that Western Power has a program in place where suitably qualified, trained and equipped staff are utilised in the event of such incidents to relieve other emergency services personnel from stand-by and make-safe activities. <u>Overall Observations:</u> The operations functions are enabled by asset management information systems and their integration with network management systems PowerOn Fusion (for distribution,) and XA/21 (for transmission) which are regarded as state-of-the-art and reflect a strong focus from Western Power on supporting its activities with robust asset information and network management systems. Dispatch processes generate work orders directly from Ellipse (asset-linked where appropriate or possible) in order to ensue cost tracking of operation activities (both planned and unplanned). The management structure of the centre (having its own engineering support group) is regarded as positive as it ensures self-sufficiency in operational planning and operational support functions. Further, operations are governed under a single leadership team to ensure integrated operations planning and activities, and to simplify chain of command relationships. Jacobs observed during interviews with key personnel that Western Power's day-to-day operational activities are directed by business continuity plans, response procedures, emergency management protocols, and contingency plans. Overall the centre and the processes appear to be well disciplined and well managed.
• Recommendations and OFIs.	<u>Recommendations</u> • JR: 20/2014 ***Recommendation 2012/17 - EPCC Risks*** *Assets such as the East Perth Control Centre should also be included in risk assessments both in terms of its operation and risks attached to the building.* <u>Action:</u> o Include EPCC Centre in risk assessments <u>Western Power's response:</u> o The building risks were assessed and reported in May 2011: Security Risk Assessment and Vulnerability Analysis at the East Perth Control Centre, DM# 9341887 o 2011 Property Security Report by Campbell & Campbell o 2011 AAA Property Risk & Insurance Report Dec 2011 (DM#9976215) o The risks were analysed and prioritised: EPCC Risk Report – Risk Matrix Qualitative Analysis Prioritised DM# 9385685

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	o The actions entered in the Risk Register and tracked: East Perth Building Risk Register DM# 5022474. Jacobs' recommendation: Refer to PR: 2012/17 commentary. Whilst Jacobs is satisfied that the action taken was sufficient, Western Power would need to ensure that the risks are routinely reviewed and updated accordingly. Jacobs notes that evidence provided of the review is dated 2011. It would be prudent to reassess these risks, particularly in the light of recent organisational changes that have led to changes in the management arrangements for the operations centre. Jacobs recommends that a routine formal risk re-assessment program be implemented for the EPCC in line with Western Power's general facilities management responsibilities. • JR: 18/2014 • JR: 19/2014 • JR: 20/2014 ***Recommendation 2012/18 –Emergency Management Planning*** *Review Contingency planning and testing at the Control Centre to incorporate:* o *Control Centre Staff Scenario Testing to include non-network issues such as pandemic, telephone unavailability, etc* o *Routine testing of identified contingency plans through annual exercises* o *Develop test procedures and protocols* o *Develop and implement action plans from test learnings* o *Monitor progress through action plan implementation and formal close-off procedure.* Actions: o Update Emergency Management Plan for East Perth Control Centre. o Develop the East Perth Control Centre Business Continuity plan to be aligned to the Western Power Business Continuity management framework. o Establish a formal test register to record details of tests and management of actions arising there from. Western Power's response: o Scenario Risk Workshop conducted by the Corporate Risk Group in 2013 (DM#10889856) o The Emergency Management Plan (DM#2072196) was reviewed to align with Australasian Inter-service Incident Management System (AIIMS) guidance and a Contingency Framework has been incorporated to summarise the relevant contingency procedures (DM#11031378). o Furthermore an implementation plan (DM#10611155) was compiled to facilitate the roll-out and ensure that all the actions are signed off by end of December 2013. o Truscott Crisis Leaders was tasked to train and assess 13 EPCC staff with as EMT members on 28 November 2013. The activity consisted of a workshop followed by three desktop exercises (covering different scenarios) which provided the opportunity for incremental improvements in systems, facilities and individual confidence as well as assessment of individual competency against a range of EMT roles. A report was issued with recommendations to improve the Planning, Facilities and EMT Process (DM#11593215) and 13 certificates of attainment were issued. o The Business Continuity Plan for East Perth (DM#11253034) based on the corporate Western Power BCP template produced by Risk was compiled and approved by the Executive Manager Network Planning and Operations, signed off in January 2014. o A register for Significant Emergency events and actions has been created to record actions taken and facilitate follow-up. (DM# 10550188). o Management Action 2012/18 Signoff Sheet (DM#10288155) Jacobs' recommendation: Refer to PR: 2012/18 commentary. Jacobs is satisfied that the training, identification of issues and

Asset Management Process	Observations
	action item responses by western Power for this recommendation have been addressed. However, Jacobs is of the view that Western Power has not rigorously identified all reasonably foreseeable contingencies that would form the basis of the Emergency Management Response planning and testing exercises. Additional actions in this regards are addressed in the asset management system review KPA: 9. –Contingency Planning. • JR: 18/2014 • JR: 19/2014 • JR: 19/2014 ***Recommendation 2012/19 – Contingency Planning*** *Carry out a risk analysis of the complete suite of contingency scenarios to ensure that all likely threats to responses are systematically evaluated and appropriate responses designed.* Actions: o Conduct annual Emergency Management Risk Review Workshop to review the updated Emergency Management Plan for East Perth Control Centre. Western Power's response: o Workshop was held at East Perth on 24 June 2013 including all the relevant stakeholders. All the possible scenarios were brainstormed and evaluated to determine the likelihood and potential impacts. It was summarised on the Fishbone diagram (DM#10890378) where items in red indicated highest impact and green lowest impact. o The scenarios were summarised and current procedures/contingency plans identified (DM#10889856). Several gaps were identified and actions were summarised (DM#10930546). o The Emergency Management Plan (DM#2072196) was reviewed to align with AIIMS guidance. An implementation plan (DM#10611155) was compiled to facilitate the roll-out and ensure that all the actions can be signed off by end of December 2013. o Workshop was held on 28 November 2013 with the objective to cover three different Emergency scenarios and apply the guidelines provided by Emergency Management Manual to ensure business continuity. It was facilitated by Truscott Crisis Leaders and members of the EMT were exposed to the roles as per AIIMS guidelines. A report was issued with feedback/recommendations (DM#11593215). Jacobs' recommendation: Jacobs observed that notwithstanding actions arising from the previous review being implemented, an opportunity for improvement continues to exist in the contingency planning area. Jacobs did not see evidence of a systematic and comprehensive approach to scenario planning, as noted in the asset management system review KPA: 9. –Contingency Planning. The main recommendations flowing from this observation are summarised here: o Western Power should actively consider and develop response plans for a broad range of network contingencies such as widespread simultaneous loss of transmission and distribution network, loss of key critical load centres, credible multiple contingency scenarios. These should be reviewed and tested on a routine basis; o Western Power should develop a review timetable for the contingency and emergency management plans and the reviews should be undertaken at a frequency commensurate with the nature of the scenario and the likelihood of its occurrence in recognition of the changes in the network over time; o Western Power should actively consider and factor into its contingency and emergency response plans issues such as social infrastructure impact, with restoration prioritisation actively considered as part of the plans; o Contingency plans should actively consider the coordination of responses with other utilities, emergency service departments and social-infrastructure service providers, and; o Western Power should also give active consideration to the management and review of Western Power's mobile radio capability, and the management and coordination of a fleet of mobile

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	generators in order facilitate their rapid deployment to vital locations and key third party infrastructure sites.
AOSF 4. Transformer Management	• Assessment of the effectiveness of the asset condition assessment processes for distribution and transmission transformers and the performance of those processes in the field. The reviewer is also required to investigate the management of the three transmission transformers at the Muja Power Station, two of which (BTT1 and BTT2) have failed within the past 24 months. • The reviewer will examine the (transformer) asset inspection documentation with a view to determining if the documentation is complete and fit for purpose. Additionally, the reviewer will examine the actions taken by Western Power to rectify the issues identified to be the cause of the failure of the transformers, and whether these actions were appropriate and commensurate with existing asset management policies.
• Key findings of the review fieldwork.	<u>Distribution transformers</u> • Jacobs has reviewed the Catalogue of Equipment Types and Definitions of Defect Severities for Distribution Substation (DM# 1200779) which is used for condition assessments of ground mounted distribution transformers. Jacobs considers this document to be complete and fit for the purpose of assessing asset condition. The document provides defect rectification timeframes for the different severity levels. Jacobs notes that these timeframes appear to be inconsistent with Western Power's new Fault/PAR/ZBAM approach to asset maintenance. • Jacobs has reviewed the Catalogue of Equipment Types and Definitions of Defect Severities for Distribution Overhead Lines (DM# 9047586) which is used for condition assessments of pole mounted distribution transformers. Jacobs considers this document to be complete and fit for the purpose of assessing asset condition. Jacobs notes that the July 2014 revision (DM# 1220966) has been updated consistent with Western Power's new Fault/PAR/ZBAM approach to asset maintenance. • Jacobs has reviewed the Catalogue of Maintenance Timescales (DM# 3235127) for ground and pole mounted distribution transformers and considers the timeframes to be consistent with typical industry practice: o All pole top transformers are inspected every four years as a part of bundle pole inspection to capture defects and attributes. o All ground mounted transformers every two years (except in CBD – yearly inspection). • Jacobs has also reviewed the Distribution Substation Inspection process document (DM# 3271973) and considers this to be appropriate and consistent with the equipment defect catalogues discussed above. • Jacobs has discussed the inspection and condition assessment processes in detail with relevant field staff and based on these discussions is satisfied that inspections and condition assessments are carried out effectively in the field. Condition assessments are carried out electronically using 'tough-books'. The tough-books have embedded scripts that ensure inspectors work through each element of the inspection and condition assessment process. These scripts are also evidenced within the inspection process document. Jacobs understands that the relevant defect catalogues are available within the tough-books to assist in the correct identification and assessment of defect severities. In Jacobs' view the use of electronic tough-books rather than paper check-sheets is advantageous in enabling inspection and condition assessment procedures to be carried out more diligently. Electronic condition assessments also have the benefit of uploading condition data for faster risk analysis and works prioritisation. • Jacobs has reviewed the June 2014 Asset Performance Dashboard – Distribution Transformers (DM# 12049029). This provides a snapshot of the transformer population for the previous month; including general attributes and defect analysis. Jacobs found that there is scope to improve the dashboard reporting to better present risk profiles to stakeholders. For example, statistics for pole-top and ground-mount transformers are grouped together, pending defects are identified but there is no information on

Asset Management Process	Observations
	timeliness, and no historical data is presented to give an understanding of trends. Also, the dashboard did not provide any information on inspections. <u>Transmission transformers</u> • Jacobs has reviewed the maintenance criteria for Power Transformers (DM# 1045897) which identifies monthly inspection intervals for transmission power transformers. Oil sampling and thermal camera inspections are carried out annually. Jacobs considers these schedules to be appropriate and consistent with typical industry practice. Jacobs notes that Western Power has now transitioned to bi-monthly inspections. Based on our experience and observations in other jurisdictions Jacobs does not consider this to be inappropriate. • Jacobs has reviewed the Transmission Substation Primary & Secondary Plant Inspection Quality Verification Sheet (DM# 9377452) which is used for recoding transmission transformer inspections. Jacobs has also reviewed the Primary and Secondary Plant Inspection for Transmission Terminal and Zone Substation (DM# 1373480) procedure which lists the checks that are to be performed by the inspector to populate the check-sheet. Essentially, the inspection procedure: o Identifies all checks that must be undertaken by the inspector. o Identifies that all defects must be raised as a Query Trouble (QT). o Provides generic severity action codes in its appendix which are applied to assess all defects. o Provides a drip conversion table for oil loss estimation; however it was not clear how these would be converted to defect severities for different types of oil filled assets such as bushings, transformers, circuit breakers etc. Jacobs considers the combination of these documents adequate for transformer inspections and did not identify any apparent gaps; however, it is noted that: o The severity assessments rely on the expertise of the inspector. o The equipment catalogues for distribution assets appear to be more thoroughly considered. Additionally, Jacobs notes that unlike distribution asset inspections where ‘tough-books’ are used, the inspection sheet is a paper sheet that is completed manually. Jacobs understands that the transmission transformer check-sheets are archived without being uploaded electronically (noting that any defects will be recorded through a QT). These can be retrieved by asset managers for review if required. All evidence observed by Jacobs indicates that the inspections are carried out effectively in the field. Notwithstanding any potential opportunities for improvement with respect to the inspection procedures, Jacobs notes that inspections primarily pick-up external defects which are rarely the cause of failure for power transformers. Diagnostic tests play the critical role in monitoring transformer condition and indicating the probability of failure. • Jacobs has reviewed Western Power’s power transformer condition assessment methodology as detailed within the Condition Based Risk Management (CBRM) – Power Transformers (DM# 6694682) document. The CBRM method considers a range of factors in making an overall condition assessment, including: o Electrical diagnostic testing results – 5 yearly. o Dissolved Gas Analysis (DGA) – annual. o Transformer age and loading. o Defect history – identified through normal QT / routine maintenance. o Tap-changer type / performance. o Other risks such as family type, partial discharge, gassing, overheating and design deficiencies will increase the risk of failure. In addition, the number of ’bad‘ condition transformers at the same substation would also increase the reliability risk. Jacobs considers the elements considered in the CBRM methodology to demonstrate a comprehensive and rigorous approach to power transformer condition assessments. • The CBRM tool is calibrated based on Western Power’s experience, considering:

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	o Findings from internal investigations on power transformers. o Accepted values of transformers with similar design, construction, or age and operating in a similar environment. o Practices supported by industry groups including TechCon, CIGRE, etc. o Industry standards including IEEE, IEC etc. o Trend analysis, whereby increasing trends (where the score may still be within acceptable limits) are treated as a critical indicator. Jacobs considers the analysis and information sources used to calibrate the CBRM tools to also demonstrate a comprehensive and rigorous approach to power transformer condition assessments. • Jacobs has reviewed CBRM tools used by Western Power over the period (DM# 4384485, DM# 8425986) and considers these to demonstrate the effective application of the methodologies described above. The assessment from January 2014 shows indicates that Western Power has: o 54% of transformers in 'Good' condition. o 17% of transformers in 'Fair' condition. o 20% of transformers in 'Poor' condition. o 9% of transformers in 'Bad' condition. This overall distribution of condition ratings is consistent with the age of Western Power's transformer population, where approximately 35% are 40 years or older; power transformers have a nominal life expectancy of 40-50 years. Jacobs considers this to be indicative that the output CBRM tool is reflective of the condition of Western Power's transformers. Jacobs notes that whilst the CBRM tool is demonstrably effective, the risk parameters that are applied do not appear consistent with Western Power's Risk Assessment Criteria (DM# 6242026) document. • Jacobs has observed the application of the CBRM methodology leading to effective outcomes, including: o Replacement of units at Carrington, Merredin and Narrogin; and disposal decisions at Victoria Park, Narrogin and Merridin. o Identification of 'Wet' transformers justifying the purchase of dry-out units (DM# 1058860) and the prioritisation of the installation of dry-out units. <u>Muja transformer failures</u> • Jacobs understands that two transformers (BTT1 and BTT2) have failed at Muja power station within the 2012-14 period. o BTT1 failed in September 2012 – 22 years after commissioning in 1990. BTT1 was a 510 MVA, 330-132 kV Auto-Transformer manufactured by ABB. BTT1 is thought to have failed due to a fault that originated in the selector switch. o BTT2 failed in February 2014 – 24 years after commissioning in 1990. BTT2 was a 395 MVA, 220-132 kV Auto-Transformer also manufactured by ABB. BTT2 is thought to have failed due to a fault that originated in the tertiary winding. These transformers were both at approximately 50% of their nominal lifespan and would not be expected to fail due to deteriorating condition at this stage. Jacobs notes that the types of faults do not clearly point to a similar root cause. Jacobs has investigated Western Power's management of these transformers to determine whether they were effectively managed and whether any potential mismanagement has resulted in the failures. Jacobs has also reviewed the actions taken by Western Power following the transformer failures. The observations from the review are detailed below. • Jacobs has reviewed the maintenance and inspection timelines for the transformers and understands that periodic maintenance and inspections have been carried out as appropriate, and in accordance with Western Power's scheduling standards. • Jacobs has reviewed available maintenance history documents for the three transformers. The documents appear to be consistent with the timelines and Western Power's maintenance guidelines –

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	although Jacobs understands that these will have varied over the 22-24 year period from 1990. • Jacobs has reviewed the defect (QT) extracts on the three transformers. Jacobs considers the defect records to be typical and not suggestive of any underlying issues with these transformers. It is noted that BTT3 which has not failed has a longer record of defects than BTT1 or BTT2. • Jacobs has reviewed the recent HV test scores for the transformers. o BTT1: The June 2009 report (DM# 6192403) recommended that *'the DDF cables on the High Voltage Bushings needs to be replaced, in order to prevent an open circuit on the C2 side of the bushings'*. Jacobs understands that it is not thought to be related to the failure of the transformer. o BTT2: The April 2007 report (DM# 3613101) found that *'the white phase C2 online monitoring cable appeared not to have made proper contact to earth at the base of the bushing, it seems that this caused the C2 connection to heat up to such a degree as to cause discoloration'.* The April 2011 report (DM# 8148579) found that *'the high voltage white phase bushing C2 returned results similar to the results obtained in 2007'.* Jacobs understands that this issue is not thought to be related to the failure of the transformer. • Jacobs has observed the CBRM condition scores of the Muja transformers prior to the failures. All three Muja transformers were assessed as being in good condition. This is consistent with the age of the transformers. • Jacobs has observed the historic DGA results which show that all parameters for the failed transformers were within criteria ranges, with no increasing trends. The results show no indication that the transformers had an increased risk of failure. This is consistent with the CBRM assessments. • Jacobs has reviewed the historic loading of the transformers (to 2011) and observes that the BTT1 and BBT2 transformers have been loaded at under 50% of their rated capacity at all times. Jacobs notes that BTT3 (non-failed transformer) has a heavier load profile than BTT1 and BTT2 (failed transformers). Jacobs does not consider that overloading would have contributed to the failure of the transformers. • Based on the historic information reviewed as outlined above, Jacobs does not consider in there is evidence which suggests that mismanagement or negligence on the part of Western Power has led to the failure of the BTT1 and BTT2 transformers at Muja. • Western Power has undertaken specific investigations into the failure of BTT1 and BTT2. Investigations on BTT2 are continuing. Jacobs understands that a broader system investigation is currently being undertaken in view of the failure of both transformers. • BTT1 investigations: Western Power has undertaken an internal investigation, a manufacturer investigation and an independent investigation. o Internal investigation: Western Power's internal investigation is detailed within the Muja BTT1 Failure Report (DM# 10229839). The investigation found that there were two probable causes: - Arcing occurred between the selector moving contact connection leads between the selector switch and diverter. - A short circuit developed within the tapping windings between loops three and five or three and four, which would have generated large circulating currents. The report recommended that: - Network Performance to consider the options of repairing or replacing the unit – Jacobs understands that this was completed December 2012. - Inspect all of the windings to determine other probable causes. Issue a supplementary report if other causes are determined – Jacobs understands that this was completed in May 2013. - Carry out a risk assessment on the two similar transformers and take appropriate actions – Jacobs understands that this was completed in May 2013. o Manufacturer report (ABB): ABB's investigation is detailed within the Failure Inspection Report (DM# 10836025). The investigation found that there were two probable causes: - Arcing between leads and gearing within the tap changer selector due to inadequate mechanical clearance. The resulting mechanical wear has eventually compromised and worn through the electrical insulation on the leads triggering the failure.

