



# Safety Management System Annual Performance Report 2017/18

September 2018



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## 1. Annual performance reporting - ENSMS

The Electricity Network Safety Management System (ENSMS) is a collection of inter-related strategies, policies, procedures, Formal Safety Assessments (FSAs), plans and standards which govern the behaviour of Network Operators in relation to the safety and management of their electricity network.

Essential Energy's ENSMS and the Electrical Safety Policy (CECP8096) have been developed in light of and/or to assist in achieving/meeting the primary objective of safety network systems, which is to take all reasonable steps to ensure that the design, construction, commissioning, operation and decommissioning of the network, or any part of its network, is safe (clauses 5 and 6 of the *Electricity Supply (Safety and Network Management) Regulation 2014*).

The following systems are key to Essential Energy's ENSMS;

- > Business Management System (BMS) – also called the Policy Library
- > TotalSAFE - Workplace Health and Safety Management System (WHSMS).

Regular inspection and maintenance of network assets is intended and/or assists in maximising the technical life and minimise safety and network risk associated with assets. Essential Energy has engaged in a program of scheduled inspections and maintenance to systematically address the maintenance requirement of their electricity network. Additionally, Essential Energy has developed tools to facilitate maintenance to assets outside the scheduled maintenance program when required.

### 1.1 Safety and reliability of the network operator's network

#### 1.1.1 Programs and activities undertaken to maintain or improve the safety and reliability of the network operator's network

Essential Energy undertakes significant programs of work aimed at maintaining or improving the safety and reliability of the network. This 'business as usual' activity includes network planning, design, construction, operation, maintenance, renewal and disposal built from many years of experience as a Distribution Network Service Provider (DNSP).

New and ongoing programs and initiatives outside of these business as usual activities are provided in Table 1.

**Table 1 - Programs/Initiatives undertaken to improve safety and reliability of the network**

Program/Initiative	Description	New/ Ongoing
Refresh of Network Safety and Environment and Reliability Strategies.	The Network Safety and Environment and Reliability Strategies have undergone major reviews. These now set the objectives and strategic priorities for the next 5 years to ensure Essential Energy achieves the performance objectives in these areas.	Ongoing.
Development and implementation of Asset Risk, Value and Risk-Informed Optimisation Frameworks.	The Asset Risk, Value and Risk-Informed Optimisation Frameworks set out the approach to risk-based asset management. The frameworks establish the approach to risk management and to maximising the value from investments on the network.	Ongoing.
C55 – Implementation of Asset Investment and Planning System. Risk prioritisation tool assigned at a portfolio level.	The Asset Investment and Planning System implements the Asset Risk and Value Frameworks and supports the portfolio optimisation process. This helps Essential Energy to focus investments on delivering optimal value through quantifying the benefits, risks and costs of network capital investment programs.	Ongoing.

Program/Initiative	Description	New/ Ongoing
Enterprise Asset Management System.	Essential Energy has begun the process of reviewing its Enterprise Asset Management system to improve data accuracy and asset management decision making.	Ongoing.
Risk-Based Scheduling.	Essential Energy has begun work to develop a risk-based scheduling approach that will efficiently bundle work tasks together, thereby delivering improved risk reduction per dollar invested.	New.
Updated Aerial Inspection Survey Strategy. Pre-Summer Bushfire Inspection (PSBI) program Engineering Lidar/High Definition (HD) Imagery program LiDAR Vegetation program.	This updated aerial inspection strategy allows for accurate scoping of over 60 per cent of the network including the highest bushfire risk areas on an annual basis.  The strategy includes an annual visual patrol of high fire risk zones. Continuation of the Aerial Patrol & Analysis (AP&A) program, including LiDAR and HD photography, as an enhanced condition monitoring program for assets.	Ongoing.
Development of Task Rectification Priority (TRP) priority classification for all overdue tasks.	This reporting tool takes account of the safety and reliability impacts of failures and prioritises accordingly.	Ongoing.
Detailed Safety Factor Calculations for Poles.	A detailed safety factor calculation is a more comprehensive assessment of a poles condition, residual strength and serviceability. This allows a better risk assessment of individual poles following an inspection.	New.

### Safety and Environmental Audits

The Health, Safety and Environment (HSE) Audit and Assurance team forms part of the HSE Risk, Audit and Investigation division. The objective of the audit and assurance program is to support and validate Essential Energy safety managements systems.

The HSE Assurance Program is designed to:

- > determine whether the safety systems conform to the expected arrangements and requirements of relevant standards;
- > measure the effectiveness of the safety systems in meeting the organisations objectives and targets, including preventing injury, illness or environmental harm and identifying and mitigating risks within the workplace or from activities;
- > determine whether the safety systems have been properly implemented and maintained;
- > assist the organisation to identify gaps in system planning arrangements, processes, procedures or instruments (tools and forms); and
- > provide information to management and workers to implement illness, injury and environmental prevention strategies in response to audit findings.