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	- Excessive tension applied by a tapping lead to the tap changer contacts. This resulted in mechanical failure of tap changer support posts allowing arcing between tap changer contacts. The report provided recommendations: - That would be required to repair the transformer – refer to report for details. - To check the 'sister' transformer (Southern Terminal) – refer to report for details. o Independent investigation (Wasinger Transformers): Wasinger Transformer's investigation is detailed within the Failure Investigation Report (DM# 10836102). The investigation found that: - On the balance of probability, the fault commenced with a flashover between the interconnecting rods on top of the selector switch. Reason for this was probable strains to those rods during factory or site assembly work. It recommended that: - On the second transformer at Muja the tap-changer area between selector and diverter and the diverter compartment itself be inspected for possibly incipient faults. • Jacobs understands that the actions undertaken by Western Power following the failure of BTT1 are as follows: o Reduced the maximum loading on the BTT2 transformer to 50%. o Developed multiple contingency plans for other potential failures (including the failure of BTT2). o Developed options for BTT1 replacement, which culminated in the fast tracked procurement of a new transformer. o Increased monitoring of adjacent and similar plant and equipment. o Initiate the three investigations (internal, manufacturer, independent). o Drain down of sister unit at Southern Terminal (DM# 12121120). o Bulletin sent to manufacturers on tap lead clearances (DM# 10673124). • BTT2 investigations: Western Power has undertaken an internal investigation, a manufacturer investigation and initiated an independent investigation (currently underway). o Internal investigation: Western Power's internal investigation is detailed within the Muja BTT2 Failure Report (DM# 11831030). The investigation found that: - The electrical testing indicated that the blue phase tertiary winding was faulty. There was physical evidence of internal arcing and failure of the blue phase winding. - The root cause analysis for the failed MU BTT2 is still in progress. The failure mode, extent of damage and any other underlying component or assembly issues related to this fault can only be confirmed by a forensic unwinding and a close examination of these windings and sampling analysis of paper insulation. The report recommended that: - Perform a forensic disassembly and an inspection of failed winding groups on MU BTT2 to assist in determining the root cause of the winding failure. - Investigate operating and environmental conditions for the failed MU BTT2 transformer. o Manufacturer report (ABB): ABB's investigation is detailed within the Failure Inspection Report (DM# 11848812). The investigation found that: - Electrical testing of the transformer has confirmed major damage to C Phase (Blue Phase) tertiary winding. The failure appears to have started with the C Phase windings, most probably the innermost tertiary winding. - The root cause is indeterminate from the inspection of the accessible areas. There was no initiating event or activity on the system at the time of failure. The report provided recommendations: - That would be required to repair the transformer – refer to report for details. - Disassemble the windings for further investigation – refer to report for details. o Independent investigation (Wasinger Transformers): The independent investigation is currently

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	underway. • Jacobs understands that the actions undertaken by Western Power following the failure of BTT2 are as follows: o Established an Emergency Management Team to deal with the issue as quickly as possible. The work of this team included: - Moving a reactor bank to Albany to assist with network voltage issues. - Conducting an international search for existing transformers that may be a suitable replacement for the failed transformer. - Conducting an options analysis with a view to restoring the network to N-1 as quickly as possible. o Purchase of Online DGA monitoring units for Muja BTT3 and Southern Terminal T2 (DM# 11808908). o Muja BTT2 teardown and investigation is being scheduled (independent investigation). • Based upon the review Jacobs considers that: o The evidence does not suggest that the failures of the Muja transformers were the result of mismanagement of negligence of Western Power; either historic, or in the lead up to the failures. o The actions undertaken by Western Power following the failures have been an appropriate response. o The management of the transformers has been commensurate with the existing management policies. • Jacobs understands that: • The independent investigation of the BTT2 transformer failure at Muja is still underway. • Western Power is undertaking a broader system investigation to understand if there were network operating conditions that may be a contributing factor in the failure of the transformers. Jacobs understands that this investigation is also considering the reactive attributes of the network including the location of reactive compensation equipment. • At this stage no external expert opinion has been sought with regards to whether broader system conditions may have contributed to the failures of the Muja transformers. • Western Power has now installed online DGA monitoring at BTT3 transformer at Muja. Jacobs understands that online DGA monitoring is selectively used at Western Power but is not widespread. It is unclear whether online DGA may have helped to prevent the two transformer failures at Muja.
• Recommendations and OFIs.	<u>Recommendations</u> • JR: 07/2014 Jacobs has reviewed the June 2014 Asset Performance Dashboard – Distribution Transformers (DM# 12049029). This provides a snapshot of the transformer population for the previous month; including general attributes and defect analysis. Jacobs found that there is scope to improve the dashboard reporting to better present risk profiles to stakeholders. For example, statistics for pole-top and ground-mount transformers are grouped together, pending defects are identified but there is no information on timeliness, and no historical data is presented to give an understanding of trends. Also, the dashboard did not provide any information on inspections. Jacobs recommends that the reports be revised consistent with the new approach such that risk profiles are accurately represented to stakeholders. Specific areas that should be considered include: o Distribution transformer remediation for all risk categories (fault/PAR/ZBAM); including volumes, failures and timeliness. o Distribution transformer remediation with respect to Western Power's high consequence areas (i.e. bushfire zones etc.); including volumes, failures and timeliness. • JR: 13/2014 Jacobs understands that the independent investigation of the BTT2 transformer failure at Muja is still underway.

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	Jacobs recommends that Western Power take appropriate action based on the findings of the independent investigation, and in view of the findings of other investigations and actions taken to-date. • JR: 13/2014 Jacobs understands that Western Power is undertaking a broader system investigation to understand if there were network operating conditions that may be a contributing factor in the failure of the transformers. Jacobs understands that this investigation is also considering the reactive attributes of the network including the location of reactive compensation equipment. Jacobs recommends that a report be produced detailing the findings of the system investigation, and actions be taken as appropriate based on the findings. • JR: 13/2014 Jacobs understands that at this stage no external expert opinion has been sought with regards to whether broader system conditions may have contributed to the failures of the Muja transformers. Jacobs advises that Western Power consider whether external expertise may be appropriate to assist in understanding whether broader system conditions may have contributed to the failure of the Muja transformers; and whether other transformers may also be at risk. <u>OFIs</u> • Jacobs has reviewed the Catalogue of Equipment Types and Definitions of Defect Severities for Distribution Substation (DM# 1200779) which is used for condition assessments of ground mounted distribution transformers. Jacobs considers this document to be complete and fit for the purpose of assessing asset condition. However, Jacobs notes that the document provides timeframes for defect rectification for the different defect severity levels. These timeframes appear to be inconsistent with Western Power's new Fault/PAR/ZBAM approach to asset maintenance. Jacobs' notes that this document is scheduled for review. Jacobs advises that Western Power revise the defect resolution timeframes consistent with the Fault/PAR/ZBAM approach to asset maintenance during the scheduled review. • Jacobs has reviewed the maintenance criteria for Power Transformers (DM# 1045897) which identifies monthly inspection intervals for transmission power transformers. Oil sampling and thermal camera inspections are carried out yearly. Jacobs considers these schedules to be appropriate and consistent with typical industry practice. Jacobs advises that Western Power revise the maintenance criteria for Power Transformers (DM# 1045897) consistent with bi-monthly inspections. Western Power may wish to produce a document which explains the reasoning for the inspection regime change such that it can be readily understood by interested external parties. • Jacobs has reviewed the Transmission Substation Primary & Secondary Plant Inspection Quality Verification Sheet (DM# 9377452) which is used for recording transmission transformer inspections. Jacobs has also reviewed the Primary and Secondary Plant Inspection for Transmission Terminal and Zone Substation (DM# 1373480) procedure which lists the checks that are to be performed by the inspector to populate the check-sheet. Essentially, the inspection procedure: o Identifies all checks that must be undertaken by the inspector. o Identifies that all defects must be raised as a Query Trouble (QT). o Generic severity action codes in its appendix which are applied to assess all defects. o Provides a drip conversion table for oil loss estimation; however it was not clear how these would be converted to defect severities for different types of oil filled assets such as bushings, transformers, circuit breakers etc. Jacobs considers the combination of these documents adequate for transformer inspections and did not identify any apparent gaps; however, it is noted that: o The severity assessments rely on the expertise of the inspector. o The equipment catalogues for distribution assets appear to be more thoroughly considered.

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	Additionally, Jacobs notes that unlike distribution asset inspections where 'tough-books' are used, the inspection sheet is a paper sheet that is manually filled. Jacobs understands that the transmission transformer check-sheets are archived without being uploaded electronically (noting that any defects will be recorded through a QT). Jacobs advises that Western Power consider: o An overhaul of the Transmission Terminal and Zone Substation (DM# 1373480) procedure document. o The use of tough-books or similar to electronically record substation inspections, based on a business case assessment of the costs and benefits of deploying this technology • Jacobs notes that whilst the CBRM tool is demonstrably effective, the risk parameters that are applied do not appear consistent with Western Power's Risk Assessment Criteria (DM# 6242606) document. Jacobs advises that Western Power consider aligning the CBRM tool with the Risk Assessment Criteria (DM# 6242026) document. • Jacobs understands that Western Power has now installed online DGA monitoring at BTT3 transformer at Muja. Jacobs understands that online DGA monitoring is selectively used at Western Power but is not widespread. It is unclear whether online DGA may have helped to prevent the two transformer failures at Muja. Jacobs recognises that the use of online condition monitoring is a significant undertaking that requires underlying system infrastructure which would require significant business justification. Online DGA is considered to be an advanced method of condition monitoring by typical industry standards; where periodic sampling as currently undertaken by Western Power is the typical industry standard for 'effectiveness'. However, Jacobs advises that Western Power may wish to consider: o Whether broader use of online DGA would be beneficial from a cost vs. benefits scenario. o Developing a documented strategy for the use of online DGA.

5. Recommendations

5.1.1 Overview

Jacobs' Recommendations (JR) resulting from the asset management system review are provided in Table 5-1 and Table 5-2 below. Jacobs' recommendations capture the key findings, as detailed in Section 4 of this report, that are considered to have a material impact on asset management system effectiveness.

The detailed recommendations with respect to each key process area and area of special focus are consolidated into a succinct set of achievable recommendations intended to provide constructive measures to enhance the effectiveness of the asset management system.

5.1.2 Recommendations resolved during the current review period

Table 5-1 below captures recommendations focussed at key issues that Western Power has resolved over the 2012-14 period. Jacobs has not attempted to reproduce the previous recommendations from the 2012 review in the table below; the inclusions below cover key issues that were either not picked up or were not clearly identified as an issue in the previous review (2012). The full scope of issues resolved during the period can be ascertained via Table 5-1 below, Table 2-3 in Section 2, and the discussions in Table 4-2 and Table 4-3 in Section 4.

Table 5-1 : Current Review Asset System Deficiencies / Recommendations – Resolved during current review period

A. Resolved during the current review period			
Ref.	**Asset System Deficiency** **(Rating / Asset Management System Component & Effectiveness Criteria / Details of Asset System Deficiency)**	**Date Resolved (& management action taken)**	**Reviewers' comments**
1.	Rating: C3 KPA: 6. Asset Maintenance EC: Risk management is applied to prioritise maintenance tasks AOSF: 2. Distribution Wood Poles At the beginning of the 2012-14 period Western Power had a significant backlog of wood poles. According to Western Power's report to the Authority (DM# 10352362, Letter to ERA – Wood Pole Replacement Backlog, 12 April 2013) *'the forecast volumes of unserviceable wood poles (requiring remedial treatment) for the AA3 period is approximately 369,000, with almost 80% of these poles already classified as unserviceable on the basis of a desk top assessment of attributes'.* Jacobs understands that Western Power has insufficient capacity to remediate the large volume of poles in poor condition within the nominal timeframes, and *'at 30 June 2012 Western Power had 31,444 poles for replacement in backlog. This was the total volume of poles identified as needing replacement through the inspection process (i.e. poles classified as P1, P2 and P3), not just poles in urgent need of replacement.'* (DM# 10352362). Jacobs is of the view that if capacity cannot be increased to	January 2014 Jacobs has observed the following management actions to resolve this issue: • Western Power has introduced a rigorous risk-based approach to distribution wood pole management. • The P1-P4 condition based classifications are no longer used and poles are now categorised as Fault / Priority Attention Required (PAR) / Zone Based Asset Management (ZBAM). • A more robust approach to assessing the probability of failure has been established, which is based on the findings of investigations into the causes of pole failures on the network and also considers wind loading etc. • Poles are now prioritised for remediation based upon the Network Risk Management Tool (NRMT), which considers likelihood and consequences of failure to determine an overall risk score for the each pole. • Poles at risk of imminent failure are treated via the Fault process. High risk poles (not at risk of imminent failure) are treated via the PAR process and the remainder via the ZBAM process.	Rating: B2 KPA: 6. Asset Maintenance EC: Risk management is applied to prioritise maintenance tasks AOSF: 2. Distribution Wood Poles Jacobs has observed significant advancements in Western Power's strategic management of wood poles over the 2012-14 period; particularly with respect to the prioritisation of wood pole remedial works. Over the period Western Power's strategic approach has matured from a simple condition based priority ranking system to a sophisticated risk based prioritisation approach. The previous approach mapped defect severity scores to an overall priority rank from P1 to P4 which was linked to time based remediation targets. In risk terms this approach effectively prioritised pole remediation using defect severities as an approximation of the failure probability. The new approach prioritises pole remediation through overall risk scores which are determined in consideration of: • A more rigorous assessment of the likelihood of failure, which combines defect severities with general attributes such as age

A. Resolved during the current review period			
Ref.	**Asset System Deficiency** **(Rating / Asset Management System Component & Effectiveness Criteria / Details of Asset System Deficiency)**	**Date Resolved (& management action taken)**	**Reviewers' comments**
	address all of the poles in poor condition within the required timeframes, then the highest risk poles should be prioritised within the achievable volumes. However, it is noted that the P1-P4 approach lacks the sophistication to prioritise the poor condition poles to target those presenting the greatest overall risk. The P1-P4 categorisations use asset condition as a proxy for failure probability, and assign a nominal timeframe to remediate the poles. In Jacobs' view the P1-P4 classifications are a simplistic approach which should be revised to ensure that poles can be prioritised based on overall risk, considering both the probability and consequences of failure. Within the risk assessments a more rigorous approach to accurately representing the probability of failure should be established; based upon analysis of the attributes of failed poles and the causes of failure. An overall risk assessment can then be applied in consideration of the failure consequences, such as safety and network reliability etc.		and type etc, and also considers wind loading. The calibration is based on investigations undertaken by Western Power into wood pole failures on their network. Jacobs has reviewed the 2012 wood pole failure investigation report (DM# 10305548) and the 2013 review (DM# 118851978). Jacobs considers that these documents demonstrate a robust analytical approach to investigating causes and trends in wood pole failures. Jacobs' has observed the findings of the investigations reflected in the Wood Pole Structures Asset Management Strategy (DM# 9155338), the Wood Poles Risk Assessment Tool (DM# 10276033) NRMT technical manual and the Risk Model – Distribution Wood Poles (DM# 12119341). • An assessment of the consequences of failure, considering factors including safety, bushfire zones and network reliability. Jacobs considers the consequence of failure assessments to be a reasonable approach. • Risk scores – these are calculated based upon the combination of the likelihood and consequences of failure, as detailed within the NRMT technical manual, Risk Model – Distribution Wood Poles (DM# 12119341). In Jacobs' view this demonstrates a strong scientific approach. Overall, Jacobs considers the new risk-based approach to managing pole defects as being sophisticated and innovative from an industry point of view. The approach is a significant improvement in the management of wood pole remedial works compared to the simple condition based P1-P4 approach. Jacobs anticipates that Western Power will continue to refine the approach and calibrate the processes and tools based on outcomes. Jacobs has made some recommendations intended to assist in the continual improvement of the new approach:

A. Resolved during the current review period			
Ref.	**Asset System Deficiency** **(Rating / Asset Management System Component & Effectiveness Criteria / Details of Asset System Deficiency)**	**Date Resolved (& management action taken)**	**Reviewers' comments**
			• Reporting: Jacobs considers that reporting to effectively represent risk profiles is a key driver to ensuring the most appropriate continual improvement measures are taken in future; recommendations include: o JR: 07/2014 (Ref: KPA 4. Environmental Analysis, AOSF 2. Distribution Wood Poles, PR: 2012/08, AOSF 4. Transformer Management) – this recommendation supports a change in reporting to reflect the transition to the new approach, in view of accurately representing risk profiles. Rather than report against the P1-P3 backlog and planned vs. completed remediation volumes, it is advised that Western Power consider specific areas including: - Pole remediation for all risk categories (Fault-Short Term Deferred/PAR/ZBAM); including volumes, failures and timeliness. - Pole remediation with respect to Western Power's high consequence areas (i.e. bushfire zones etc.); including volumes, failures and timeliness. o JR: 08/2014 (Ref: KPA 4. Environmental Analysis, AOSF 2. Distribution Wood Poles) – this recommendation advises Western Power to seek guidance from Energy Safety and the Authority on appropriate pole failure targets for reporting purposes, with a view on ensuring that reporting against these targets appropriately represents the risk profile. • Process criterion: Several criteria determine when each pole will ultimately be remediated under the risk based approach. Jacobs observes that the process flow and decision criterion selected in establishing the approach have generally been well considered. Notwithstanding, Jacobs considers it important to re-evaluate these criteria based on outcomes as part of continual

A. Resolved during the current review period			
Ref.	**Asset System Deficiency** **(Rating / Asset Management System Component & Effectiveness Criteria / Details of Asset System Deficiency)**	**Date Resolved (& management action taken)**	**Reviewers' comments**
			improvement procedures; recommendations include: o JR: 10/2014 (Ref: KPA 6. Asset Maintenance, AOSF 2. Distribution Wood Poles) – this recommendation advises that Western Power should investigate the appropriateness of the nominal timeframes for Fault- Short Term Deferred and PAR remediation to assess whether they are appropriate, and whether there is scope for improving them. o JR: 12/2014(Ref: KPA 6. Asset Maintenance, AOSF 2. Distribution Wood Poles) – this recommendation advises Western Power to consider whether firm time limits for low risk defects or priority escalations are appropriate. o JR: 15/2014 – this recommendation advises that a post-implementation review (PIR) should be scheduled at an appropriate time once the outcomes of the new approach can be effectively considered against the original objectives.
2	Rating: B3 KPA: 6. Asset Maintenance EC: Maintenance policies and procedures are documented and linked to service levels required The combined maintenance program had been in effect for three years at the beginning of the 2012-14 period. The introduction of combined maintenance was a significant change in approach to the management of Western Power's substation assets. Jacobs would expect that a post-implantation review (PIR) be undertaken to assess the outcomes of the approach against its original objectives. However, Jacobs understands that PIRs would only routinely be carried out for Board approved capital projects, and not necessarily in review of new asset management approaches.	August 2013 A comprehensive review of the combined maintenance program has been undertaken.	Rating: B1 KPA: 6. Asset Maintenance EC: Maintenance policies and procedures are documented and linked to service levels required Jacobs has observed a comprehensive review of the combined maintenance program, which considers a broad range of performance outcomes and 'lessons learnt'. However, Jacobs has not observed a policy which defines a clear intent for carrying out these types of reviews. Jacobs has made a recommendation to this effect, which advises broadening the PIR framework so that programs such as combined maintenance will be covered – refer to JR: 14/2014 (Ref: KPA 2. Asset Creation and Acquisition.