Essential Energy maintains certification to AS/NZS 4801 Safety Management Systems and AS/NZS ISO 14001 Environmental Management Systems. Both standards require an internal audit process to objectively review and maintain our safety systems.

In 2017/18 the HSE audit and assurance team completed 11 major audits and follow-up audits on safety and environmental risks in 2017/18. These are listed in Table 2.

**Table 2 - Audit of risk areas in 2017/18**

No	Area of Audit in 2017/18
1	Bushfire Management
2	Operational Risk - 14. Exposure to environmental elements
3	Operational Risk - 18. Exposure to sound or sound pressure
4	Operational Risk - 20. Exposure to threats or acts of violence from customers and / or third parties
5	AS/NZ 4801:2001 and ISO 14001:2004 Compliance Audit Q2
6	AS/NZ 4801:2001 and ISO 14001:2004 Compliance Audit Q4
7	Contractor HSE Compliance Audit - Trenching and Under-boring Systems
8	Contractor HSE Compliance Audit - Vegetation Systems
9	Investigations audit 1 - Vehicle and Plant Pre-Operational Inspections
10	Investigations audit 2 – Vehicle Incident Trend Analysis
11	Investigations audit 3 - Asset Inspectors Hazardous Chemical Management

All actions raised from internal audits are allocated a specific timeframe and responsibility is tracked through our safety incident reporting system TotalSAFE. Identified non-compliances for 2017/18 within the ENSMS are provided in table 3.

**Table 3 - Identified non-compliances within the ENSMS from safety and environmental audits**

Identified non-compliances	Actions against non-compliances	Progress of actions
Exposure to Threats or Acts of Violence from External Parties Access requirements under the Electricity Supply Act.	Policies and procedures to be reviewed to ensure consistency with the Electricity Supply Act.	Policies and procedures to be reviewed to reflect access and notification requirements.
AS/NZS 4801 and ISO 14001 Compliance Audit (Element 2 - Planning) Documentation used in the Health Safety Environment Management System (HSEMS) requires review to align with new ISO14001:2015.	Complete the review of HSE environmental procedures.	Ongoing project to review and update components of the HSEMS.
IPART contracted audit of Essential Energy's ENSMS identified non-compliances with Formal safety Assessment scope, risk assessment process and stakeholder engagement.	Identified actions to be resolved within identified timeframes in 2018-19.	In progress.

## Safety and Environmental Investigations

The HSE Investigations team forms part of the HSE Risk, Audit and Investigation division. Essential Energy utilises the Incident Cause Analysis Method (ICAM) to:

- > identify contributing factors and latent hazards
- > review the adequacy of existing controls and procedures
- > report the findings
- > recommend corrective actions which can reduce risk and prevent reoccurrence
- > detect organisational factors that can be analysed to identify specific and reoccurring problems
- > identify key learnings for distribution.

The Safety and Environmental Investigations team completed 134 ICAM level investigations. The ICAM investigations identified 214 actions to be taken in response to the various incidents, with 202 completed at the time of this report. The majority of investigation findings relate to addressing the human factors or errors associated with the incident.

In reviewing the safety and environmental investigations for 2017/18, five actions were identified as potential non-compliances within the ENSMS and are summarised in table 4.

**Table 4 - Identified non-compliances within the ENSMS from safety and environmental investigations**

Identified non-compliances	Actions against non-compliances	Progress of actions
Non-compliances in CEOP5125 Network Asset testing and commissioning. To address commissioning and decommissioning of network assets.	Internal review of CEOP5125 Network Asset testing and commissioning to address identified non-compliances. Treatment Action Plan aligns with this investigation	Implemented.
Non-compliances within CEOP2018 Polarity & Neutral Identification.	Internal review of CEOP2018 Polarity & Neutral Identification.	Implemented.
Non-compliances within CEOP8030 Electrical Safety Rules to ensure adequate direction is provided for all workers (including ASP workers), in relation to the requirement for a Competent Assistant working at the customer's connection point and the requirement to be attached while working at height on private assets supporting uninsulated service mains.	Internal review of CEOP8030 Electrical Safety Rules to address identified non-compliances	Ongoing. Partial changes completed in August 2017. Further amendments are due for completion by 30 November 2018.
Non-compliances within CEOP8049 Network Authorisation Requirements to ensure adequate direction is provided for ASPs in relation to required authorisations and competencies to perform the role of a competent assistant. Coverage is required for Over Head (ladder and EWP) and Under Ground.	Internal review of CEOP8049 Network Authorisation Requirements to address identified non-compliance.	Implemented.
Non-compliance within CEOM7097 Overhead Design Manual to address clearances over waterways.	Internal review of CEOM7097 Overhead Design Manual to address identified non-compliances.	Implemented.

## **1.2 Advice to the public about hazards associated with electricity in relation to the network operator's network**

### **1.2.1 Programs and activities undertaken to promote the public knowledge and understanding of electrical network safety hazards**

Analysis of public safety incidents forms the basis of Essential Energy's Public Electrical Safety Awareness Plan (PESAP) and has informed the development of targeted programs and campaigns to increase public awareness of potential risks associated with Essential Energy's network and reduce the occurrence of public safety incidents.

Essential Energy completes regular reviews of public safety incidents. The key criteria includes:

- > risk context including latest information from SafeWork NSW;
- > detailed data analysis of public safety incidents including:
  - specific industry sectors;
  - cluster location of incidents;
  - objects involved;
  - network assets involved;
  - types of workers involved; and
  - root cause analysis.
- > investigation reports including ICAM analysis;
- > threat/barrier diagrams.

The review assists Essential Energy in determining the effectiveness of its controls and programs. Through the preparation of the annual PESAP (CEOP8005) targeted initiatives are developed to address at-risk industry. The 2017-18 PESAP is attached as an Appendix to this report.

## **1.3 Management of bushfire risk relating to electricity lines and other assets of the network operator's network that are capable of initiating bush fire**

### **1.3.1 Programs and activities undertaken to maintain or improve the management of bushfire risk associated with the network operator's network**

Essential Energy has implemented and is in the process of implementing additional programs and initiatives associated with bushfire risk mitigation as set out below. This work includes the continued enhancement of existing programs initiated following a review of the Victorian Bushfires Royal Commission recommendations.

#### **Bushfire Mitigation Capex Programs**

Essential Energy has a range of Capital expenditure (Capex) programs directly related to Bushfire Mitigation. Examples include:

- > Overhead substation refurbishment program
- > Pole Top refurbishment programs
- > Replacement of Bare Overhead Conductor program.

#### **Bushfire Mitigation Opex Programs**

Essential Energy's network Operating expenditure (Opex) is predominantly related to inspection and maintenance activities, accordingly a large component of the Opex program investment directly contributes to the mitigation of bushfire risk. Examples include:

- > Public education programs and information provision (e.g. Public Safety Group information and communications to agri-businesses)
- > Website information
- > Operation and maintenance of protection schemes and systems
- > Aerial Patrol Inspections and Analysis
- > Vegetation management programs

- > Lidar inspection
- > Ground line pole and line inspection (including inspection of private lines)
- > Zone substation maintenance
- > Pole and line maintenance.

### Bushfire Mitigation through Asset Management

Asset management functions also contribute to mitigation of network caused fires for both existing, and new assets, through activities such as:

- > Standards and policies relating to design, planning, procurement and construction
- > Adoption of industry standards, codes, and guidelines, and national or international standards
- > Research and development
- > Risk management practices.

Specific Bushfire Risk related programs and initiatives, new or ongoing are captured in Table 5 below.

**Table 5 - Bushfire Risk related programs and initiatives (New or Improved)**

Program / Initiative	Hazard (Safety / Reliability)	Description	New / Ongoing
Engagement with NSW Rural Fire Service (RFS).	Public Safety, Bushfire Risk.	Essential Energy has engaged with RFS in numerous Forums. Senior Staff from the RFS briefed Essential Energy on the upcoming Fire Season.  Essential Energy has attended the RFS Pre-season Multi-Agency Briefing and Workshop and the RFS State Operations Exercise  Essential Energy has representatives on the District Bush Fire Management Committees (BFMC's) who meet multiple times throughout the year to review Bushfire Hazards  Essential Energy has been provided access to the RFS ICON system. This is their live operational system and includes weather forecasting, fire observations and predictions and predicted extreme fire conditions.	New/ Ongoing.
Engagement with Industry.	Public Safety, Bushfire Risk.	Essential Energy facilitated a Phoenix Fire Risk Modelling Industry day with NSW utilities, RFS and Melbourne University. The focus of the day was on improving understanding of the Phoenix Fire Modelling product and the results of recent modelling for NSW Network Operators	New.
Engagement with Industry.	Public Safety, Bushfire Risk.	Essential Energy attended and presented at the Bushfire Mitigation Industry day. This Industry day is aimed at discussing and sharing latest developments, initiatives, knowledge and emerging issues from within their organisations regarding Bushfire Mitigation.	New/ Ongoing.
Engagement with Industry.	Public Safety, Bushfire Risk.	Essential Energy attended and presented at the Utility Arborists Association of Australia Annual Conference. Topics included utility vegetation management.	New/ Ongoing.