A. Resolved during the current review period			
Ref.	**Asset System Deficiency** **(Rating / Asset Management System Component & Effectiveness Criteria / Details of Asset System Deficiency)**	**Date Resolved (& management action taken)**	**Reviewers' comments**
3	AOSF 1: Asset Management Information System Jacobs understands that at the beginning of the 2012-14 period there was poor utility and integration between Western Power's asset management information systems. As such, there was a clear need to upgrade, integrate and rationalise the information systems in use.	January 2014 Western power has undertaken and largely completed a comprehensive information system integration project since the previous review. Jacobs understands that this systems renewal project covered, amongst other things; • The replacement of the outdated GIS system with a new ESRI system (the source of truth for locational data and geo-spatial attributes for the asset base). • The integration of this new GIS with the Ellipse Equipment register, with the latter being the sources of truth for asset specific details, including parent-child asset relationships based on parent asset location (mainly poles). • The ability to 'drill' into asset records through a web-based interface for ease of access across Western Power's operational centres. • Live and batch-based upload of asset maintenance and inspection data from the field, using the Mobile Inspector application and-field deployed 'Toughbook' asset record capture devices. • Integration of new network designs through a CAD to GIS integration facility, thereby minimising data upload effort and translation errors for new network connections. • Daily batch transfers of the live-connected distribution network topology through to the Distribution Management System (PowerOn Fusion) used in day-to-day operational control of the network in the East Perth Control Centre (EPCC) and at other locations. • Automatic asset-specific linking and issue of service work orders	AOSF 1: Asset Management Information System The newly integrated system has improved data capture quality and data capture timeliness. The improvements identified by Western Power are consistent with improvements observed by the Jacobs review team in other utilities. Jacobs confirms that these represent significant improvements to asset information management process flows compared to less integrated legacy systems. Western Power advised that the Asset Management Information System has continued to be enhanced since its inception and since the previous reviews. Enhancements include: • Ability to develop reports which seamlessly connect with asset management systems. • Improved accessibility to asset defects and inspections information. • Improved accessibility to land feature information where assets are located e.g. environmentally sensitive areas (ESA), local government areas (LGA), fire zones, etc. • Improved accessibility, scheduling and quality of reporting using corporate reporting tools. • Ability to monitor asset information quality over time. • Improved geo-spatial representation and access to asset data through enhancements to SPIDA. • Automation of the Dial Before You Dig underground assets search process. Notwithstanding the significant improvements Jacobs observed that Western Power does not have an overall strategic plan for its asset management information system and that no post-implementation

A. Resolved during the current review period			
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		(as appropriate) as an output from the mobile inspection system integration through to the equipment register. • Tighter quality control over maintenance and inspection reporting outcomes due to the dictionary-based standards for identifying and prioritising defects, programmatically embedded in the Mobile Inspector system. • The ability to readily develop routine and ad-hoc reports maintenance performance and data quality reports direct from the data warehouse based using the Cognos reporting tool. • The ability to develop and manage a suite of overall data quality and data management process reports in order to monitor and improve Asset Information processes across the business.	review had been undertaken following the system upgrades. Jacobs has made some recommendations in view of this – refer to JR: 15/2014 (Ref: KPA 12. Review of Asset Management System, PR: 2012/20, KPA 6. Asset Maintenance, AOSF 1. Asset Management System Information System, AOSF 2. Distribution Wood Poles) and JR: 17/2014 (Ref: KPA 7. Asset Management Information System, AOSF 1. Asset Management System).

5.1.3 Recommendations unresolved at the end of the current review period

Table 5-2 captures recommendations focussed at issues that are currently unresolved.

Table 5-2: Current Review Asset System Deficiencies / Recommendations – Unresolved at end of current review period

B. Unresolved at end of current review period			
Reference (no./year)	**Asset Management System Deficiency**	**Reviewers' Recommendation**	**Management action taken by end of audit period**
01/2014	Rating: B1 KPA: 1. Asset Planning EC: Asset management plan covers key requirements At present Western Power does not have an overarching asset management strategy document which outlines an approach for each lifecycle stage.	Jacobs recommends that there should be an overarching asset management strategy applicable to all network assets which considers each stage in the asset lifecycle e.g. plan, design, build, operate, maintain, renew, dispose.	Post review action plan prepared.
02/2014	Rating: C2 KPA: 1. Asset Planning EC: Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning It was difficult for Jacobs to gain insight into the total asset renewal driven investment requirements of the business. In particular, it is not clear whether Western Power can articulate an overall asset renewal strategy, and the extent to which there is a hierarchy in its approach to asset renewal planning that allows for the development of an optimised asset renewal driven investment portfolio. Also, it is unclear whether Western Power has a long term view of the total asset renewal expenditure requirement, or is able to demonstrate how renewal needs for "child" assets roll up in a coordinated way that would lead to an overall renewal plan for a parent asset; for example, being able to demonstrate the planning of how the confluence of replacement needs for individual assets in a substation may lead to the need to plan for the replacement of the substation as a whole.	It is recommended that Western Power establish a long term view of the total asset renewal expenditure requirement that integrates renewal needs across the range of asset classes. This should demonstrate how renewal needs for "child" assets roll up in a coordinated way to an overall renewal plan for a parent asset (for example, circuit breakers and transformers into substation renewal, etc.). The long-term renewal plan should be coordinated and articulate renewal needs across the whole asset base. It should include high-level planning data such as renewal expenditure modelling, "renewal" to "development" overlap synergies, and long-term objectives for overall asset and network health.	Post review action plan prepared.
03/2014	Rating: B2 KPA: 1. Asset Planning	It is recommended that Western Power establish clear long-term objectives for the key performance measures such as SAIFI, SAIDI, supply security standards etc, and provide a sharp focus for the investment program through this.	Post review action plan prepared.

B. Unresolved at end of current review period			
Reference (no./year)	**Asset Management System Deficiency**	**Reviewers' Recommendation**	**Management action taken by end of audit period**
	EC: Service levels are defined Service levels are defined in the Network Investment Strategy (NIS) and in the Network Management Plan (NMP). The NIS defines the performance standards for the network as a whole, and the NMP articulates performance outcomes and re-investment needs for individual asset classes. Jacobs was unable to observe however how long-term objectives for these service levels were developed, whether they were informed by particular strategic business objectives, or the extent to which they reflected community and stakeholder expectations.	These objectives may be along the lines of maintaining current standards but at higher efficiency levels, or may be targeted, for example, by increasing performance standards for rural areas whilst maintaining standards for urban areas, etc., and should be clearly linked to overall business strategic plans and objectives.	
04/2014	Rating: B2 KPA: 2. Asset Creation and Acquisition EC: Full project evaluations are undertaken for new assets, including comparative assessment of non-asset solutions Whilst it was clear that the consideration of non-network options formed part of the planning process, Western Power's strategic intent in this area was not strongly evident. Jacobs was unable to observe a Demand Management (DM) or non-network solution policy, framework or strategy that would normally be expected in order to drive behaviours in this regard. It was not clear whether there exists within Western Power a specific DM strategy, and the extent to which this is actively pursued as a separate corporate activity with its own objectives, management framework, and performance measurement. Jacobs is of the view that DM initiatives tend only to be actively considered when done so with deliberate corporate intent and are resourced accordingly.	Jacobs recommends that Western Power articulate its intentions regarding DM and non-network solutions through a specific policy and associated strategy, and should consider developing high-level targets for DM programs or outcomes if practicable.	Post review action plan prepared.
05/2014	Rating: C3 KPA: 2. Asset Creation and Acquisition EC: Ongoing legal/environmental/safety obligations of the asset owner are assigned and understood Jacobs explored Western Power's approach to the management of strategic spares (at a whole-of-plant level). Whilst it was clear that Western Power had intent around this issue and facilities to acquire and manage strategic plant spares, it is not clear the extent to which this was actively planned	Jacobs recommends that a strategic spares policy be developed that specifically spells out the types of risks being addressed, the appropriate level of spares to be kept, location and spares access arrangements, and a spares management regime (e.g. rotation through the live network, retention periods, maintenance arrangements, etc.) This spares policy should also give consideration to access,	Post review action plan prepared.

B. Unresolved at end of current review period			
Reference (no./year)	**Asset Management System Deficiency**	**Reviewers' Recommendation**	**Management action taken by end of audit period**
	and managed in accordance with a policy framework that governed issues such as the identification, acquisition, management, and deployment of strategic spares for key items of electrical plant.	transport arrangements and define boundaries around acceptable time-to-site in order to better define storage requirements.	
06/2014	Rating: B2 KPA: 3. Asset Disposal EC: Under-utilised and under-performing assets are identified as part of a regular systematic review process Jacobs notes that while asset performance is considered in the annual Network Management Plan (NMP) revisions, it was not clear what emphasis the review process places on validation and re-evaluating the performance KPIs and targets that are used to assess asset performance. It is noted that KPI review is not specified within the scope of the Network Management Plan Review (Period: 1 July 2014 – 30 June 2019) (DM# 12028950).	Jacobs recommends that review of the performance KPIs and targets be formalised within an appropriate review process.	Post review action plan prepared.
07/2014	Rating: C2 KPA: 4. Environmental Analysis EC: Performance standards (availability of service, capacity, continuity, emergency response, etc.) are measured and achieved AOSF: 2. Distribution Wood Poles Jacobs recognises that Western Power's approach to the management of wood poles has significantly evolved over the 2012-14 period. However, Jacobs considers that the reporting mechanisms (Executive Dashboard – Delivery & Public Safety and Western Power Corporate Monthly Performance Report and Unserviceable Wood Pole Report) have not been revised consistent with the new approach. In Jacobs' view this means that the risk profiles associated with wood poles are no longer being accurately reflected in the dashboard reports. PR: 2012/08	Jacobs recommends that Western Power introduce and monitor timeliness indicators for attending to defects. This should be consistent with the new approach such that risk profiles are accurately represented to stakeholders. Specific areas that should be considered include: • Pole remediation for all risk categories (Fault-Short Term Deferred/PAR/ZBAM); including volumes, failures and timeliness. • Pole remediation with respect to Western Power's high consequence areas (i.e. bushfire zones etc.); including volumes, failures and timeliness. Jacobs advises that Western Power may wish to consider revising its reporting for all assets consistent with the above; with a view on ensuring that risk profiles are being accurately represented.	Post review action plan prepared.

B. Unresolved at end of current review period			
Reference (no./year)	**Asset Management System Deficiency**	**Reviewers' Recommendation**	**Management action taken by end of audit period**
	Jacobs has reviewed the Wood Pole Management Dashboard for December 2013 (DM# 11674354). Jacobs is satisfied that the December 2013 dashboard appropriately reported performance against the backlog of Priority 1 (P1) / Priority 2 (P2) poles. However, with the transition to a risk based approach the previous P1 and P2 timeliness targets are no longer applicable. Under Zone Based Asset Management (ZBAM) a volume of high-risk poles are targeted based upon available resources. This means that measuring the backlog against the resources-based target volume no longer captures the issue surrounding timeliness of pole remediation. Jacobs understands that under the new risk-based approach the highest priority categories are 'fault' poles and the second highest priority are Priority Attention Required (PAR). Faults are addressed immediately or, should this be prevented due to access restrictions, made safe and reclassified as 'Short Term Deferred' works. PAR poles have 12 week remediation targets and Short Term Deferred poles are re-assessed on a two-weekly basis until remediated. Performance against these targets is not however reported in the dashboard. Wood pole performance is now reported in the Executive Dashboard for Delivery & Public Safety, and Jacobs has reviewed this dashboard for May 2014 (DM# 12081090). Jacobs is not satisfied that the May 2014 dashboard reported wood poles remediation KPIs against timeliness targets. AOSF: 4. Transformer Management Jacobs has reviewed the June 2014 Asset Performance Dashboard - Distribution Transformers (DM# 12049029). This provides a snapshot of the transformer population for the previous month; including general attributes and defect analysis. Jacobs found that there is scope to improve the dashboard reporting to better present risk profiles to stakeholders. For example, statistics for pole-top and ground-mount transformers are grouped together, pending defects are identified but there is no information on timeliness, and no historical data is presented to give an understanding of trends. Also, the dashboard did not provide any information on inspections.		
08/2014	Rating: B2	Jacobs recommends that Western Power seek guidance from	Post review action plan

B. Unresolved at end of current review period			
Reference (no./year)	**Asset Management System Deficiency**	**Reviewers' Recommendation**	**Management action taken by end of audit period**
	KPA: 4. Environmental Analysis EC: Compliance with statutory and regulatory requirements AOSF: 2. Distribution Wood Poles Western Power is reporting pole failures against the 'target' of 1 in 10,000 in accordance with its pole management policy and strategy. It is unclear how this target was derived, and therefore whether a comparison against this target is appropriate. It is further unclear whether such a comparison is an effective representation of the level of risk associated with the number of pole failures, particularly given that Western Power now prioritises its pole replacements on the basis of risk impact.	Energy Safety and the Authority on appropriate pole failure targets for reporting purposes.	prepared.
09/2014	Rating: B2 KPA: 6. Asset Maintenance EC: Risk management is applied to prioritise maintenance tasks Jacobs observes that for its transmission assets Western Power plans to migrate away from a time-based routine maintenance approach to a Condition Based Risk Management (CBRM) approach where the nature of the plant and the condition data available facilitates this. This has the potential to impact the project planning and implementation phases of the Combined Maintenance program, and may introduce risks in the effectiveness of the Combined Maintenance approach, especially in the light of the observations regarding the project management aspects of the Combined Maintenance program (refer to JR: 11/2014).	Jacobs recommends that a review be undertaken of the merits of adopting a broad CBRM approach in the light of the Combined Maintenance framework. This would be aimed at: • Assessing the impacts of CBRM on the efficiencies of combined maintenance, • Ensuring an orderly migration plan from time-based maintenance to condition and risk based maintenance across the asset base, • Ensuring the Combined Maintenance Framework is adjusted to reflect the impacts of the CBRM approach, and that the project management structures are in place to accommodate this, and • Ensuring that CBRM remains targeted to the areas of greatest impact.	Post review action plan prepared.
10/2014	Rating: C2 KPA: 6. Asset maintenance EC: Maintenance policies and procedures are documented and linked to service levels required The 12 week Priority Attention Required (PAR) benchmark was selected on the maximum reasonable time to rectify a defective pole based on the pragmatic issues such as the time to schedule access (up	Jacobs recommends that Western Power should investigate the appropriateness of the 12 week PAR remediation timeframe to assess whether it is appropriate, and whether there is scope for its improvement. Additionally, Western Power should consider the monitoring and reporting of time to remediate 'Faulted' and 'Short-Term Deferred' Poles.	Post review action plan prepared.

B. Unresolved at end of current review period			
Reference (no./year)	**Asset Management System Deficiency**	**Reviewers' Recommendation**	**Management action taken by end of audit period**
	to 6 weeks) and the time to plan the work (up to a further 6 weeks). There is performance monitoring against this benchmark, and the reasons for not achieving this timeframe for some poles are investigated and understood. Nevertheless, it was not evident whether this benchmark was in itself a focus for performance improvement, whether it generated an appropriate risk-management outcome, and whether strategies were being considered to facilitate improvement in this benchmark. AOSF: 2. Distribution Wood Poles As a legacy and nature of Western Power's works programming structure, the timeframe for remediating PAR poles is nominally 12 weeks. Jacobs has not observed any investigation that concludes that this timeframes is appropriate, or whether it should be improved.	Jacobs is of the view that Western Power should exercise a demonstrable focus on improving defect rectification times, not just for poles but across all of its distribution maintenance activities (where practicable). Issues that may frustrate the achievement of benchmarks (and benchmark improvement) may be considered to develop a suite of sub-benchmarks, for example time to rectify for access constrained poles versus access available poles.	
11/2014	Rating: B2 KPA: 6 Asset maintenance EC: Risk management is applied to prioritise maintenance tasks Jacobs notes that, in general, Western Power displayed the broad application of project management principles to the planning and implementation of its Combined Maintenance program for transmission assets (in particular substation assets). Whilst Jacobs observed that the approach was sophisticated, well-understood, and well-embraced within Western Power, it is believed that some risks with the approach exist. These mainly relate to a degree of informality in the project management approach, and the fact that the Combined Maintenance program was largely planned and managed by one subject matter expert.	Jacobs recommends that project management disciplines are formally implemented, and that Western Power considers the more formal provision of project planning and management support, perhaps through the formation of a permanent Combined Management Projects team. The creation of this team would need to be underpinned by process and procedure documentation, team resource planning, and succession planning.	Post review action plan prepared.
12/2014	Rating: B2 KPA: 6. Asset maintenance EC: Risk management is applied to prioritise maintenance tasks	Jacobs recommends that Western Power consider whether firm time limits are appropriate for low-risk defects, and whether defect escalations are appropriate after specified time periods have lapsed.	Post review action plan prepared.

B. Unresolved at end of current review period			
Reference (no./year)	**Asset Management System Deficiency**	**Reviewers' Recommendation**	**Management action taken by end of audit period**
	AOSF: 2. Distribution Wood Poles Jacobs considers the Zone Based Asset Management (ZBAM) approach to be a rigorous methodology for prioritising non high-risk poles. However, it was not clear what timeframes are in place to ensure that low-risk defects will eventually be treated.		
13/2014	AOSF: 4. Transformer Management Jacobs understands that investigations have identified the suspected causes of the transformer failures at Muja. However, investigations are ongoing with the following currently being carried out: • An independent investigation of the BTT2 transformer failure at Muja. • An internal investigation of the power system to understand if there were network operating conditions that may be a contributing factor in the failure of the transformers. Jacobs understands that this investigation is also considering the reactive attributes of the network including the location of reactive compensation equipment.	Jacobs recommends that: • Western Power takes appropriate action based on the findings of the independent investigation, and in view of the findings of other investigations and actions taken to-date. • A report be produced detailing the findings of the internal system investigation, and actions to be taken as appropriate based on the findings. • Based on the outcome of the current investigations Western Power may wish to consider whether external expertise may be of assistance in diagnosing any broader system irregularities that may have contributed to the transformer failures.	Post review action plan prepared.
14/2014	Rating: B3 KPA: 2. Asset Creation and Acquisition EC: Projects reflect sound engineering and business decisions Western Power demonstrated that Post-Implementation Reviews (PIR) are conducted for Board approved projects, and an annual report is provided to the Board accordingly (DM#11689575 PIR Board Approved Projects January 2014). Samples of the Work Program Governance Model (WPGM) 'gate compliance' reports for individual projects/programs (undertaken post-project) were also provided for review. Notwithstanding this, Jacobs did not see evidence that comprehensive PIRs were undertaken for all Board-approved projects and programs. Further, Jacobs is of the view that there may be some projects that fall below the Board approval threshold that are worthy of PIR due to their nature, scale, or complexity.	Jacobs recommends that a more formal and comprehensive approach to undertaking project post implementation reviews be developed. This would include a framework to facilitate a broader identification of projects that require a PIR. This should include high-significance non-Board approved projects or programs; such as the new approach to distribution assets management and significant upgrade to the asset management information system. A PIR framework (including a plan) should be developed that ensures that these are conducted as required and that actions and learnings are agreed upon, formally tracked and are used to inform improvements in project governance and project execution. Recommendation 15/2014 identifies a number of current or planned	Post review action plan prepared.