Program / Initiative	Hazard (Safety / Reliability)	Description	New / Ongoing
Major Revision of Essential Energy's Bushfire Risk Strategy.	Public Safety, Bushfire Risk.	Commenced a review process for the Bushfire Risk Strategy including development of the Fire Formal Safety Assessment.	Ongoing.
Electricity Industry Safety Steering Committee Guideline (ISSC3) for Managing Vegetation Near Power Lines - Compliance Planned Implementation.	Public Safety, Bushfire Risk.	Essential Energy has developed and is implementing a plan to achieve ISSC3 compliance on a prioritised basis as approved by IPART.	New.
Bushfire Mitigation Index revision – based on fire modelling.	Bushfire Risk.	An updated Bushfire Mitigation Index has incorporated the new Bushfire Risk Classification from the Phoenix modelling. This allows greater understanding of the bushfire risk of the network.	Improved and Ongoing.

Identified non-compliances relating to the management of bushfire risk associated with the network both planned and in progress are captured in Table 6 below.

**Table 6 - Non-compliances relating to the management of bushfire risk associated with the electricity network**

Identified non-compliances	Actions against non-compliances	Progress of actions
ISSC3 non-compliance.	Compliance plan developed and provided to IPART.	Implementation on target with plan.
Bushfire directions to private customers.	New procedures implemented, and additional resources employed to achieve compliance.	In progress. Process review completed, and additional resources employed.

### 1.3.2 Bushfire risk management report

Essential Energy's 2016/17 Bushfire preparedness report is included as an Appendix to this report.

## 2. Contextual Information

### 2.1 Deviation from Standards

Where Essential Energy deviate from (several) industry codes, guides and standards an equivalent or better outcome is achieved. In some instances, these deviations arise simply from inconsistencies between the various codes, guides and standards. In other cases, variations are historical. Essential Energy has summarised each deviation in Table 7 below, and where necessary, how an equivalent or better outcome is achieved.

**Table 7 - Deviations from Standards**

Deviation Description	Justification
<p>AS/NZS 7000:2016 Overhead line design and the associated Handbook HB331</p> <ul style="list-style-type: none"> <li>a. Essential Energy has adopted the industry practice in electing to use the prior version of AS 1720 Timber Structures relating to strength of utility poles and not the latest version of AS 1720. Recent research by the Energy Network Association (ENA) Poles Committee confirms modern re-growth poles are not as strong as historically sourced forest poles.</li> <li>b. Tables 3.6 Insulated Services and 3.7 Clearance to Structures are less than the requirements of the NSW SIR's.</li> <li>c. Section 33.8 Country Line Crossings requirements of HB331.</li> </ul>	<ul style="list-style-type: none"> <li>a. Based on historical Industry experience, and the fact we monitor residual pole strength through its life, AS/NZS 7000 has, to date, not altered its assumption on pole fibre stress</li> <li>b. This is covered in a Note to the respective Tables i.e. that jurisdictional Rules apply (see also comments for AS/NZS3000)</li> <li>c. This section of the Handbook was included at the request of WA, is not 'normative', and the same experiences have not been evident in NSW. Adding aerial markers reduces ground clearance.</li> <li>d.</li> </ul>
<p>AS/NZS 3000 Wiring Rules. Table 3.8 Insulated Services.</p>	<p>As with AS/NZS 7000 the jurisdictional rules (i.e. NSW SIR's) take precedence. There are also minor variances between jurisdictions for insulated services clearances and hence Essential Energy applies three different standards in the jurisdictions it supplies.</p> <p>From September 2017 (Construction Advice 17-09) all new services (including replacements) shall (wherever practicable) maintain 5.5m clearance from the roadway for the full width of the carriageway, and exceptions shall be by approval only.</p>
<p>ISSC 29 –Guideline for Pre-Climbing and Climbing Assessment of Poles Section 12 and Appendix 3 – marking of Private Poles.</p>	<p>Essential Energy has chosen not to put these large yellow labels on farm poles recognising the legacy maintenance and inspection arrangements regarding LV poles on farms.</p>
<p>Rigging Codes (Various) – size and type of rope (e.g. 16mm fibre rope).</p>	<p>The Electricity Supply Industry uses polypropylene rope (of smaller size in some cases) because of its insulating properties. At one point, we had a 'formal' exemption for this under the Construction and Safety Act and Regulations of the day. Particularly in the Live HV work arena, we know exactly what loads we handle. Our tools and equipment are designed for 16mm and 12mm poly rope, and smaller in some instances such as tail ropes.</p>

Deviation Description	Justification
DRAFT AS 3891.2 – 2017 and old EC10 – 1992 (relating to Aerial Marking).	Requires the second and third structure either side of an overcrossing to be marked with a 300mm yellow disc on the approach side. Legacy situations exist with alternate marking arrangements (e.g. first and second structure or one structure only).

## 2.2 Significant Community Infrastructure

For the purposes of incident reporting, Essential Energy considered the following to be significant community infrastructure:

- > Albury Base Hospital
- > Coffs Harbour Base Hospital
- > Dubbo Base Hospital
- > Lismore Base Hospital
- > Manning Base Hospital
- > Orange Health Service
- > Port Macquarie Base Hospital
- > Tamworth Base Hospital
- > The Tweed Hospital, and
- > Wagga Wagga Base Hospital.

### 3. Formal safety assessment reviews and residual risks

Essential Energy's Risk Management Policy and Procedure sets out the organisational risk framework, principles and approach to risk management and assessment.

Essential Energy's Chief Human Resources Officer and General Manager Network Services and Executive Manager Engineering are responsible for ensuring that safety risks are managed in accordance with requirements and expectations.

#### 3.1 Classification of risk levels

Essential Energy utilises the risk rating criteria as shown in Table 8 - Common Risk Matrix in conjunction with the Table 9 - likelihood assessment. Table 10 displays the consequence assessment criteria.

**Table 8 - Common Risk Matrix**

		CONSEQUENCE				
		Insignificant	Minor	Moderate	Major	Severe
LIKELIHOOD	Almost Certain	Medium	Medium	High	Extreme	Extreme
	Likely	Low	Medium	High	High	Extreme
	Possible	Low	Medium	Medium	High	High
	Unlikely	Low	Low	Medium	Medium	High
	Rare	Low	Low	Low	Medium	Medium

**Table 9 - Likelihood Assessment Table**

	Almost Certain	Likely	Possible	Unlikely	Rare
Likelihood Criteria	Likelihood of event occurring - more than 5 times a year.	Likelihood of event occurring - more than once a year but no more than 5 times a year.	Likelihood of event occurring - more than once in 10 years but no more than once a year.	Likelihood of event occurring - more than once in 25 years but no more than once in 10 years.	Likelihood of event occurring - less than once every 25 years.

**Table 10 - Consequence Assessment Table**

	Insignificant	Minor	Moderate	Major	Severe
<b>Safety</b>	Low level injury/symptoms requiring first aid only.	Non-permanent injuries/work related illnesses requiring medical treatment.	Significant non-permanent injuries/ work related illnesses requiring emergency surgery or hospitalisation for more than 7 days.	Permanent injuries/ work related illnesses to one or more persons.	One or more fatalities Significant permanent injuries/ work related illnesses to one or more persons.
<b>Network</b>	<p><b>Corporate SAIDI: Note (1)</b> &lt; 0.25 minute</p> <p><b>Outage Duration to a small group of customers: Note 2</b> &lt; 4 hours</p> <p><b>Outage to 1 or more Sensitive Load Customers: Note (3)</b> Any event where the community/ economic impact to the customers is considered insignificant.</p>	<p><b>Corporate SAIDI: Note (1)</b> 0.25 minute to 1 minute</p> <p><b>Outage Duration to a small group of customers: Note 2</b> 4 to 12 hours</p> <p><b>Outage to 1 or more Sensitive Load Customers: Note (3)</b> Any event where the community/ economic impact to the customers is considered minor.</p>	<p><b>Corporate SAIDI: Note (1)</b> &lt; 1 minute to SAIDI exclusion threshold</p> <p><b>Outage Duration to a small group of customers: Note 2</b> 12 hours to 36 hours</p> <p><b>Outage to 1 or more Sensitive Load Customers: Note (3)</b> Any event where the community/ economic impact to the customers is considered moderate.</p>	<p><b>Corporate SAIDI: Note (1)</b> SAIDI exclusion threshold to 20 minutes</p> <p><b>Outage Duration to a small group of customers: Note 2</b> 36 hours to 1 week</p> <p><b>Outage to 1 or more Sensitive Load Customers: Note (3)</b> Any event where the community/ economic impact to the customers is considered major.</p>	<p><b>Corporate SAIDI: Note (1)</b> &gt; 20 minutes</p> <p><b>Outage Duration to a small group of customers: Note 2</b> &gt; 1 week</p> <p><b>Outage to 1 or more Sensitive Load Customers: Note (3)</b> Any event where the community/ economic impact to the customers is considered severe.</p>
	<p>Note (1) A measure of the impact of the event on the overall System Average Interruption Duration Index (SAIDI) performance calculated using the organisation's total connected customers as the base.</p>	<p>Note (2) A small group of customers is generally considered to be less than 100 non-sensitive load customers.</p>	<p>Note (3) Sensitive load customers are customers whose supply is substantively Network reliant and where an interruption to their Network supply has the potential to cause widespread community or economic impact.</p>		