B. Unresolved at end of current review period			
Reference (no./year)	**Asset Management System Deficiency**	**Reviewers' Recommendation**	**Management action taken by end of audit period**
		projects / programs where Jacobs considers that PIRs would be beneficial but would not necessarily be carried out under the existing policies.	
15/2014	Consistent with recommendation 14/2014, Jacobs has identified several areas where Post-Implementations Reviews (PIR) would be beneficial. Rating: B2 KPA: 12. Review of asset management system EC: A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current PR: 2012/20 In carrying out the 2012-14 asset management system review Jacobs found that uncertainties surrounding document revisions and control still persist within the organisation; for example: • Critical documents don't always contain document control information. • Documents with control sections do not identify the intended start and completion dates for the next review. Jacobs understands that Western Power has carried out a review of document control and record keeping functions. Jacobs has observed a presentation of the recommendations and action plan stemming from this review (DM# 11061903). A key recommendation of the review was that 'the document management system should be upgraded, simplified and automation introduced to manage controlled documents'. In response Western Power has reviewed options for upgrading its document management system to simplify and automate the review of controlled documents. In relation to the upgrade of the electronic document management system Western Power has advised that: • A preferred option is to replace the current electronic document management system with the	Jacobs recommends that PIRs be carried out for the following projects and programs that are scheduled or were implemented during the 2012-14 period: • Following the implementation of the new document management system which is currently out for tender. This should consider whether the document control and review issues have been addressed – as per the OFI detailed in Jacobs observations with respect to KPA 12 i.e.: o *Jacobs understands that a number of controlled documents are routinely reviewed and updated similar to the NMP. However, Jacobs has noted (2012/20) that uncertainties picked up in the 2012 review surrounding document revisions and control still persist within the organisation; for example:* - *Critical documents don't always contain document control information.* - *Documents with control sections do not identify intended start and completion dates for the next review.* *Jacobs advises that:* - *Western Power outlines and monitors all reviews that are required for each of its asset management system documents, processes and systems.* - *All documents should have a document control sections that includes information on past revisions and intended start and completion dates for the next review.* • New distribution maintenance approach (Fault / PAR / ZBAM). This review should be scheduled at an appropriate time once the	Post review action plan prepared.

B. Unresolved at end of current review period			
Reference (no./year)	**Asset Management System Deficiency**	**Reviewers' Recommendation**	**Management action taken by end of audit period**
	'OpenText Content Server', which is expected to provide the enhanced capability that is required for effective document control. • An Expression of Interest (DM#11703735) for implementation services was released and responses assessed in February 2014. • A Scope of Work (DM#11791901) was issued to three short-listed providers and the responses are being assessed now (May 2014). • The upgrade is currently scheduled to commence in the second half of 2014, subject to business case development and approval. Rating: B2 KPA: 6. Asset Maintenance EC: Maintenance policies and procedures are documented and linked to service levels required The transition to Fault/Priority Attention Required (PAR) /Zone based Asset Management (ZBAM) represents a significant change to Western Power's approach to managing its distribution assets. Jacobs recognises that the approach applies an enhanced degree of scientific rigour that is expected to have significant benefits. AOSF: 1. Asset Management Information System It would normally be expected that a comprehensive Post-Implementation Review (PIR) would be conducted to assess the effectiveness of the implementation of the project against key objectives articulated in the strategy or the plan. In particular, a PIR review should be conducted to assess the following: - The extent to which expected outcomes were achieved; - The actual costs of the project and how they compared to budget estimates; - Issues identified (an issues register including close-out progress);	outcomes can be effectively considered against the original objectives. This should also consider the re-evaluation of categorisation and risk assessment criteria such as the PAR classifications and the 20:80 split of resources between high-risk poles and ZBAM. In general, all specific risk prioritisation criteria should be periodically reviewed for appropriateness based on outcomes. • Asset Management Information System upgrade. This should include (but not be limited to) an overview of costs compared to budget, gap analysis of implemented specification to original specification, a review of changes and the change control process, observable benefits compared to originally expected benefits, and outstanding issues and action plan to resolve them.	

B. Unresolved at end of current review period			
Reference (no./year)	**Asset Management System Deficiency**	**Reviewers' Recommendation**	**Management action taken by end of audit period**
	- Reviews on data quality and system performance outcomes; and - Outstanding functionality requirements and opportunities for future development. AOSF: 2. Distribution Wood Poles The 'Pareto Principle' has been applied to allocate resources between high-risk (Sniper, PAR, high-priority) poles and poles to be managed via ZBAM. This means that 20% of resources are allocated to addressing high-risk poles and 80% to addressing ZBAM poles. Jacobs considers this to be a reasonable starting point; however this should be revaluated as the new approach continues. The above also applies to the PAR classification and other risk assessment criteria. In general, all specific risk prioritisation criteria should be periodically reviewed for appropriateness based on outcomes.		
16/2014	Rating: B2 KPA: 5. Asset Operations EC: Risk management is applied to prioritise operations tasks Rating: B1 KPA: 7. Asset Management Information System EC: Adequate system documentation for users and IT operators Rating C3 KPA: 8. Risk Management EC: Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system Rating: C3 KPA: 9. Contingency Planning EC: Contingency plans are documented, understood and tested to confirm their operability and to	Jacobs recommends that the Risk Management Framework include network operation (including contingency planning) and business information systems.	Post review action plan prepared.

B. Unresolved at end of current review period			
Reference (no./year)	**Asset Management System Deficiency**	**Reviewers' Recommendation**	**Management action taken by end of audit period**
	cover higher risks Western Power has a high-level Risk Management Policy (RMP) (DM# 3842495) which defines a consistent approach to risk management that is intended to be applied to all aspects of the business. The policy overarches three risk management frameworks; these are: • The Enterprise Risk Management Framework (ERMF) (DM# 3861477): Jacobs understands that this covers corporate type risks such as insurance and Western Power's licence to operate. • Project Risk Management Framework (PRMF) (DM# 9937853): Jacobs understands that this covers specific project delivery risks such as contracts, project delays and safe works delivery. • The Network Risk Management Framework (NRMF) (DM# 6592239): Jacobs has reviewed the NRMF and its underlying documents and processes in detail. It focuses on network planning and management and has strong links to network investment. Notably omitted from the suite of risk management framework documents was the specific inclusion of network operations (including contingency planning) and asset information systems.		
17/2014	Rating C1 KPA: 7. Asset Management Information System EC: Adequate system documentation for users and IT operators Jacobs understands that an asset data quality framework is currently under development. Data management quality and performance indicators are tracked and routinely published in various asset information dashboards (either pertaining to generic data quality and timeliness standards, or relating data quality requirements of asset management process owners). It is not clear however how this information is used to drive performance improvement at the current development stage of the asset information management system. Western Power does not appear to have a demonstrable long-term strategic plan for asset information management, and there does not appear to be long-term stated objectives for improving data quality, data integrity, and timeliness. AOSF: 1. Asset Management Information System	Jacobs recommends that Western Power develop a strategic plan for its asset management information systems and data. This plan should include a review current state of the systems and where Western Power is placed along the strategic journey. It should also include a long-term vision for the systems and outline an understanding of the likely costs, benefits, and timeframes for achieving the vision. Western Power should undertake a strategic review of asset information requirements for the business and establish long term objectives for key process areas as well as system integration needs; recognising that high quality data is an enabler for asset management performance improvement. Western Power should specifically consider as part of this strategic review the need for better gathering and integration of transmission asset condition data (and associated test data) to ensure ready access to this information. This is particularly pertinent given the	Post review action plan prepared.

B. Unresolved at end of current review period			
Reference (no./year)	**Asset Management System Deficiency**	**Reviewers' Recommendation**	**Management action taken by end of audit period**
	Jacobs observed that whilst individual implementation plans for various modules of the integrated asset management information system existed, an overall strategic plan for the integration was not evident. It would normally be expected that such a complex project would have a high-level over-arching plan, or perhaps be influenced by a strategic plan for asset management information. Jacobs is of the view that such a comprehensive systems renewal and integration project is complex and risky, with issues such as cost escalation, applications interfacing, data quality, and organisational culture potentially creating some of the highest risks to successful implementation.	separation of the Operations Asset Management group from the day-to-day management of the asset maintenance activities undertaken managed from the Kewdale depot.	
18/2014	Rating C2 KPA: 9. Contingency Planning EC: Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks Jacobs observed that contingency planning does not appear to be widespread across all major foreseeable risks and contingencies to which the network may be subjected. In particular, Jacobs observed that there did not appear to be a formal structure that provided for contingencies to be methodically identified and responded to. Given that Western Power has jurisdictional responsibilities for both Transmission and Distribution, it is foreseeable that widespread network events could simultaneously occur in such a manner that could confound the ability of the Emergency Management Team to effectively prioritise response and respond accordingly. PR: 2012/18 AOSF: 3. SOCC & NOCC Business Continuity Refer to PR: 2012/18 commentary. Jacobs is satisfied that the training, identification of issues and action item responses by western Power for this recommendation have been addressed. However, Jacobs is of the view that Western Power has not rigorously identified all reasonably foreseeable contingencies that would form the basis of the Emergency Management Response planning and testing exercises.	Jacobs is of the view that Western Power should develop response plans for a broad range of contingencies, as given by way of example in the list below. These are by no means exhaustive but are provided as an indication of the range of issues that should be considered: • Simultaneous loss of transmission and widespread distribution due to a single event (storm and or bushfire); review network topology where this may be a susceptibility due to local environmental factors or network topology. • Credible (although unlikely) multiple transmission network contingencies; Common-mode or simultaneous failures of key elements. • Widespread generation loss or network islanding scenarios; Jacobs recognises that this is not necessarily in Western Power's jurisdiction, but plans will be required to manage community requirements nonetheless. • Widespread interruptions to major load centres (e.g. Perth CBD). These should be reviewed and tested on a routine basis – see JR: 20/2014.	Post review action plan prepared.

B. Unresolved at end of current review period			
Reference (no./year)	**Asset Management System Deficiency**	**Reviewers' Recommendation**	**Management action taken by end of audit period**
	PR: 2012/19 AOSF: 3. SOCC & NOCC Business Continuity Jacobs observed that notwithstanding actions arising from the previous review being implemented, an opportunity for improvement continues to exist in the contingency planning area. Jacobs did not see evidence of a systematic and comprehensive approach to scenario planning.		
19/2014	Rating: C3 KPA: 9. Contingency Planning EC: Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks Jacobs understands that in the event of a significant network event, third-party impacts tended to be "operationally" factored into restoration responses on the basis of a Restoration Priority Framework. However, the extent to which the framework priorities and response are overtly factored into contingency plans is not clear. In this respect Jacobs is of the view the Western Power should actively consider and factor into its contingency and emergency response plans issues such as social infrastructure impacts and restoration prioritisation. This should not only include the management of supply restoration on a priority basis, but operational issues regarding relieving emergency officers standing by fallen wires, 'make-safe' protocols, etc. In this respect Jacobs notes that Western Power has a program in place where suitably qualified, trained and equipped staff are utilised in the event of such incidents to relieve other emergency services personnel from stand-by and make-safe activities. PR: 2012/18 AOSF: 3. SOCC & NOCC Business Continuity Refer to PR: 2012/18 commentary. Jacobs is satisfied that the training, identification of issues and	Jacobs recommends that Western Power consider and factor into its contingency and emergency response plans for a broad range of issues such as social infrastructure impacts and restoration prioritisation. This in particular applies where Western Power's response plans actively rely upon the availability of this infrastructure such as mobile phone capability and fuel supply. In this respect, contingency plans should actively consider the restoration of supply to vital infrastructure such as the examples listed below, noting that this list is not exhaustive: • Water supply. • Sewage systems. • Food supply. • Traffic Management and Public Transport • Mobile telephones and emergency services telecommunications. • Hospitals (coordination with Department of Health and routine testing of standby generation capability). • Fuel supply (Supply to Kwinana refinery, bulk supply terminals, and local supplies). Active consideration should be given to the Management and review of Western Powers' mobile radio capability, and the management	Post review action plan prepared.

B. Unresolved at end of current review period			
Reference (no./year)	**Asset Management System Deficiency**	**Reviewers' Recommendation**	**Management action taken by end of audit period**
	action item responses by western Power for this recommendation have been addressed. However, Jacobs is of the view that Western Power has not rigorously identified all reasonably foreseeable contingencies that would form the basis of the Emergency Management Response planning and testing exercises. PR: 2012/19 AOSF: 3. SOCC & NOCC Business Continuity Jacobs observed that notwithstanding actions arising from the previous review being implemented, an opportunity for improvement continues to exist in the contingency planning area. Jacobs did not see evidence of a systematic and comprehensive approach to scenario planning.	and coordination of a fleet of mobile generators in order facilitate their rapid deployment to vital locations and key third party infrastructure sites. This would also include agreeing on supply connection standards for such assets. In addition to the above, contingency plans will need to consider the coordination of responses with other utilities. In this respect, protocols should be established with other emergency service departments and social-infrastructure service providers, including the examples listed below. These are by no means exhaustive but are provided as an indication of the range of issues that should be considered. • Police. • Fire Brigade. • Ambulance and Hospitals. • SES. These should be reviewed and tested on a routine basis – see PR: 20/2014.	
20/2014	Rating: B1 KPA: 9. Contingency Planning EC: Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks Jacobs notes that whilst some vulnerability and emergency management response reviews were recently undertaken, evidence was not observed that regular reviews of such response plans are planned. PR: 2012/17	Jacobs recommends that Western Power develop a review timetable for the contingency and emergency management plans and the reviews should be undertaken at a frequency commensurate with the nature of the scenario and the likelihood of its occurrence in recognition of the changes in the network over time. Western Power should also develop an annual review policy, timetable or framework as appropriate for the East Perth Control Centre (EPCC). A routine formal risk re-assessment program should be implemented for the EPCC in line with Western Power's general facilities management responsibilities. These reviews also relate to contingency planning JR: 18/2014 and JR: 19/2014.	Post review action plan prepared.

B. Unresolved at end of current review period			
Reference (no./year)	**Asset Management System Deficiency**	**Reviewers' Recommendation**	**Management action taken by end of audit period**
	AOSF: 3. SOCC & NOCC Business Continuity Refer to PR: 2012/17 commentary. Whilst Jacobs is satisfied that the action taken was sufficient, Western Power would need to ensure that the risks are routinely reviewed and updated accordingly. Jacobs notes that evidence provided of the review is dated 2011. It would be prudent to reassess these risks, particularly in the light of recent organisational changes that have led to changes in the management arrangements for the operations centre. PR: 2012/18 AOSF: 3. SOCC & NOCC Business Continuity Refer to PR: 2012/18 commentary. Jacobs is satisfied that the training, identification of issues and action item responses by western Power for this recommendation have been addressed. However, Jacobs is of the view that Western Power has not rigorously identified all reasonably foreseeable contingencies that would form the basis of the Emergency Management Response planning and testing exercises. PR: 2012/19 AOSF: 3. SOCC & NOCC Business Continuity Western Power conducted an emergency management risk review across a range of scenarios in 2013. Various action items and opportunities were identified, recorded and assigned. However, it is not clear that the review will be conducted annually as recommended.		

Appendix A. Interview schedule

The interview schedule for the fieldwork is provided in Table A-1 below; including the topics of discussion, the Western Power personnel in attendance and meeting locations. It should be noted that in addition to those identified below, Kim McArthur (Asset Strategy & Risk Manager) and John Paolino (Senior Compliance Specialist) were present at all interviews.

Table A-1: Fieldwork interview schedule

Day	Date	Duration	Time	Key Process or AOSF	Risk Assessment		Interviewees	Position Titles	Presentation Information	Location
					Dist. Risk	Trans. Risk				
Monday	7-Jul-14	30 Min	09:00 - 9:30	2012 Recommendation Closeouts	-	-	Ian Gibb, Mike Pover	Senior Asset Systems Analyst, Asset Performance Systems Mgr	11982138	Head Office G09
		60 Min	9:30 - 10:30	Review of Asset Management System	L	L	Ankur Maheshwari, Mark Wilshusen	Chief Asset Management Officer Head Of Asset Performance	12131273	Head Office G09
		30 Min	10:30 - 11:00	Opening Meeting	-	-	Stewart Hart Matthew Cronin Margaret Pyrchla	CFO Head of Reg.& Investment Mgmt Regulatory Compliance Mgr	N/A	Stewart's Quiet Room
		60 Min	11:00 - 12:00	Financial Planning/Capital Expenditure Planning	M	M	Steve Kelly, Raj Parmar, Marat Bliev	Investment Evaluation Mgr, Works Optimisation Mgr, Entrprz & Reg. Planning & Rpting Mgr	12027029 12105017	Head Office G09
		60 min	12:00 - 12:30	Lunch						
		90 Min	12:30 - 2:00	Risk, Crisis Mgmt and Business Continuity	H	H	Ian Hord, Victoria Hogg, Ed Davy Margaret Pyrchla	Risk & Insurance Manager, Engineering Team Leader, Risk Adviser Regulatory Compliance Manager	12050081	Head Office G09
		60 Min	2:00 - 3:00	Asset Mgmt Information System	M	M	Graeme Fairley, Andy Neeman David Klein Trish Burton David Capon	Enterprise Architecture Manager, Data Management & Quality Mgr Principal GIS Specialist Senior Data Analyst Senior Data Analyst	12047947 6540570	Head Office G09