	Insignificant	Minor	Moderate	Major	Severe
<b>Finance</b>	<= \$250k	= \$250K - \$5M	= \$5M - \$25M	= \$25M - \$50M	> \$50M
<b>Compliance</b>	Indication of interest from Regulator No fines incurred but administration costs may be payable No litigation.	Warning/ notifications from Regulator Minor financial penalties Short term duration litigation.	Medium financial penalties Medium duration litigation.	High financial penalties Lengthy litigation.	Significant financial penalties Potential jail term for individuals Extensive litigation Loss of Operational Licence.
<b>Customer</b>	Grade of service >75% (GOS = % of calls answered within 30 secs – Emergency Line) Minor increase in call wait time (General Enquiries) Service Other completion > 90%.	Grade of service 75%-50% Call wait time 10 to 30 minutes Service Other completion 75%-89%.	Grade of service 49%-34% Call wait time 31 to 60 minutes Service Other completion 60%-74%.	Grade of service < 35% Call wait time > 60 minutes Service Other completion 50%-59%.	No communication channels available Service Other completion < 50%.
<b>Reputation</b>	Public concern restricted to local complaints or intra-industry knowledge / awareness.	Attention from media and or heightened concern from local community / external stakeholders Criticism from multiple sources for one or two days.	Adverse national media/public/stakeholder attention sustained over 1-2 weeks.	Significant adverse national media/public/stakeholder' s attention sustained over 1-2 weeks Loss of confidence by State government minister Directive to amend practice received from regulators.	Significant adverse national media/public/stakeholders' outcry Sufficient outcry to cause irreparable damage to brand Ministerial enquiry / Royal Commission.
<b>Environment</b>	Limited localised damage to minimal area of low significance.	Minor impact on biological or physical environment or heritage item over a limited area Little or no need for remediation.	Moderate damage over a large area or affecting ecosystem, or heritage item Moderate remediation is required.	Serious widespread, long term damage to ecosystem or heritage item Significant rectification is required.	Very serious long term, wide spread impairment of ecosystem or heritage item.

### 3.2 Risks within the scope of the ENSMS

Table 11 provides a description of the worker, public, environmental and loss of supply risks incorporated into Essential Energy's ENSMS.

**Table 11 - Business Risks within scope of the ENSMS**

AS5577 Reference	AS5577 Principle	Relevant Business Risk	Business Risk Definition
1.2 a (i)	The safety of persons near or working on the network.	1.1 Exposure to unintended discharge of electricity.	An incident involving an unintended discharge of electricity on or near the network that could result in fatality or permanent injury to a worker.
1.2 a (i)	The safety of persons near or working on the network.	1.2 Exposure to hazardous chemicals / materials.	An incident involving exposure to hazardous chemicals/materials (including but not limited to asbestos, lead, acid and other chemicals, PCB, SF6, ozone and/or contaminated soil/water) in one or more forms (solid, liquid, gas and particulate) that could result in fatality or permanent injury to a worker. The event may have resulted from an incident involving loss of control, or in normal controlled activities (e.g. storage, handling, production, transport, recycling, or disposal).
1.2 a (i)	The safety of persons near or working on the network.	1.3 Fall from height.	An incident involving a fall from one level to another that could result in a fatality or permanent injury to a worker.
1.2 a (i)	The safety of persons near or working on the network.	1.4 Motor vehicle accident.	An incident involving a motor vehicle accident (during the course of work related duties) that could result in a fatality or permanent injury to a worker. This excludes work related to mobile plant.
1.2 a (i)	The safety of persons near or working on the network.	1.5 Unintended contact with mobile plant.	An incident involving unintended contact with mobile plant that could result in a fatality or permanent injury to a worker. This includes an event where mobile plant collides/contacts with other mobile plant or a fixed object or person.
1.2 a (i)	The safety of persons near or working on the network.	1.6 Struck by falling or moving object.	An incident involving an object falling from height or moving in an uncontrolled manner that could result in a fatality or permanent injury to a worker.

AS5577 Reference	AS5577 Principle	Relevant Business Risk	Business Risk Definition
1.2 a (i)	The safety of persons near or working on the network.	1.7 Incident while undertaking lifting operations.	Incident while undertaking lifting operations that could result in a fatality or permanent injury to a worker.
1.2 a (i)	The safety of persons near or working on the network.	1.8 Uncontrolled collapse of excavation work.	An incident involving unintended ground/earth movement due to Company works that could result in a fatality or permanent injury to a worker. Excludes damage to infrastructure caused by the excavation.
1.2 a (i)	The safety of persons near or working on the network.	1.9 Breach of a controlled worksite when working near or around traffic.	An incident involving a breach of a controlled worksite by company vehicles or general traffic that could result in a fatality or permanent to a worker.
1.2 a (i)	The safety of persons near or working on the network.	1.10 Exposure to Hazardous Manual Tasks.	The worker suffers body stress either from prolonged poor posture in the office environment, repetitive movements or from an incident caused by lifting, carrying or putting down objects whilst at work.
1.2 a (i)	The safety of persons near or working on the network.	1.11 Exposure to mental stress.	Worker(s) experiences trauma or similar response which impacts their mental health.
1.2 a (i)	The safety of persons near or working on the network.	1.12 Uncontrolled release of a pressurised substance.	An incident where there is an uncontrolled release of a pressurised substance which has the potential to or does cause an injury to a worker e.g. a gas release/explosion resulting in burns to a person or hydraulic pressure release resulting in injury.
1.2 a (i)	The safety of persons near or working on the network.	1.13 Slips, trips and falls.	A worker is injured as a direct result of the action of falling, kneeling or trying to recover from a slip, trip or a fall.
1.2 a (i)	The safety of persons near or working on the network.	1.14 Exposure to environmental elements (heat and cold).	A worker is injured due to exposure to extreme cold or heat environment whilst at work e.g. frostbite, hypothermia, sunstroke, dehydration, heat exhaustion.
1.2 a (i)	The safety of persons near or working on the network.	1.15 Exposure to non-ionising radiation.	A worker is exposed to non-ionising radiation (visible lasers, infrared, microwaves, radio waves and low frequency) above recommended safety thresholds.

AS5577 Reference	AS5577 Principle	Relevant Business Risk	Business Risk Definition
1.2 a (i)	The safety of persons near or working on the network.	1.16 An incident while working in a confined space.	A worker is injured or at risk as a direct result of accessing a confined space. (As defined in the NSW Work Health and Safety Regulation 2011).
1.2 a (i)	The safety of persons near or working on the network.	1.17 Striking object with part of the body.	A worker strikes an object with the part of their body. It includes rubbing or chafing.
1.2 a (i)	The safety of persons near or working on the network.	1.18 Exposure to sound or sound pressure.	A worker may be exposed to prolonged or sudden noise which Essential Energy was a contributing factor to the incident.
1.2 a (i)	The safety of persons near or working on the network.	1.19 Exposure to a biological hazard including flora/fauna.	An incident as a result of a worker exposed to a biological hazard of human or non-human origin.
1.2 a (i)	The safety of persons near or working on the network.	1.20 Exposure to threats, abuse or acts of violence from customers or third parties.	A worker has suffered as a result of exposure to abuse, threats or acts of violence by a member of the public or third party whilst at work.
1.2 a (i)	The safety of the public.	Public safety risk, including the identified hazardous events: <ul style="list-style-type: none"> <li>&gt; Failure to identify overhead electrical assets</li> <li>&gt; Failure to identify underground electrical assets</li> <li>&gt; Breach of worksite control by public worker or members of the public</li> <li>&gt; Asset failure (due to design, inspection or maintenance issues)</li> <li>&gt; Unauthorised access to network assets including electrical substations.</li> </ul>	An incident where Essential Energy assets or work practices create an adverse impact for public workers and / or members of the public (excluding loss of supply).

AS5577 Reference	AS5577 Principle	Relevant Business Risk	Business Risk Definition
1.2 a (iii)	Safety aspects arising from protection of the environment, including protection for ignition of fires.	2.2 Major fire caused by the Network or Network activity.	A major fire caused by our Network or Network activity resulting in injury or loss of life or damage to the environment.
1.2 a (iii)	Safety aspects arising from protection of the environment.	6.1 Polluting the environment.	Leak, spill, or discharge of a contaminating substance (such as sediment, oil, fuels, contaminated water) into the environment.
1.2 a (iii)	Safety aspects arising from protection of the environment.	6.2 Unauthorised development or damage to Flora/Fauna or Heritage.	Failure to adequately prepare or comply with environmental assessment/internal guidelines thereby breaching requirements or damaging flora, fauna, or heritage without authorisation.
1.2 a (iii)	Safety aspects arising from protection of the environment.	6.3 Reportable waste and contamination incidents.	Failure to appropriately manage wastes, contaminated land, PCB's or pesticides, thereby breaching requirements.
1.2 a (iii)	Safety aspects arising from protection of the environment.	6.4 Reportable Excessive and Intrusive Emissions.	Emissions such as noise, dust/fumes breaching requirements exceeding levels acceptable to the community excluding electro-magnetic fields (EMF). The risk associated with community exposure to EMF is covered at an operational level.
1.2 a (iv)	Safety aspects arising from the loss of electricity supply.	2.1 Performance of the Network is inadequate (reliability & capacity) to meet customer supply expectations.	Outages and situations where the quality and capacity of electricity supply experienced by customers does not meet their expectations. Poor quality supply may mean an absence of supply, or the various deviations from standard supply voltage or frequency that have a negative impact on the way in which customers are able to use electricity.