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Day	Date	Duration	Time	Key Process or	Risk Assessment		Interviewees	Position Titles	Presentation	Location
		60 Min	3:00 - 4:00	Special Area of Interest 1 Asset Mgmt Information System	-	-	Graeme Fairley, Andy Neeman David Klein Trish Burton David Capon	Enterprise Architecture Manager, Data Management & Quality Mgr Principal GIS Specialist Senior Data Analyst Senior Data Analyst	12047947 12082748	Head Office G09
		60 Min	4:00 - 5:00	Environmental analysis (Regulatory, Technical Changes, Performance Standards)	M	M	Aaron Gibbons, Karyne Wong, Margaret Pyrchla, Marat Bliev	Senior Asset Strategy Engineer, Engineering Team Leader, Regulatory Compliance Manager, Entrprz & Reg. Planning & Rpting Mgr	12042777	Head Office G09
Tuesday	8-Jul-14	60 Min	08:30 - 09:30	Audit Admin						
		30 Min	9:30 - 10:00	Works Program Governance Management	-	-	Lawrence Muhuthia	Portfolio Solutions Team Leader	12096649	Head Office G09
		120 Min	10:00 - 12:00	Special Area of Interest 2 Wood Poles Documentation & Processes	-	-	Neville Scott, Raphael Ozsvath, Don Stander, Pauline Fitzgerald, Steve Bushby	Engineering Team Leader, Pole & Tower Performance Mgr, Scheduling & Coordination Mgr, Works Planning & Allocation Mgr, Works Program Packaging Mgr	12061996	Head Office G09
		60 Min	12:00 - 1:00	Lunch						
		120 Min	1:00 - 2:45	Special Area of Interest 4 DX / TX Transformers Condition Assessment Processes / Methodology	-	-	Sam Woolard, Zahra Jabiri, Don Stander, Pauline Fitzgerald, Steve Bushby Karna Vyas Dean Frost Neil Chivers	Engineering Team Leader, Oprtnl Asset Assessments Mgr, Scheduling & Coordination Mgr, Works Planning & Allocation Mgr, Works Program Packaging Mgr, Senior Asset Strategy Engineer Operations Engineering Mgr Strategic Network Dev. Mgr.	12090334	Head Office G09
		30 Min	2:45 - 3:15	Audit Admin						
		120 Min	3:15 - 5:00	Asset Creation And Acquistion	M	H	Neil Chivers, Raj Parmar, Jieh Loong Shervin Fani Grant Coble-Neal Sam Woolard Pieter Olivier	Strategic Network Dev. Mgr Work Optimisation Manager Senior Planning Engineer Network Planning Manager (Act) Network Forecasting Mgr Engineering Team Leader Field Prot Commissioning Team	12022607	Head Office G09

Day	Date	Duration	Time	Key Process or	Risk Assessment		Interviewees	Position Titles	Presentation	Location
								Leader		
Wednesday	9-Jul-14	30 Min	08:30 - 09:00	Audit Admin						
		90 Min	09:00 - 10:30	Asset Planning	M	H	Sam Woolard, Karna Vyas Neville Scott, Neil Chivers, Raj Parmar Ian Gibb Rahael Ozsvath	Engineering Team Leader, Senior Asset Strategy Engineer Engineering Team Leader Strategic Network Dev. Mgr, Work Optimisation Manager Asset Performance Systems Mgr Poles & Tower Performance Mgr	12090402	Head Office G09
		30 Min	10:30 - 11:00	Asset Disposal	L	M	Sam Woolard, Karna Vyas Neville Scott, Neil Chivers, Raj Parmar Ian Gibb Rahael Ozsvath	Engineering Team Leader, Senior Asset Strategy Engineer Engineering Team Leader Strategic Network Dev. Mgr, Work Optimisation Manager Asset Performance Systems Mgr Poles & Tower Performance Mgr	12090402	Head Office G09
		60 Min	11:00 - 12:00	Investment Evaluation Model			Shaun Porter	Senior Invetment Evaluation Analyst	N/A	Head Office G09
		30 Min	11:30 - 12:00	Audit Admin						
		30 Min	12:00 - 1:00	Lunch						

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Day	Date	Duration	Time	Key Process or	Risk Assessment		Interviewees	Position Titles	Presentation	Location
		120 Min	1:00 - 3:00	Asset Maintenance	L	M	Zahra Jabiri Sam Woolard, Neville Scott, Pauline Fitzgerald, Steve Bushby, Steve Samuels Mike Elms Amir Sherkat Masoum Neil Willis Mike Taylor	Oprtnl Asset Assessments Mgr, Engineering Team Leader Engineering Team Leader Works Planning & Allocation Mgr, Works Program Packaging Mgr, Contracts Field Operations Mgr Principal Engineering Technician Senior Asset Engineer Substation Maint. Services Mgr Finance Team Leader	12061502	Head Office G09
		60 Min	4:00 - 5:00	Audit Admin						
Thursday	10-Jul-14	30 Min	08:30 - 09:00	Audit Admin						
		120 Min	09:00 - 11:00	Asset Operations Contingency Planning	M	H	Rudy Bake, Edwin Davy, Margaret Pyrchla Andrew Williams Dean Frost Iyari Cevallos	Operations Development Mgr, Risk Advisor, Regulatory Compliance Manager Facilities Manager Operations Engineering Mgr Portfolio Quality Analyst	9425445	East Perth Operating Centre
		60 Min	11:00 -12:00	Special Area of Interest 3 NOCC / SOCC Business Continuity	-	-	Rudy Bake, Edwin Davy, Margaret Pyrchla Andrew Williams Dean Frost Iyari Cevallos	Operations Development Mgr, Risk Advisor, Regulatory Compliance Manager Facilities Manager Operations Engineering Mgr Portfolio Quality Analyst	9425445	East Perth Operating Centre
		60 Min	12:00 - 1:00	Lunch						
		60 Min	1:00 - 2:00	Audit Admin						
		60 Min	2:00 - 3:00	Training Records and Qualifications			Harry McDonald Dave Christmas	Network Access Manager Work Practices Dev. Manager	N/A	Head Office G09
		60 Min	3:00 - 4:00	Audit Close Out			Margaret Pyrchla	Regulatory Compliance Mgr	N/A	Head Office G09
		60 Min	4:00 - 5:00	Audit Admin						
Friday	11-Jul-14	30 Min	08:30 - 10:00	Audit Admin						

Day	Date	Duration	Time	Key Process or	Risk Assessment		Interviewees	Position Titles	Presentation	Location
		180 Min	10:00 - 1:00	Kewdale Visit			Neil Willis Brett Dew Noel Jess James Croft Michelle Silvestro Lisa Yovich Jodie Hansen	Substation Maint. Services Mgr Field Services Coordinator Field Services Coordinator (Act) Technical Network Officer Administration Networks Officer Networks Officer Scheduler	N/A	Kewdale Depot

Appendix B. Document list

Table B-1 below lists the documents provided by Western Power over the course of the review. It should be noted that additional documents were also observed throughout the fieldwork and other documents were obtained from external sources including the Authority's website.

Table B-1: Documents provided by Western Power during the course of the review

Review Area	Document name	Comments	No.
Asset Planning	DM#11001014 Network Management Plan 2013-2018.pdf		1
Asset Planning	DM#11226237 TNDP-Transmission Network Development Plan 2013-14.pdf		2
Asset Planning	DM#5200741 Works Program Governance Framework.pdf		3
Asset Planning	DM#7314528 Network Investment Strategy.pdf		4
Asset Planning	DM#7471555 Asset Management Policy.pdf		5
Asset Planning	DM#8381133 Western Terminal-Load Area Long Term Strategy Report.pdf		6
Asset Planning	DM#9397876 DISTRIBUTION NETWORK DEVELOPMENT 2012.pdf		7
Asset Planning	DM#9993078 TNDP-Transmission Network Development Plan 2012-13.pdf		8
Asset Planning	DM#8191058_Western_Terminal__Project_Briefing_Paper.pdf		9
Asset Planning	DM#10253623_Business_Case_Shenton_Park_zone_substation.pdf		10
Asset Planning	DM#10323058_FINAL_REPORT_PLANNING_SHENTON_PARK_REINFORCE.pdf		11
Asset Planning	DM#10366019_zone_substation_Shenton_Park_Proj_Manage_Plan.pdf		12
Asset Planning	DM#10584239_Deliverability_checklist_Shenton_Park_Conversion.pdf		13
Asset Planning	DM#8444711_SP_CONVERT_VOLTAGE_&_REINFORCE_DIST_NWK.pdf		14
Asset Planning	DM#8758588_PPR_Shenton_Park.pdf		15
Asset Planning	DM#8922253_PPD_Shenton_Park_T0348702_for_A2_Est.pdf		16
Asset Planning	DM#9755427_Establish_New_Shenton_Park_(SPK)_Estimate_Report.pdf		17
Asset Planning	DM#12090402_2014 Presentation on Criteria 1 and 3 plan-disposal.pdf		18
Asset Planning	DM#12049029 A P Distribution Transformer Dashboard June 2014	From presentation DM#12090402 Asset Planning - under SAOI 4 Transformers	19
Asset Planning	Annual Planning Report 2013 - Refer to website (www.westernpower.com.au)	From presentation DM#12090402 Asset Planning	20
Asset Planning	DM#8667221 Ravensthorpe Edge of Grid Solution Stage 2 Business Case	From presentation DM#12090402 Asset Planning	21
Asset Planning	DM#10263627 DM Screening Tool	From presentation DM#12090402 Asset Planning	22
Asset Planning	DM#10592347 DM Screening Tool User Guide	From presentation DM#12090402 Asset Planning	23
Asset Planning	DM#706135 SWIS TX Plant Failure Contingency Plan	Contains references to Emergency Spares	24
Asset Planning	DM#8341588 Required Number of Strategic Spares		25

Review Area	Document name	Comments	No.
Asset Planning	DM#9189769 NIX Training Presentation on Demand Management	Addresses question of DM guidelines and the use of DM within Western Power	26
Asset Planning	DM#9085391 NIX Training User Guide on Demand Management	Addresses question of DM guidelines and the use of DM within Western Power	27
Asset Planning	DM#10107407 DM Tool Workshop by Western Power	Addresses question of DM guidelines and the use of DM within Western Power	28
Asset Planning	DM#10098418 DM Tool Presentation by Energetic	Addresses question of DM guidelines and the use of DM within Western Power	29
Asset Planning	DM#9055217 Network Management Plan 2012-2017	Email item 3.1 (first dot point)	30
Asset Creation and Acquisition	DM#10073840 Long-term Network Development Plan-East Perth and CBD.pdf		31
Asset Creation and Acquisition	DM#10328532 BUNBURY LOAD AREA LONG TERM NETWORK DEVELOPMENT PLAN.pdf		32
Asset Creation and Acquisition	DM#11226237 TNDP-Transmission Network Development Plan 2013-14.pdf		33
Asset Creation and Acquisition	DM#8381133 Western Terminal-Load Area Long Term Strategy Report.pdf		34
Asset Creation and Acquisition	DM#9397876 DISTRIBUTION NETWORK DEVELOPMENT 2012.pdf		35
Asset Creation and Acquisition	DM#9993078 TNDP-Transmission Network Development Plan 2012-13.pdf		36
Asset Creation and Acquisition	DM#8191058_Western_Terminal__Project_Briefing_Paper.pdf		37
Asset Creation and Acquisition	DM#10253623_Business_Case_Shenton_Park_zone_substation.pdf		38
Asset Creation and Acquisition	DM#10323058_FINAL_REPORT_PLANNING_SHENTON_PARK_REINFORCE.pdf		39
Asset Creation and Acquisition	DM#10366019_zone_substation_Shenton_Park_Proj_Manage_Plan.pdf		40
Asset Creation and Acquisition	DM#10584239_Deliverability_checklist_Shenton_Park_Conversion.pdf		41
Asset Creation and Acquisition	DM#8444711_SP_CONVERT_VOLTAGE_&_REINFORCE_DIST_NWK.pdf		42
Asset Creation and Acquisition	DM#8758588_PPR_Shenton_Park.pdf		43
Asset Creation and Acquisition	DM#8922253_PPD_Shenton_Park_T0348702_for_A2_Est.pdf		44
Asset Creation and Acquisition	DM#9755427_Establish_New_Shenton_Park_(SPK)_Estimate_Report.pdf		45
Asset Creation and Acquisition	DM#12022607_2014 Presentation_on Criteria 2_Asset Creation_&_Acquisition.pdf		46
Asset Disposal	DM#11226237 TNDP-Transmission Network Development Plan 2013-14.pdf		47
Asset Disposal	DM#8381133 Western Terminal-Load Area Long Term Strategy Report.pdf		48
Asset Disposal	DM#9397876 DISTRIBUTION NETWORK DEVELOPMENT 2012.pdf		49
Asset Disposal	DM#9993078 TNDP-Transmission Network Development Plan 2012-13.pdf		50
Asset Disposal	DM#8191058_Western_Terminal__Project_Briefing_Paper.pdf		51
Asset Disposal	DM#10253623_Business_Case_Shenton_Park_zone_substation.pdf		52

Review Area	Document name	Comments	No.
Asset Disposal	DM#10323058_FINAL_REPORT_PLANNING_SHENTON_PARK_REINFORCE.pdf		53
Asset Disposal	DM#10366019_zone_substation_Shenton_Park_Proj_Manage_Plan.pdf		54
Asset Disposal	DM#10584239_Deliverability_checklist_Shenton_Park_Conversion.pdf		55
Asset Disposal	DM#8444711_SP_CONVERT_VOLTAGE_&_REINFORCE_DIST_NWK.pdf		56
Asset Disposal	DM#8758588_PPR_Shenton_Park.pdf		57
Asset Disposal	DM#8922253_PPD_Shenton_Park_T0348702_for_A2_Est.pdf		58
Asset Disposal	DM#9755427_Establish_New_Shenton_Park_(SPK)_Estimate_Report.pdf		59
Asset Disposal	DM#12090402_2014 Presentation on Criteria 1 and 3 plan-disposal.pdf		60
Asset Disposal	DM#9155338 Wood Pole Structures Asset Management Strategy	Email item 3.2 - Already provided under SAOI 2 Poles	61
Asset Disposal	DM#2802557/9816671 Asset Disposal Guidelines	Email item 3.2	62
Asset Disposal	DM#8649705 Business Case - Distribution Plant & Equipment AA3 (2012/13-2013/14)	Email item 3.3	63
Asset Disposal	DM#9087909 AA3 Business Case for Wood Pole Replacement & Reinforcement 12/13&13/14	Email item 3.3	64
Asset Disposal	DM#9811378 Business Case for Transmission Line Removal VP-Web 71	Email item 3.1 (second dot point)	65
Asset Disposal	DM#6999451 Work Practice Manual	Email item 3.2 - Also on Western Power website	66
Environmental Analysis	DM#12072052 Breach Register - 1 July 2012 - 31 May 2014.pdf		67
Environmental Analysis	DM#12042777_2014 Presentation on Criteria 4 Env_Analysis.pdf		68
Asset Operations	DM#1190638_SOP_122__BUSHFIRE_MANAGEMENT.pdf		69
Asset Operations	DM#1193884_SOP_106__BACKUP_CONTROL_CENTRE_TRANSMISSION.pdf		70
Asset Operations	DM#1994223_NETWORK_OPERATIONS_BACKUP_CONTROL_CENTRE_NWI_043.pdf		71
Asset Operations	DM#3250482_G_315_PANDEMIC_Epidemic_Guideline.pdf		72
Asset Operations	DM#3323911_SOP_124_POLE_TOP_FIRES_CONTINGENCY_PLAN.pdf		73
Asset Operations	DM#94254452014 Presentation on Criteria 5 and 9 Operations and Contingency.pdf		74
Asset Maintenance	DM#10035615 Distribution Production Plan 13-14.pdf		75
Asset Maintenance	DM#10038993_Transmission_New_QT_Requirements.xlsx		76
Asset Maintenance	DM#10252187 Approved Works Program 1314 to 1718.pdf		77
Asset Maintenance	DM#10598496_Transmission Electronic_QT_Form_Template.pdf		78
Asset Maintenance	Delivery status reporting processes.pdf		79
Asset Maintenance	DM#11060064_Workflow_Process_for_PAR_defects.pdf		80
Asset Maintenance	DM#11138009_ZBAM_Implementation.pdf		81

Review Area	Document name	Comments	No.
Asset Maintenance	DM#12061502_2014 Presentation on criteria 6 Asset Maintenance.pdf		82
Asset Maintenance	DM#9932578 OAM Lines & Cables - Maintenance Plan 2013/14	From presentation DM#12061502 Asset Maintenance	83
Asset Maintenance	DM#12162157 Summary of TX Pole Base Inspection Results 2013/14	From presentation DM#12061502 Asset Maintenance	84
Asset Maintenance	DM#10659377 Busselton to Margaret River Pole Base Inspection Results 2012/13	From presentation DM#12061502 Asset Maintenance	85
Asset Maintenance	DM#10856498 Busselton to Margaret River Pole Base Insp Sound Wood QA Results 2012/13	From presentation DM#12061502 Asset Maintenance	86
Asset Maintenance	DM#10659362 Busselton to Margaret River Pole Base Insp Contractor QA Results April 2013	From presentation DM#12061502 Asset Maintenance	87
Asset Maintenance	DM#12091177 Complete Results Report for Albany - May 2014	From presentation DM#12061502 Asset Maintenance	88
Asset Maintenance	DM#11955929 QA Reporting Wood Poles Albany 2013/14	From presentation DM#12061502 Asset Maintenance	89
Asset Maintenance	DM#9823003 QA Defect Rectification Tracker Albany 2012/13	From presentation DM#12061502 Asset Maintenance	90
Asset Maintenance	DM#10965512 Contractor Reports and Monthly Minutes DM References Albany	From presentation DM#12061502 Asset Maintenance	91
Asset Maintenance	DM#10849808 TX Combined Maintenance Delivery 2012/13 Close Out Report	From Kewdale visit	92
Asset Maintenance	DM#8269010 Combined Maintenance Scheduling & Execution Guideline	From Kewdale visit	93
AMIS	DM#12047947 2014_PRESENTATION on Criteria 7 AMIS.pdf		94
AMIS	DM#6540570_asset management system Review Criteria 7 Data Management Info Pack.pdf		95
AMIS	DM#11928675 Data Governance Framework - Data Quality Measures	From presentation DM#12047947 "Asset Mgnt Information System"	96
AMIS	DM#12154796 Copy of Email - Field to Office KPI's - May 2014	From presentation DM#12047947 "Asset Mgnt Information System"	97
AMIS	DM#8392172 Disaster Recovery Plan - Volume 3	From presentation DM#12047947 "Asset Mgnt Information System"	98
Risk Management	DM#12057555_example_of_risk_register_for_2014_AMSR.pdf		99
Risk Management	DM#3528771_Network_Risk_Issues_Register.pdf		100
Risk Management	DM#10307129_Network_Planning_&_Ops_-_Ops_Risk_Register.pdf		101
Risk Management	DM#11060064_Workflow_Process_for_PAR_defects.pdf		102
Risk Management	DM#11138009_ZBAM_Implementation.pdf		103
Risk Management	DM#12081103_AMSR_2014_Risk8.pdf		104
Risk Management	DM#12081104_AMSR_2014_Risk_6.pdf		105
Risk Management	DM#3842495_1_5_1_-_RISK_MANAGEMENT_POLICY.pdf		106
Risk Management	DM#12050081_2014 Presentation on Criteria 8 Risk Management.pdf		107
Risk Management	DM#11918906 Assurance Policy	From presentation DM#12050081 "Risk, Crisis Mgmt & Business Continuity	108
Risk Management	DM#5057127 Business Continuity Policy	From presentation DM#12050081 "Risk, Crisis Mgmt & Business Continuity	109
Risk Management	DM#6242026 Risk Assessment Criteria	From presentation DM#12050081 "Risk,	110

Review Area	Document name	Comments	No.
		Crisis Mgmt & Business Continuity	
Risk Management	DM#6592239 Network Risk Management Framework	uploaded on 28/7	111
Risk Management	DM#6592701 Network Risk Management Procedure	uploaded on 28/7	112
Risk Management	DM#10656927 NRMT Risk Assessment Process, Risk Identification, Analysis & Evaluation	uploaded on 28/7	113
Risk Management	DM#11031408 NRMT Consequence Model- Definitions & Statistical methodology	uploaded on 28/7	114
Risk Management	DM#8761693 Replace Merredin 132/66 kv Transformers Business Case	uploaded on 28/7	115
Risk Management	DM#10276033 Risk Assessment Tool Wood Pole Management	uploaded on 28/7	116
Risk Management	DM#8945297_Transmission_Pole_Top_Fire_Risk_Assessment_Model	uploaded on 28/7	117
Risk Management	DM#8483008 ISAM Distribution Work Prioritisation	uploaded on 28/7	118
Risk Management	DM#9510298 NRMT Business Case	uploaded on 28/7	119
Risk Management	DM#11851565 DX Pole Top Fire Mitigation Strategy	uploaded on 28/7	120
Risk Management	DM#10715548 Opex Management Process	uploaded on 28/7	121
Risk Management	DM#11954291 CAPEX Management Process (Operational Asset Assessments)	uploaded on 28/7	122
Risk Management	DM#9800902 Transmission OAM Lines Failure Investigation	uploaded on 28/7	123
Risk Management	DM#12059159 Powerline Defects Guidelines	uploaded on 28/7	124
Risk Management	DM#1220966 Catalogue of Equip Types for DX OH Lines	uploaded on 28/7	125
Risk Management	DM#11077941 Bushfire Management Implementation Plan 2013/14	uploaded on 28/7	126
Risk Management	DM# 7137178 Fault Response Group Process Map	uploaded on 28/7	127
Risk Management	DM#12207618 Risk Methodology Used for Various Asset Classes 2012-13 to 2013-14	Uploaded on 29/7	128
Risk Management	DM#3861477 Risk Management Framework	Uploaded on 31/7	129
Contingency Planning	DM#11253034 Business Continuity Plan.pdf		130
Contingency Planning	DM#1190638_SOP_122__BUSHFIRE_MANAGEMENT.pdf		131
Contingency Planning	DM#3250482_G_315_PANDEMIC_Epidemic_Guideline.pdf		132
Contingency Planning	DM#3323911_SOP_124_POLE_TOP_FIRES_CONTINGENCY_PLAN.pdf		133
Contingency Planning	DM#9425445 2014 Presentation on Criteria 5 and 9 Operations and Contingency.pdf		134
Contingency Planning	DM#11767283 ISO9001 Audit Report 2014	From presentation DM#9425445 "Contingency Planning & Business Continuity"	135
Contingency Planning	DM#8482502 Prioritising Network Restoration Guideline	From presentation DM#9425445 "Contingency Planning & Business Continuity"	136
Contingency Planning	DM#1994223 Network Operations Backup Control Centre	From presentation DM#9425445 "Contingency Planning & Business Continuity"	137
Contingency Planning	DM#11031378 Contingency Framework	From presentation DM#9425445 "Contingency Planning & Business Continuity"	138
Contingency	DM#2072196 Emergency Management Plan	Email item 4.2 (4th dot point)	139

Review Area	Document name	Comments	No.
Planning			
Financial Planning	DM#10986579_Consol_Monthly_Performance_Report_June_2013.pdf		140
Financial Planning	DM#3435391_DELEGATED_FINANCIAL_AUTHORITY & GUIDELINES.pdf		141
Financial Planning	DM#8777244 Strategic Investment Framework.pdf		142
Financial Planning	DM#12105017_2014_Presentation on Criteria 10 Financial_Planning.pdf		143
Financial Planning	DM#10674865 Strategic Development Plan 2013/14	From presentation DM#12105017 "Financial Planning"	144
Capital Expenditure	DM#10035615 Distribution Production Plan 13-14.pdf		145
Capital Expenditure	DM#10252187 Approved Works Program1314-1718.pdf		146
Capital Expenditure	DM#7206870_Investment_Evaluation_Model_(IEM)_Template.xlsm		147
Capital Expenditure	DM#8777244 Strategic Investment Framework.pdf		148
Capital Expenditure	DM#12079533_PPS_Dashboard_May_2014.pdf		149
Capital Expenditure	DM#12027029_2014 Presentation on Criteria 11_Cap_Exp_Planning.pdf		150
Review of asset management system	DM#10881611 AMCL Asset Management System Review Report.pdf		151
Review of asset management system	DM#12131273_2014_Presentation_on_Criteria_12_Review_of_asset management system.pdf		152
Review of asset management system	DM#7471555 Asset Management Policy.pdf		153
Review of asset management system	DM#7471555 Asset Management Policy Updated in 2014.pdf	From presentation "Review of Asset Management System"	154
Review of asset management system	DM12028950 Network Management Plan Review 1/7/2014 to 30/6/2019	From presentation "Review of Asset Management System"	155
SAOI 1 AMIS	DM#12082748_AMSR SPECIAL AREA OF INTEREST 1.pdf		156
SAOI 1 AMIS	DM#12079899 SPIDA_Data_Migr Valid_cutover_DFIS_vs_SPIDA.xlsx		157
SAOI 1 AMIS	DM#12102551_ERA__EWD_Analytic_Rigor_response.pdf		158
SAOI 1 AMIS	DM#12105265_ISAM DFMS_Conv_into_Ellipse_Nameplate_Reconc.xlsx		159
SAOI 1 AMIS	DM#9397836_ISAM-DFMS_Workplanner_Defect_Conv_Recon.xlsx		160
SAOI 1 AMIS	DM#9414306_ISAM_DFMS_Ellipse_Equipment_Register_Conv_Recon.xlsx		161
SAOI 1 AMIS	DM#9480765_ISAM_Equipment_Reconcilliation_Production.xlsx		162
SAOI 1 AMIS	DM#12047947 2014_PRESENTATION on AMIS.pdf		163
SAOI 2 Poles	DM#10252187 Approved Works Program1314-1718.pdf		164
SAOI 2 Poles	DM#10305548_Pole_Failure_Investigation_Report_-		165

Review Area	Document name	Comments	No.
	_2012.pdf		
SAOI 2 Poles	DM#10532362_Letter_to_ERA_wood_pole_replacement_backlog.pdf		166
SAOI 2 Poles	DM#11164679_Failed_Pole_Investigation_Business_Process_Model.pdf		167
SAOI 2 Poles	DM#11674354_Wood_Pole_Management_Dashboard_KPI_Report.pdf		168
SAOI 2 Poles	DM#12028547_unassisted_Pole_failure_risk_244.pdf		169
SAOI 2 Poles	DM#5449945_DIST_BUNDLED_POLE_INSPECTION_OPER _INSTRUCTIONS.pdf		170
SAOI 2 Poles	DM#8084663_v7_Investigation_and_testing_of_wood_poles.pdf		171
SAOI 2 Poles	DM#9047586_Catalogue_for_Distribution_Overhead_Lines.pdf		172
SAOI 2 Poles	DM#9155338 Wood Pole Structures Asset Management Strategy.pdf		173
SAOI 2 Poles	DM#9204170_v4_Policy_for_management_of_hardwood_poles.pdf		174
SAOI 2 Poles	DM#11060064_Workflow_Process_for_PAR_defects.pdf		175
SAOI 2 Poles	DM#11138009_ZBAM_Implementation.pdf		178
SAOI 2 Poles	DM#12079533_PPS_Dashboard_May_2014.pdf		179
SAOI 2 Poles	DM#12081090_Executive_Dashboard_Delivery_Public_Safety_May_2014.pdf		180
SAOI 2 Poles	DM#12083132_Asset_Viewer_Report_S791376_B_wood_pole_failure.pdf		181
SAOI 2 Poles	DM#9498938_v3_Wood_Pole_Asset_managememt_Plan_2013-2018.pdf		182
SAOI 2 Poles	DM#12120726_ERA _Dx_W_pole_treatments_required_at_May_2014.pdf		183
SAOI 2 Poles	DM#12102328_Letter_to_ERA_wood_pole_dashboard_for_May_2014.pdf		184
SAOI 2 Poles	DM#12066943_ERA_report_Balance_of_UNSE_Wood_Poles_May_2014.pdf		185
SAOI 2 Poles	DM#12020929_2014_Report_Output_for_Asset_Performance PAR.pdf		186
SAOI 2 Poles	DM#12061996_2014 Presentation on SAOI 2 Wood Poles.pdf		187
SAOI 2 Poles	DM#11521867 Post 30 November 2013 Bush Fire Mitigation Plan(BFM)	From presentation DM#12061996 "Special Area of Interest 2 Wood Poles	188
SAOI 2 Poles	DM#8172520 Wood Pole Structures Asset Management Plan 2014	uploaded on 28/7	189
SAOI 2 Poles	DM#9343690 Wood Pole Structures Standard Operating Procedures Manual	uploaded on 28/7	190
SAOI 2 Poles	DM#9301355 Wood Pole Structures Works Implementation Plan 2014	uploaded on 28/7	191
SAOI 2 Poles	DM#9418769 Wood Pole Structures Inspection and assessment procedure	uploaded on 28/7	192
SAOI 2 Poles	DM#11670469 Cabinet-in-confidence_03880_-_62629_Draft_Western_Power's_2014-15_State_Budget_submission_and_financial_adjustments.PDF	uploaded on 28/7	193
SAOI 2 Poles	DM#12119341 NRMT2 Technical Manual Wood Poles	uploaded on 29/7	194

Review Area	Document name	Comments	No.
SAOI 2 Poles	DM#10580804 Optimised Maintenance Rules for Distribution Overhead Network	uploaded on 30/7	195
SAOI 2 Poles	DM#9389199 Wood Pole Structures Asset Management SOP	uploaded on 31/7	196
SAOI 2 Poles	DM#6662107 Serviceability Assessment Model for Wood Poles	uploaded on 31/7	197
SAOI 2 Poles	DM#12006447 Wood Pole Asset Management SOP - Prioritising Remedial Action	uploaded on 31/7	198
SAOI 3 Business Continuity	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		199
SAOI 3 Business Continuity	DM#1193884_SOP_106__BACKUP_CONTROL_CENTRE_TRANSMISSION.pdf		200
SAOI 3 Business Continuity	DM#11982138_2012-18_AMSR_Recommendations_extract .pdf		201
SAOI 3 Business Continuity	DM#1994223_NETWORK_OPERATIONS_BACKUP_CONTROL_CENTRE_NWI_043.pdf		202
SAOI 3 Business Continuity	DM#9425445 2014 presentation on SAOI 3 Business Continuity.pdf		203
SAOI 4 Transformers	DM#10252187 Approved Works Program1314-1718.pdf		204
SAOI 4 Transformers	DM#11001014 Network Management Plan 2013-2018.pdf		205
SAOI 4 Transformers	DM#10229839 Collie Muja substation Tansformer 1 failure report.pdf		206
SAOI 4 Transformers	DM#10836025_Muja_BTT1_ABB_manaufacturers_report.pdf		207
SAOI 4 Transformers	DM#10836102 MUJA BTT1 Failure Independant Investigation report.pdf		208
SAOI 4 Transformers	DM#11831030 MU BTT2 Transformer Failure Investigation Report.pdf		209
SAOI 4 Transformers	DM#11848812_MUJA_BTT2_ABB_failure_investigation_report_.pdf		210
SAOI 4 Transformers	DM#12049029 A P Distribution Transformer Dashboard June 2014.pdf		211
SAOI 4 Transformers	DM#4384485_POWER_TRANSFORMER_CONDITION_ASSESSMENT.xlsx		212
SAOI 4 Transformers	DM#12121120_ST_T2_Internal_inspection_foll_the_MU_BTT1_failure.pdf		213
SAOI 4 Transformers	DM#1373480_Plant_Inspection_for_Trans_Terminal_and_Zone_Subst.pdf		214
SAOI 4 Transformers	DM#9377452_TRANS_SUBSTATION_PLANT_INSPECTION_QUALITY_SHEET.pdf		215
SAOI 4 Transformers	DM#10673124_Tap_changer_selector_lead_inspection_.pdf		216
SAOI 4 Transformers	DM#8893851_ASSET_STRATEGY__POWER_TRANSFORMER_.pdf		217
SAOI 4 Transformers	DM#6694682_POWER_TRANSFORMER_CONDITION_ASSESSMENT_METHODOLOGY		218
SAOI 4 Transformers	DM#12076404 Muja 220 switchyrd inpection sheets BTT2 BTT3.pdf		219
SAOI 4 Transformers	DM#8893851 Asset Strategy - Power Transformers	Already provided	220
SAOI 4 Transformers	DM#10608419 Power Transformer Strategy	From presentation DM#12090334 "Special Area of Interest 4 DX/TX Transformers	221

Review Area	Document name	Comments	No.
SAOI 4 Transformers	DM#6694682 Power Transformer Condition Assessment Methodology	Already provided	222
SAOI 4 Transformers	DM#12076375 Muja BTT1 Copy of maintenace history to August 2008	From presentation DM#12090334 "Special Area of Interest 4 DX/TX Transformers	223
SAOI 4 Transformers	DM#6192403 Muja BTT1 High Voltage Test Report June 2009	From presentation DM#12090334 "Special Area of Interest 4 DX/TX Transformers	224
SAOI 4 Transformers	DM#11784470 Muja BTT2 Maintenance History to February 2014	From presentation DM#12090334 "Special Area of Interest 4 DX/TX Transformers	225
SAOI 4 Transformers	DM#3613101 Muja BTTX2 High Voltage Test Report April 2007	From presentation DM#12090334 "Special Area of Interest 4 DX/TX Transformers	226
SAOI 4 Transformers	DM#8167664 Muja BTTX2 High Voltage Test Report April 2011	From presentation DM#12090334 "Special Area of Interest 4 DX/TX Transformers	227
SAOI 4 Transformers	DM#12076380 Muja BTT3 Scanned maintenance history to 28/3/2011	From presentation DM#12090334 "Special Area of Interest 4 DX/TX Transformers	228
SAOI 4 Transformers	DM#8148579 TX MU BTT3 High Voltage Test Report April 2011	From presentation DM#12090334 "Special Area of Interest 4 DX/TX Transformers	229
SAOI 4 Transformers	DM#12076404 Muja 220kv switchyard scanned inspection sheets 14 Feb 14	Already provided	230
SAOI 4 Transformers	DM#10454254 Ground mounted assets 2013/14 work program	From presentation DM#12090334 "Special Area of Interest 4 DX/TX Transformers	231
SAOI 4 Transformers	DM#11841698 Distribution Transformer replacement Strategy		232
SAOI 4 Transformers	DM#8893851 Power Transformer Strategy		233
SAOI 4 Transformers	DM#8693652 DPE Business Case failure rate replacement projection	uploaded on 28/7	234
SAOI 4 Transformers	DM#10644468 DSTR Strategy	uploaded on 28/7	235
SAOI 4 Transformers	DM#1200779 Catalogue of Equip Types for DX Substations	uploaded on 28/7	236
SAOI 4 Transformers	DM#1220966 Catalogue of Equip Types for DX OH Lines	uploaded on 28/7	237
SAOI 4 Transformers	DM#3271973 DX Substation Inspection Tech Maint Requirements	uploaded on 28/7	238
SAOI 4 Transformers	DM#3235127 Catalogue of Maintenance Timescales	uploaded on 28/7	239
SAOI 4 Transformers	DM#8425986 Transformer Condition Assessment Score Card OAM	uploaded on 28/7	240
SAOI 4 Transformers	DM#1045879 Maintenance Criteria for Power Transformers	uploaded on 28/7	241
WPGM	DM#12096649_2014 Presentation on_WPGM.pdf		242
Recommendation Presentation	DM#11982138_Presentation on 2012_Recommendations.pdf		243
Recommendation 1	DM#11001014 Network Management Plan 2013-2018.pdf		244
Recommendation 1	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		245
Recommendation 2	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		246
Recommendation 2	Delivery status reporting processes.pdf		247
Recommendation 3	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		248

Review Area	Document name	Comments	No.
Recommendation 3	DM#11709033 Compliance & Assurance Framework - Summary PPT		249
Recommendation 3	DM#11689575 Post Implementation Review Board Approved Projects January 2014		250
Recommendation 3	DM#9596210 Board Submission January 2013 PIR GA For Noting		251
Recommendation 3	DM#9596210 Board Submission August 2012 PIR GA For Noting		252
Recommendation 3	DM#11852402 Portfolio Office Gate Compliance Monthly Report PPTX		253
Recommendation 3	DM#11934293 MWEP Healthcheck Review Final Report		254
Recommendation 3	DM#10192007 Final Gate 1 Review Report Replace Wood Pole Crossarms		255
Recommendation 3	DM#10573826 Final Gate 5 Review Report SNR New Bletchley Park Feeder		256
Recommendation 3	DM#9584871 Final PIR Install Battery Paralleling Boards		257
Recommendation 3	DM#9704498 Management Actions Register		258
Recommendation 3	DM#12196384 Summary of Portfolio Office Compliance & Assurance Activities re PIR	uploaded on 28/7	259
Recommendation 4	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		260
Recommendation 4	DM#7206870_Investment_Evaluation_Model_(IEM)_Template.xlsm		261
Recommendation 4	DM#7219347_BUSINESS_CASE_TEMPLATE_.pdf		262
Recommendation 5	DM#11001014 Network Management Plan 2013-2018.pdf		263
Recommendation 5	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		264
Recommendation 5	DM#10968174_Analysis_of_Causes_of_Pole_Top_Fires_for_12_13.pdf		265
Recommendation 5	DM#11120150_2012_13_Reivew_of_Distribution_Overhead_Conductors.pdf		266
Recommendation 5	DM#11885197_REVIEW_OF_POLE_ASSET_FAILURE_INVESTIGATIONS_2013.pdf		267
Recommendation 5	DM#12046249_AP_Function_Investigation_Process_Diagram_Current.pdf		268
Recommendation 5	DM#12120488_Process_C3-04_Validate_Investigate_Asset_Incidents.pdf		269
Recommendation 5	DM#12188579 asset management system Review Response to Supplementary Questions		270
Recommendation 6	DM#10038993_Transmission_New_QT_Requirements.xlsx		271
Recommendation 6	DM#10598496_Transmission Electronic_QT_Form_Template.pdf		272
Recommendation 6	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		273
Recommendation 7	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		274
Recommendation 8	DM#10532362_Letter_to_ERA_wood_pole_replacement_backlog.pdf		275

Review Area	Document name	Comments	No.
Recommendation 8	DM#11674354_Wood_Pole_Management_Dashboard_KPI_Report.pdf		276
Recommendation 8	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		277
Recommendation 8	DM#9155338_v3_Wood_Pole_Structures_Asset_Management_Strategy.pdf		278
Recommendation 8	DM#12153093 Wood Pole Reporting to the ERA June 2014 (May copy DM 12066943)	uploaded on 28/7	279
Recommendation 8	DM#10650997 Letter to ERA from Paul Italiano re Wood Pole changes from P1 to PAR	uploaded on 28/7	280
Recommendation 8	DM#12191483 Summary of reasons for move from P1 P2 process to PAR	uploaded on 28/7	281
Recommendation 9	DM#10436593_Report_on_ERA_2012_Audit_Actions_for_P1_and_P2.pdf		282
Recommendation 9	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		283
Recommendation 9	DM#9047586_Catalogue_for_Distribution_Overhead_Lines.pdf		284
Recommendation 9	DM#12141229 Catalogue of Equipment Types & Definitions for DX Overhead Lines	This is the updated version of previously provided DM#9047586	285
Recommendation 10	DM#11164679_Failed_Pole_Investigation_Business_Process_Model.pdf		286
Recommendation 10	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		287
Recommendation 10	DM#8084663_v7_Investigation_and_testing_of_wood_poles.pdf		288
Recommendation 11	DM#10305548_Pole_Failure_Investigation_Report_-_2012.pdf		289
Recommendation 11	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		290
Recommendation 11	DM#8084663_v7_Investigation_and_testing_of_wood_poles.pdf		291
Recommendation 11	DM#9047586_Catalogue_for_Distribution_Overhead_Lines.pdf		292
Recommendation 11	DM#9155338_v3_Wood_Pole_Structures_Asset_Management_Strategy.pdf		293
Recommendation 11	DM#9204170_v4_Policy_for_management_of_hardwood_poles.pdf		294
Recommendation 12	DM#11767283_ISO_9001_2008_Audit_Report_2014.pdf		295
Recommendation 12	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		296
Recommendation 13	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		297
Recommendation 13	DM#5449945_DIST_BUNDLED_POLE_INSPECTION_OPER _INSTRUCTIONS.pdf		298
Recommendation 14	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		299
Recommendation 14	DM#12057555_example_of_risk_register_for_2014_AMSR.pdf		300
Recommendation 14	DM#12057578_Example_of_transmission_production_plan_2013-14.pdf		301
Recommendation 15	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		302

Review Area	Document name	Comments	No.
Recommendation 15	DM#12057619_recommendation_2012-15.pdf		303
Recommendation 15	DM#3528771_Network_Risk_Issues_Register.pdf		304
Recommendation 16	DM#12028547_unassisted_Pole_failure_risk_244.pdf		305
Recommendation 16	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		306
Recommendation 17	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		307
Recommendation 17	DM11988614 Business Impact Analysis Report April 2014	Uploaded on 29/7	308
Recommendation 18	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		309
Recommendation 18	DM#10550188 Register for Significant Emergency Events & Actions		310
Recommendation 18	DM#10611155 Emergency Preparedness Implementation Plan		311
Recommendation 18	DM#11593215 Truscott Report Emergency Management Training		312
Recommendation 19	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		313
Recommendation 19	DM#10889856 Emergency Management Plan Scenario Risk Workshop		314
Recommendation 19	DM# 10890378 Disruption Scenarios Fish Bone		315
Recommendation 19	DM#10930546 Actions for Contingency Workshop 24 June 2013		316
Recommendation 20	DM#12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf		317
Recommendation 20	DM#12055645_Recommendation_2012-20_closeout.pd		318
Recommendation 20	DM#11061903 Recommendations and Action Plan	Addresses Action 1 & 3 of Recommendation 2012/20	319
Recommendation 20	DM#10977937 Corporate Records project Status report Actions	Addresses action 2 of Recommendation 2012/20	320
Recommendation 20	DM#7872829 Document Controllers and Registers	Addresses action 3 of Recommendation 2012/20	321
Recommendation 20	DM#11656160 Record keeping Compliance Obligations	Addresses action 3 of Recommendation 2012/20	322
Administration	DM#12117798 Meeting Schedule and Attendees for 2014 asset management system Review		323

Appendix C. 2012 Post Review Implementation Plan

Western Power's *2012 Post Review Implementation Plan (AMSR)* collated the 2012 issues and recommendations which were embedded throughout the previous report[5], and proposed actions in response to each recommendation. Jacobs understands that the status of these actions has been tracked by the Authority over the 2012-14 period. Western Power has updated the document to provide commentary on the status of the actions undertaken[6]. This has been provided below to provide context to Jacobs' review of the status of the 2012 recommendations.

[5] *Qualeng, Review Report, Western Power Electricity Licences Asset Management System Review, August 2012*

[6] Filename: *12042793_Auditor_update_PRIP_2012_Asset_Management_System_Review.pdf*

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2012 Post Review Implementation Plan (AMSR)

The following table details the status of Western Power's management actions following the 2012 asset management system review.

Recommendation No.	AMS Element / Effectiveness Criteria Finding	Elements of Recommendations	Actions	By Whom	Document Reference	Status
2012/01	1.1 There may be an opportunity to review the framework displayed in the Network Management Plan (NMP) (e.g. Fig 2.1) to show the relationship of documents such as the Production Plans, SCI, AAs etc in the framework. 1.1 The implementation of the NMP is addressed in the Annual Work Program (AWP) and the Production Plans, however there is no ready traceability of programs noted in the NMP to tasks committed to in the production plans. 1.8 There was no clear documented evidence of document review in the 2 versions of the NMP examined in the review. There was a "Prepared by" entry, however no review/approval and no control box. Approval by the Managing Director was provided by a separate document.	[OFI] There is an opportunity to review the presentation of the Asset Management Document Framework in the NMP to show documents related to the NMP, such as the Production Plans, Statement of Corporate Intent, Access Arrangement, which are not shown in the Asset Management Document Framework. [1] There should be more visible means to identify responsibilities and commitment to tasks described in the NMP through referencing to work plan activities. [2] There should be evidence of review / approval in the controlled version of critical documents such as the NMP. There is a need to document a methodology for document review for the NMP. [6, 25]	1. Update the Asset Management Document Framework in the NMP to show the relationship of integral documents included in the Network Investment Strategy Annual Planning cycle and all applicable corporate documents. Section 2.2	Branch Manager Network Performance	DM 11001014 On Project Web	Completed
			2. Update the NMP to include linkage between the asset strategies/plans articulated within the NMP; to the work programs listed in the Production Plan/Approved Works Program. Section 7.24		DM 11001014 On Project Web	Completed
			3. The NMP will be updated to include a document control page.		DM 11001014 On Project Web	Completed
			4. The methodology for review of the NMP will be updated in section 11 of the NMP.		DM 11001014 On Project Web	Completed
2012/02	1.1 Processes for handover and delivery of OPEX and CAPEX work programs have been mapped and have been published on the appropriate	Continue with the publishing of Lifecycle Status Reporting and Delivery Status Reporting processes. [11/06-1&2]	Complete the publishing of Lifecycle Status Reporting and Delivery Status Reporting processes. See 2011 AMSR action item 11/06-2. Action status completed and reviewed by Qualeng before 2012 report issued. See 2012 AMSR report	Branch Manager Network Performance	Delivery status reporting processes On Project Web	Completed

Recommendation No.	AMS Element / Effectiveness Criteria Finding	Elements of Recommendations	Actions	By Whom	Document Reference	Status
	Western Power portal (Modelpedia). Lifecycle Status Reporting and Delivery Status Reporting processes are still in progress and due to be published in October 2012.		FYI The Project lifecycle and delivery status reporting processes (including required reporting templates) have been developed and uploaded to Western Power's corporate process portal. These processes and accountability have been approved and communicated to key internal stakeholders. This action was completed in October 2012. Documents "Announcement: Works Program Reporting Framework is now available in the WPGM porthole on Busbar " and "Reporting process in Modelpedia" viewed verifying the completion of the action.			
2012/03	1.1 It may be pertinent to review the Work Program Governance Model (WPGM) process in the Planning phase leading to Gate 3, where activities like procurement of long lead items and detailed design may take place prior to Business Case finalisation and approval. 1.1 It was noted that interpretations of the WPGM model provided at meetings showed that Business Cases are created and reviewed after the AWP. It is expected that most of the Business Case approvals would take place before finalisation of work plans and production plans and any further Business Cases would be for changes or response to changing conditions. The reverse would imply that work plans are not	[OFI] Review timing of resource expenditure such as purchase of long lead items and detailed design prior to Business Case finalisation and approval. It may be appropriate to incorporate purchase of long lead items and detailed design in preliminary Business Cases or to bring forward Business Cases. [3] [OFI] Clarify the process between the Approved Work Program and the WPGM, the process leading to and from the creation of the Approved Work Program and the relationship to Business Cases. [4]	Develop a revised Investment Planning process including creation of the AWP. Process development to include review of early planning activities and Business Case production. Revision of AWP process was deferred as part of the organisational restructure and operating model process review and therefore, not applicable to the creation of the 2013/14 AWP Revised process is currently being reviewed and will be implemented for 2015/16 AWP AWP is based on forecasts from sponsors and project managers and reflects the expenditure identified as correct at a point in time Early planning activities and business case production included in the WPGM to ensure items such as long lead items are considered. AWP is developed and approved prior to the start of the delivery year and not all business case approvals will take place before finalisation of work plans Inclusion of programs/projects within the AWP does not indicate full approval to proceed, formal business case process is still required to be followed in accordance with WPGM	Branch Manager Network Investment		

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	implemented consistently.		Based on the above, this recommendation and action is complete This will be further discussed and evidence provided during the financial planning and capital expenditure planning sessions.			
2012/04	1.4, There was evidence of "Ops" (operating) costs being considered in the New Facilities Investment Test (NFIT) however there was no explicit analysis of operating costs of alternatives (e.g. Ops costs for 3 transformer years was the same as 6 transformer years). No evidence found that lifecycle costs are consistently evaluated over the entire life of the assets. 2.2 All lifecycle costs do not appear to be always evaluated. Full lifecycle costs are expected to be included in Business Cases (BC) such as in Southern River 3rd transformer project, " Southern River Capacity Improvements Business Case", where capital costs are included, as well as associated NFIT benefits, however no operating costs of transformer and feeders were sighted (e.g. the BC stated "additional benefits through improved reliability, slower asset deterioration and lower likelihood of faults, these have not been	There should be a more explicit and accountable analysis of lifecycle operating costs in alternative evaluations within Business Cases and in project evaluations. [5]	The life-cycle costing and OPEX options will be incorporated into the business case process and template review program. Life-cycle costing and OPEX options have been incorporated into the business case process and template in the short term. In the long term asset life-cycle management and costing will be embedded as part of the Asset Management Strategic Theme initiative. In the short term perspective, business case templates have been revised to include life-cycle costing and operational expenditure (OPEX) information into the business case options analysis. This is shown in Sections 4 and 6 of the Business Case template (DM# 7219347) 'Options Analysis' and 'Value Analysis' (refer footnotes also). The Investment Evaluation Model (DM# 7206870) utilises data input for life-cycle costing and operational expenditure costs as part of the financial analysis.	Branch Manager Network Performance	DM 7219347 DM 7206870 On project Web	Completed

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	quantified due to lack of available data"). In evaluation of transmission line costs OPEX costs of insulator washing and vegetation maintenance were not sighted. The same OPEX costs were sighted in the options of installing two transformers simultaneously or staggered by two years.					
2012/05	4.2 The KPI, Pole Integrity Index (PII) measures unassisted pole failures per 10,000 poles for Transmission (TPII) and Distribution (DPII). Both were trending upwards in 2010-11. No analysis or further treatment of this KPI was evident in the section, it would be expected that the deterioration of the transmission KPI would be treated elsewhere however there are no references in the NMP on investigations and causes of the deterioration.	There should be an improvement in the accountability of KPIs in the NMP and in the referencing and traceability of investigations and actions. [7]	1. Develop and implement a process for the investigations, analysis and causes of KPI trending. (as part of the Asset Management Framework project) The Incident investigations process has been reviewed to ensure it covers analysis and investigations of KPI trends. In 2013 it was identified as a key component of the Asset Management Framework project which was deferred and has now recommenced under the Asset Management Strategic Theme. The current process is being used as an interim until it is reviewed by the Asset Management Strategic Theme project.	Branch Manager Network Performance	June 2013 DM 12046249 On project Web	Completed
			2. Include references in the NMP for investigations, analysis and actions for KPI trending, in particular for deteriorating trends Section 7.2 Asset incident and investigations		DM 11001014 On Project Web	Completed
2012/06	5.1 Some of the field procedures do not exist or do not have sufficient visibility: Whilst there are procedures for the management of QTs on	There should be a review to establish that there are appropriate procedures for core field processes. Procedure for the management of Query Trouble Reports (QTs) in the field should be	Review Transmission Maintenance Core Field Processes for gaps and extend QT process to incorporate the initiator. A new QT form and instructions DM# 10038993	Branch Manager Transmission Maintenance Delivery	DM 10038993 DM 10598496 On project Web	Completed

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	receipt from the field, no procedure was sighted for the management of QT in the field; no procedure found in the "Work Practice Manual".	created. [8]	were provided, including an electronic form option DM# 10598496. 200 new QT books have been printed; their form reference (Product code) is 87135079 09/13. These are numbered in sequence from the previous version of form and include integral instructions on the back of the cover page and Rating rules on the back of each pink page in the book.			
2012/07	5.3 While the asset registers are up to date and complete, the accounting data (asset valuations) is captured in MIMS Ellipse, but not in the Asset Management systems at an asset level. Western Power should evaluate how asset valuation information (fair value) should be integrated between the Financial Asset Registers and the Asset Management systems to ensure that future lifecycle replacement costs can be predicted.	Continue with the implementation of the Integrated Strategic Asset Management (ISAM) project [9], which will create the electronic links between the Equipment Register and the Fixed Asset Register. [PRIP2011 11/02-1]	Include the implementation of electronic links between the Equipment Register and the Fixed Asset Register as part of the ISAM 2 project. We have implemented the links between fixed asset register and equipment register for distribution system assets. 1. These links can work on individual asset level where work order identifies the individual asset. 2. The true benefit from these links can be derived if the work order and cost capture is assigned to individual assets. Currently multiple assets/ installations may be replaced under a single job and the costs are not separated to an individual asset level. Links between FAR and ER have not been implemented for transmission substation or line assets. 1. For transmission substation plant, the FAR structure can support FAR-ER link. This will be implemented, noting that the current process to update FAR is manual. 2. For transmission lines FAR structure does not support linking FAR with ER and transmission line assets are not in Ellipse, but in TLS. The links will not be implemented until Ellipse is used as an asset register.	Branch Manager Network Performance		

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2012/08	6.3 Western Power is due to develop a monthly report which tracks the date poles were inspected against the date the pole is due to be replaced for P1 and P2 condemned poles. This report will track the poles which are not replaced within the replacement target dates. Western Power will include a standard agenda item at meetings between key operational managers to discuss the report. Issues will be highlighted and managed through the minutes of meeting. The report, when developed will form part of the Business Performance report for all distribution management and will also be	Continue with actions to develop the report on P1/P2 performance to be part of the agenda at meetings between operational managers. [PRIP11/09-2] Continue with review of delays and correction of delays in rectification of P1 and P2 wood pole conditions. [10] Continue actions to report on actual P1 and P2 delays. [PRIP 2011 11/09-1] Continue actions to identify causes of delays. Implement actions to reduce delays. [SAOI 7, 8, 9]	1. Finalise creation of monthly ISAM based P1 and P2 report and where there is a backlog, report it in the monthly Wood Pole Management Dashboard 3. Review and discuss operational performance with business stakeholders and identify and include mitigation activities in the monthly Wood Pole Management Dashboard The Performance report has been created and the report commentary addresses mitigation activities Issued monthly as part of the Wood Pole Management Dashboard Example: December 2013 WPMD Report - sections 1.11-1.14 (see DM#11674354) This December report was also provided to ERA via a letter dated 14/01/2014 (see DM#11711961)	Branch Manager Network Performance	DM 11674354 On project Web	Completed
			2. Manage transition from existing (interim) report to sole use of new (ISAM) based report.			Completed

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	reviewed by the Operations General Manager. 6.3 There are delays in achieving completion of wood pole replacements for P1 and P2 condition within the required time. The delays have been attributed to: reduction in planned outages, decreasing opportunities for replacing assets; data lag; find rate from inspections higher than replacement rate.		A report on high risk poles has been created. This will be further discussed and evidence provided during the special area of interest review.			
			4. Review the strategy by which non run to fail wood poles will be identified and scheduled for replacement or condition rectification. The Wood Pole Structures Asset Management Strategy has been revised. This revision includes the identification and prioritisation of remedial action1. DM 9155338 Paul Italiano's letter to Lyndon Rowe of the ERA on 12 April 2013 explains the changing approach from an individual pole "time to fix" (P1 and P2 poles) to a whole of pole population comprehensive risk based approach, which considers both likelihood and consequence. DM 10532362		DM 9155338 DM 10532362 On project Web	Completed
2012/09	6.3 A P1 condition identifies an asset that is not serviceable and may fail shortly, the condition was due to be rectified within 2 weeks up to 6 February 2012 and within 4 weeks from that date. No information was seen to show the grounds for extending the rectification of pole assets judged to "immediately fail" from 2 to 4 weeks. It was noted that the P1	Document the risk effects of extending the time allowed for rectification of pole assets that may immediately fail (P1 condition) from 24 hours to 4 weeks. [SAOI 10] Clarify or address the difference between the P1 target of 28 days in the "Catalogue of Equipment Types and Definitions of Condition Severities for Distribution Overhead Lines" versus the 24 hours target for Priority 1 work	1. Produce report on outcomes of changing wood pole replacement P1 rectification from 24hrs to 4 weeks. A response paper has been written and signed off that addresses these management actions. The paper is as follows: Wood Pole Asset Management Report: ERA 2012 Audit Actions 2012/09-01 & 2 for P1 and P2 Wood Poles Findings (DM# 10436593).	Branch Manager Network Performance	DM 10436593 On project Web	Completed

[1] Section 10.3 and 10.4 Wood Pole Structures Asset Management Strategy (DM#9155338v3)

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	condition required rectification within:24 hours in 2004; was extended to 2 weeks on 22 September 2010; extended to 4 weeks on 6 February 2012. 6.5 There is an inconsistency between the priority attached to condition P1, specified in the "Catalogue of Equipment Types and Definitions of Condition Severities for Distribution Overhead Lines" (DM9047586) which provides the P definitions and defects identification, versus the information on Priorities provided in the " Review of Query Trouble Reports for 1st Half of 2011/12 FY", DM9121078). For a Priority 1 condition the Catalogue specifies a turnaround of 28 days from identification, whilst the information provided on QT Reports showed a 24 hours completion target.	identified in the QT Reports process. [13]	2. Review and compare reasons for difference in P1 SLA between the "Catalogue of Equipment Types and Definitions of Condition Severities for Distribution Overhead Lines", and "Review of Query Trouble Reports for 1st Half of 2011/12 FY". A response paper has been written and signed off that addresses these management actions. The paper is as follows: Wood Pole Asset Management Report: ERA 2012 Audit Actions 2012/09-01 & 2 for P1 and P2 Wood Poles Findings (DM# 10436593PDF).		DM 10436593 On project Web	Completed
			3. Update these documents at their next scheduled review date to ensure alignment in Fault/P1/P2 terminology and associated Service Level Agreements The "Catalogue of Equipment Types and Definitions of Condition Severities for Distribution Overhead Lines" has been reviewed and updated.		DM 9047586 On project Web	Completed
2012/10	6.4 The procedure for the "Identification and Investigation of Unassisted Wood Pole Failures" DM7467671 does not indicate who is responsible for verification/ validation of data extracted from TCS. This has been found to take place satisfactorily in practice and the procedure should be updated to	Review the "Identification and Investigation of Unassisted Wood Pole Failures" DM7467671 procedure to clarify responsibilities and update content (e.g. one of the areas for review deals with filtering of classes for data extraction). [11]	At next review of "Identification and Investigation of Unassisted Wood Pole Failures", clarify the role responsible for verification/validation of data extracted from TCS and the steps in the identification and investigation process. The previous document "Identification and Investigation of Unassisted Wood Pole Failures" DM7467671 does not reflect current pole failure investigations process: • It was for unassisted pole failures only	Branch Manager Network Performance	DM 8084663 DM 11164679 On project Web	Completed

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	reflect the current process.		• We now have new systems, processes and definition used in relation to pole failures. "Identification and Investigation of Unassisted Wood Pole Failures" DM7467671 has been superseded and the equivalent document now, with regards to failure investigations, is "SOP – Investigate and Test failed and non-failed wood poles" (DM#8084663). This document is part of the Standard Operating Procedures for Wood Poles. The ERA Audit action is addressed in this document. Section 3.3 "Post failure Investigation and Classification" and its referenced "Failed Pole Investigation High Level Business Process Model" (DM#11164679) clarifies the role/s responsible for verification/validation of data extracted from TCS and the steps in the identification and investigation process.			
2012/11	6.4 Some of the classifications of pole failure such as pole leaning are not identified as unassisted. There may be a need to analyse further the causes and the risk of this type of condition: leaning may be caused by faulty foundation, a foundation is an integral part of the pole design and the pole asset and therefore should be incorporated in the definition of pole failure; leaning may result in low clearances and a hazard to the public.	[OFI] Review the classification of pole failures in terms of the whole pole asset and its design so that foundation failures are considered in pole failures. Where the cause of failure is foundation and not other factors such as high winds, pole hit etc, then that should be classified as unassisted pole failure. [12]	1. Western Power to review leaning attributes in consideration of wood pole failures. .	Branch Manager Network Performance	June 2013	Completed
			2. Western Power to conduct root cause analysis of pole failures where failure has been attributed to leaning or foundation failure (structural).		June 2013	Completed
			3. Apply any findings towards improving asset strategies relating to wood poles Western Power's policy is to investigate all pole failure incidents to an appropriate level of detail and feed the findings back into the pole management process to rectify any deficiencies found. Section 5.7 - Policy for Managing Hardwood Poles (DM#9204170v4) One of the factors considered in a pole failure		*DM 9204170* *DM 8084663* *DM 9047586* *DM 10305548* *DM 8084663* *DM 9155338* On project Web	Completed

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			investigation is the checking of previous condition recorded for the pole. Section 3.3.3 - Investigation and testing of failed and selected non-failed wood poles (DM#8084663v7) As part of the pole inspection process the pole is measured for a leaning angle (mandatory field in the Mobile Inspector script). In addition the pole inspector records a leaning condition against a pole where the pole leans by greater than 10 degrees. Section 2.4.24 - Catalogue of Equipment Types and Definitions of Defect Severities for Distribution Overhead (DM#9047586v10) As an example that leaning or foundation failures are considered and identified, there was one classified foundation failure for the period of July 2012 to December 2012. Strategic Review of Pole Failure Investigations July 2012 – December 2012 (DM#10305548v12) Western Power does apply findings towards improving asset management strategies. Western Power produces investigation reports for each failed pole. The reports capture recommendations for corrective actions or improvements that are required to prevent similar failures in the future or improve the effectiveness of how wood poles are managed. These reports do identify foundation failures as a root cause for failures and provide feedback into the Wood Pole Structures Asset Management Strategy. Section 2 and 10 – Wood Pole Structures Asset Management Strategy (DM#9155338v3) There is also a procedure for implementing corrective action/improvement recommendations. Section 6 and 7 - Investigation and testing of failed and selected non-failed wood poles (DM#8084663v7)			

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2012/12	7.1 Document registers need improvement to show consistency between the review frequency and dates of next review, the next review dates need to be updated and the registers may need to show more information on the status of the documents and their review when there are delays (i.e. If there is a postponement in a review there should be a reason given; e.g. "next review date is 19 November 2005", review had been assigned but is not yet completed). 7.1 Appoint SOCC Document Controller. [Action PRIP2011 11/01-3] The SOCC Document Controller has not been engaged. Whilst contract personnel have been engaged in this function, there are still actions that need to be completed to effectively set up	[SOCC] Continue review of "System Operation Control Room Instruction (CRI) Index" (DM7695336). This action is still in progress as several of the entries are obsolete (e.g. some of the reviews were assigned several years ago and show no closure). [23; PRIP2011 11/01-4] **[OFI]** [SOCC] Document registers need improvement to show consistency between the review frequency and dates of next review and should show more information on the status of the documents and their review (e.g. If a review is not required by that date, update the date of the review to a future date, and clarify reason in comments). The next review dates should be updated if the review is not required. [14] [SOCC] Several documents assigned for review in SOCC register have been	1. Appoint SOCC Document Controller. Position filled in Oct 2012 and Document Control functions allocated to Quality and Compliance Officer.	Branch Manager System Operations		Completed
			2. System Management will manage the Transmission System Operations Procedures & Instructions using the document control register and process and ensure all individual document control information is updated with current information and reflected in the register. Transmission documents have been integrated into the Network Operations' Controlled Document Register. This register lists all of the controlled documents which are now managed under the one quality management system; audits are routinely conducted to ensure that the controlled documents are reviewed and maintained. Refer to SAI Global audit report, DM# 11767283.		DM 11767283 On project Web	Completed

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	and manage the documentation. 9.1 SOCC's Transmission Emergency Management Plan (TEMP) quotes a NOCC Emergency Management Plan (DM2072196), however that procedure is not listed in NOCC. There is an "Emergency Management Plan for East Perth Control Centre" (DM5551897, last issue October 2011). Plan includes forms for emergency debrief checklist to be filled out post fire drill and post fire incidents. Actual application of the procedure did not have debrief information. "System Control Room Emergency Procedures" quotes the Emergency Management Plan for East Perth Control Centre" as DM367761 which appears to be a superseded version. The "Emergency Management Plan for East Perth Control Centre" (DM5551897) is not referenced in SOCC document index.	pending review for a long time and will require to be reviewed; once reviewed the register will need to be updated. [15] **[OFI]** [SOCC] The number of "Assigned" reviews could also be a KPI. This would highlight periods when many procedures are due for review. [PRIP 2011-11/01-1] [SOCC] Continue with the actions to effectively set up and manage document control. [PRIP 2011-11/01-3]	3. System Management will review all overdue Transmission System Operations Procedures & Instructions to ensure all documents are updated and reflect a current review status. As Above		As above	Completed
2012/13	7.1 Two wood pole inspection procedures were viewed, each with the same electronic name and DM number but with different version number, 8i and 11B, version 11A was noted as having	Clarify the existence of two documents with same DM number but documents are different. Determine causes and implement corrective action.[16] If a document has been superseded an	Update the document control page within the "Bundled Pole Inspection Procedure" to show previous published versions, their published dates and comments to show historical evolution of pole inspection procedures.	Branch Manager Network Performance	DM 5449945 On project Web	Completed

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	been re-issued with a different DM number. 11B is titled "Bundled Pole Inspection Procedure" on its cover, compared with "Wood Pole Inspection Procedure" for the 8i version. Version 8i and 11B are due to be reviewed in May and June 2014 respectively. There is no information on whether revisions 9 and 10 were ever issued. There are no notices on either of the documents of the existence of the other. Version 11 does not show previous revision history. A notice should be included in documents issued under this process to clarify: The status of the document, is it current, superseded, to be withdrawn? The existence of the other document. The reason for both documents and directions to the user: which procedure to use for which purpose?	indicator showing its superseded status is included in the document and a historical reference is included on the new document. Revise applicable procedures. [17]	At the last review, the Inspection Procedure document did not contain the revision history due to the large number of revisions. The revision history has now been restored in the document. Document is as published in Version 11C on 03/01/2013 through DM controls and the details of the evolution of the publications are now visible (DM5449945v11C)			
2012/14	8.2 OPEX tasks in the Transmission Production Plan are associated with risks, e.g. Underground (UG) System Inspection required for the early detection of developing faults in the UG cables. Some of the risks do not appear in the Division "Network Risk Issues Register" (e.g. fault development in UG	Ensure that risks identified in the Transmission Production Plan are included in the Division "Network Risk Issues Register" and improve their cross-traceability with the register. Clarify use of Risk register numbers. [18]	Review the Transmission and Distribution Production Plans to ensure that all risks addressed by the projects and programs are contained in and linked to a network issue in the network risk issues register. See also action 2012/15 -1 and 2 The recommendations refer to earlier versions of the Transmission and Distribution Production Plans. The risk references captured in these documents were out of date. The Transmissions and Distribution Production Plans have been updated and these out	Branch Manager Network Investment	DM 12057555 DM 12057578 On project Web	Completed

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	cables) A field "risk register number" is included in the Transmission Production Plan however the function of this field is not clear as it does not refer to the risk register.		of date risk references have been removed. The new versions of these documents have been updated and cover off on the actions: 1.The Transmission and Distribution Production plans provide a description of the issues being addressed; these issues are aligned to issues assessed in the Network Risk Issues Register. **2013/14 Transmission Production Plan (DM 10699127)** • Page 108 of Transmission Production Plan – Narrogin Transformer Replacement Project aligned with risk issue 100 Transmission Power Transformer Failure • Page 112 of Transmission Production Plan – Morley Transformer Replacement Project, aligned with risk issue 93 Transmission Circuit Breaker Failure. Risk issue register DM 3528771 example 12057555 Transmission Prod plan example DM 12057578 **2012/13 Distribution Production Plan (DM 10553124)** • Excel Summary of Distribution Production Plan (10334454) – Plan contains programs by Regulatory Category (e.g. Asset Replacement) and AA3 Activity (e.g. Conductor Management)			
2012/15	8.2 The Network Risk Issue Register does not show what actions and treatments are in place on each risk. Whilst that information may be available elsewhere, there is no readily visible traceability or link to the treatment plans, the actions, responsibilities and timing of responses.	Further review and development of the network risk register should be continued and its management process should be improved in view of the limitations of the present model. [SAOI 1] There is a need to review the risk management process and the risk register to address:	1. Each issue in the Network Risk Issues Register that is subject to an Opex treatment will be updated to include the reference/s to any related Opex treatments (programs). Where issues are to be addressed by a Capex treatment, the Business Case references are already captured in the Network Risk Issues Register. Risk Register updated to include details of Opex treatment plans – see column 'AI' in Network Risk Issues Register (DM 3528771).	Branch Manager Network Investment	DM 12057619 On project Web	Completed

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	[SAOI] The register is reliant on highly skilled staff to maintain it in synchronisation with CURA and to capture all risks that are generated by the asset managers. Because of the manual intensive input the register is prone to gather small errors. The register does not show the treatment plans and the actions. Some of the risks may be the result of clearly defined factors (e.g. design, conditions) and the current structure is not optimal for highlighting those aspects of the risks and for following up on solutions. 8.2 Interview with Transmission Operational Asset Management (OAM) section indicated that operational and maintenance staff with in depth knowledge of the asset risks and responsibilities for asset construction and maintenance were not aware of the Network Division "Network Risk Register", which indicates that there may be an opportunity to improve the annual risk analysis by including their contribution. Discussions highlighted a rising number of early faults in transformers, involvement of operational staff should highlight early any	the traceability of treatment plans, responsibilities, response times. [19] As part of the review of the Network Risk Register there may be a need to review the interfaces and the inclusion of stakeholders that have day to day exposure to the asset operation, maintenance and field performance of assets. [20]	2. The register will be updated to include the details of any Opex treatment (program) cycle times as well as forecast completion dates for Capex treatments (projects) Opex treatment cycle times included in column 'AI' Network Risk Issues.		DM 12057619 On project Web	Completed
			3. Each issue is assigned an owner in the Network Risk Issues Register, this is the responsible asset manager/planner in Networks Division for a respective issue and they also serve as the sponsor for any projects or programs to treat the issues. In addition, the Network Risk Issues Register will be updated to include Operational contacts for each issue and the risk review meeting agenda will be modified to include Operational staff, issues and feedback. Operational owner included in the register. See column 'AC'.		DM 12057619 On project Web	Completed

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	adverse operational trends.					
2012/16	8.2 Delays in rectifying wood pole P1 and P2 conditions are not recorded in risk registers. Similar risks are recorded at a macro level: i.e. "Failure to deliver the Annual Works Program". In view of the risk of late rectification of P1 conditions, It may be opportune to highlight the existence of this risk separately so that sufficient attention and resources are available to mitigate this risk.	[OFI] In view of the risk of late rectification of P1 conditions it may be opportune to highlight the existence of this risk separately in risk registers so that sufficient attention and resources are available to mitigate this risk. [21]	Update CURA to reflect visibility of issue with allocated controls and treatment plans. CURA Risk [R-000244] "Unassisted Wood Pole Failure" has been updated. This risk is impacted by the late rectification of defects and/or conditions. CURA Risk [R-000244] causes now include "delays in rectifying poles identified as requiring treatment as a result of condition defects". CURA Risk [R-000244] now includes risk treatments including: Increasing the volume of pole reinforcements and replacements; Securing funding in AA3 for this additional work; and A scheduled review action to re-assess the risk level based on the volume of poles requiring treatment. Cura report DM 12028547	Branch Manager Network Performance	DM 12028547 On project Web	Completed
2012/17	8.3 Assets such as the East Perth Control Centre should also be included in risk assessments both in terms of its operation and risks attached to the building. (A risk assessment was originally carried out for the building. The target availability of the building is 99.9%).	[OFI] The East Perth Control Centre and the building asset should also be analysed for risks. [22]	Arrange Risk Assessment of East Perth Control Centre building facilities and the East Perth Control Centre operations. Risks were assessed and reported in 2012, auditor was not made aware during interview. This will be further discussed and evidence provided during the special area of interest review.	Branch Manager SCADA & Information Systems		Completed

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2012/18	9.1 Reviewer did not sight any formal: ▪ lessons learnt and actions arising from emergency; ▪ systematic scenario test schedule and treatment of test responses. The test of July 2011 showed that not all tests were able to be carried out due to civil works at the Head Office Emergency Control Centre (HOECC). The finding was that the HOECC could be used in an emergency however: ▪ the question of the management of maintenance and construction at the back up facility needs to be reviewed to enable operation during emergencies and ▪ It is not always clear how issues encountered in tests are closed, which stakeholders are involved in the assessment of the corrective actions and whether all relevant stakeholders are aware of issues. Contingency planning may relate to the failure of an asset or to a threat to an asset or its operation.	Review Contingency planning and testing at the Control Centre to incorporate the following for SOCC and NOCC: The preparation of Control Centre staff should be tested in a variety of scenarios to ensure that the staff can adequately respond to events and that, if there are shortcomings to response procedures, these are identified under test conditions, not in real life situations. Tests may include test of Pandemic contingency plan (leading to a loss of a potential 50% of Control Room staff); loss of operational phone systems etc. [24, SAOI 2, PRIP2011 11/05-1] There should be a further review of contingency plans which need to be tested to maintain staff competency and reduce the risk of failure when those plans are put into action in response to real events. Trial scenarios/role playing exercises should be enacted on an annual basis. The trials should consider different events so that the Control Centre is tested on many possible eventualities. [SAOI 2] There should be a specific procedure to address: ▪ How to select the annual test scenario; ▪ Who will be advised of the test; ▪ Debriefing meeting and	1. Update Emergency Management Plan for East Perth Control Centre. The Emergency Management Plan was reviewed. This will be further discussed and evidence provided during the special area of interest review.	General Manager Systems Management		Completed
			2. Develop the East Perth Control Centre Business Continuity Plan to be aligned to the Western Power Business Continuity management framework. The Business Continuity Plan for East Perth was compiled. This will be further discussed and evidence provided during the special area of interest review.			Completed
			3. Establish a formal test register to record details of tests and management of actions arising there from. A register for Significant Emergency events and actions have been created to record actions taken and facilitate follow-up. This will be further discussed and evidence provided during the special area of interest review.			Completed

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	The reviewer has noted that other emergencies related to the operation of the assets may have to considered because they relate to the possible disruption of service levels, e.g.: ▪ Pandemic Contingency Plan, (loss of key staff operating the Control Centre); ▪ Pole Top Fires Contingency Plan; ▪ Response to Bushfire; ▪ Manual Program Load shedding Curtailment Instruction. Viewed records of meetings however from an operational perspective, unless each of the minutes is examined there are: ▪ no annual list of how many events had to be responded; ▪ no rating of the quality of the response; ▪ no measure of which actions and how many were raised, how critical and if any open. The recommendation made in the 2011 Review required that activation of contingency plans (other than BCC activation) should be recorded in a central register. The SOCC action was to develop "a system of logging tests and events relating to significant disruptions which have occurred."	identification of errors and weaknesses; ▪ Recording of corrective and improvement actions in an action log and monitoring of action completion. [SAOI 3] Review the process of handling and closure of tests actions to ensure that issues are critically reviewed and by which stakeholders the shortcomings are assessed. [SAOI 5] A formal test register should be implemented to record details of the tests and actions arising from the tests. [SAOI 4]				

Recommendation No.	AMS Element / Effectiveness Criteria Finding	Elements of Recommendations	Actions	By Whom	Document Reference	Status
	The system adopted was the System Disturbance Advice (SDA) system. The review found that the use of SDAs does not provide a system for recording the activation of contingency plans. The response from SOCC to the review was: "The System Disturbance process is on its own. This process is not part of contingency management. The system disturbance process is only to capture data". On this basis the recommendation of the 2011 Review has not been addressed. [11/05-3]					
2012/19	9.1 The test of July 2011 showed that not all tests could be carried out due to civil works at the Head Office Emergency Control Centre. Reviewer did not see a severe weather contingency plan for NOCC.	Carry out a risk analysis of the complete suite of contingency scenarios to ensure that all likely threats to responses are systematically evaluated and appropriate responses designed. For example the current set of responses does not include the event of maintenance and construction works being performed at the back up facility.[SAOI 6]	Conduct annual Emergency Management Risk Review Workshop to review the updated Emergency Management Plan for East Perth Control Centre. This will be further discussed and evidence provided during the special area of interest review.	Branch Manager Network Operations		Completed
2012/20	12.1 Whist there are documented program for review and update of key documents and several documents showed review, various documents showed that their review cycles had not been maintained and no indication was available of the reasons for the delay. In some cases the due date of	There is a need to adopt a methodology defining document review cycles and maintaining them, and to apply the methodology consistently to all documentation across the board, to avoid conflict between documents and registers control information. [26] [6,14,15,16,17,23, PRIP2011 11/01-4]	1. Conduct a review to determine the extent and underlying reasons for inconsistent document control discipline over key documents	Chief Information Officer IT	DM 12055645	Completed
			2. Develop a plan to address shortfalls, if necessary with a supporting business case for executive approval.		DM 12055645	Completed

Recommendation No.	AMS Element / Effectiveness Criteria Finding	Elements of Recommendations	Actions	By Whom	Document Reference	Status
	the next review was recorded within the document which is a requirement of the Document Management procedures, however this is not consistently applied and may be a cause for inconsistency.					
			3. Implement agreed actions by dates specified in the plan.		DM 12055645	Agreed actions will be implemented by 30/04/2014.

~ END OF REPORT ~