### 3.3 Risk Evaluation Outcomes

During 2017/18, major reviews of the Worker Safety, Public Safety, Environment and Loss of Supply Formal Safety Assessments were undertaken. This section details the main outcomes from the reviews, including for those hazardous events where:

- > Additional reasonably practicable controls were identified
- > No additional reasonably practicable controls were identified, but the residual risk was 'Medium' or higher.

As stated in the introduction to Section 3, risks for safety are accepted as being managed SFAIRP once all known reasonably practicable measures have been or are in the process of being implemented (consistent with industry standards and practice, and economic prudence and efficiency).

Risk evaluation tables are provided for worker safety in Table 12, public safety in table 13, environmental in table 14, and loss of supply in table 15.

**Table 12 - Worker Safety Risk Evaluations**

Hazardous event	Current residual risk	Would it be reasonably practicable to implement additional controls, or calibrate existing controls, to further reduce the risk?	Potential controls to eliminate or minimise threat	Comments on elimination or minimisation practicability	Status
An unintended discharge of electricity.	High.	It may be practicable to reduce the risk of contact with energised assets with additional controls to eliminate or minimise the risk SFAIRP.	<ol style="list-style-type: none"> <li>1. Rollout implementation plan for CEOP5125 for Network Asset testing and Commissioning</li> <li>1. Review CEOP8002 with a view to implement the Live Line setting on all new reclosers and existing reclosers as per the maintenance cycle.</li> </ol>	<ol style="list-style-type: none"> <li>1. Determined practicable. This procedure will assist in the testing and commissioning of network assets reducing the potential risk from an unintended discharge of electricity</li> <li>2. Determined practicable. A pilot trial will inform the potential changes to the procedure and therefore the potential settings for all new and existing reclosers.</li> </ol>	<ol style="list-style-type: none"> <li>1. Implemented</li> <li>2. Ongoing. A revised policy has completed an internal review. However, further external review is required as part of the trial and finalisation process.</li> </ol>

Hazardous event	Current residual risk	Would it be reasonably practicable to implement additional controls, or calibrate existing controls, to further reduce the risk?	Potential controls to eliminate or minimise threat	Comments on elimination or minimisation practicability	Status
Hazardous chemicals / materials.	Medium.	It may be practicable to reduce the risk of contact with hazardous chemicals and materials with additional controls to eliminate or minimise the risk SFAIRP.	<ol style="list-style-type: none"> <li>1. Monitor roll out of updated Chem-Alert program and training</li> <li>2. Implement an effective asbestos management program within Essential Energy.</li> </ol>	<ol style="list-style-type: none"> <li>1. Determined practicable. This will address a February 2017 audit recommendation in relation to the use of the Chem-Alert program and training</li> <li>2. Determined practicable. This action will address procedural breaches of asbestos storage and disposal practices. This will be driven by a newly created role in the form of an asbestos specialist.</li> </ol>	<ol style="list-style-type: none"> <li>1. Implemented</li> <li>2. Ongoing. SafeWork NSW asbestos containing fuse removal exemption has been obtained. Policies, user guides and training has been developed to allow workers to safely undertake this work and the improvement program has now begun work on a naturally occurring asbestos review.</li> </ol>
Falling from height.	High.	It may be practicable to reduce the risk of working at heights with additional controls to eliminate or minimise the risk SFAIRP. Improvement opportunity - halo ladder attachment required to improve safety of working at heights around awnings. Improvement opportunity – partial effective control measures such as safely securing positioning ladders.	<ol style="list-style-type: none"> <li>1. Complete trial for halo ladder attachment to improve safety of working at heights around awnings</li> <li>2. Complete telecommunications site audits in accordance with 2017/18 audit schedule, include non-compliances in future work programs and update the Fixed Ladder register accordingly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Determined practicable. The trial will determine if this ladder does improve safety when specifically working around awnings</li> <li>2. Determined practicable. Specific program of work to ensure compliance with fixed ladder register.</li> </ol>	<ol style="list-style-type: none"> <li>1. Ongoing. A prototype is currently being trailed. An evaluation process will be completed following the trail to assess implementation</li> <li>2. 2017/18 schedule implemented.</li> </ol>

Hazardous event	Current residual risk	Would it be reasonably practicable to implement additional controls, or calibrate existing controls, to further reduce the risk?	Potential controls to eliminate or minimise threat	Comments on elimination or minimisation practicability	Status
Driving.	High.	It may be practicable to reduce the risk of driving with additional controls to eliminate or minimise the risk SFAIRP. Communication and safety incidents can be difficult in rural and remote locations. Improvement opportunity to automatically identify a vehicle roll-over. Improvement opportunity to ensure drivers have the necessary driver training and skills to complete the work they have been employed to do. Better application of fair and just culture in relation driver safety incidents.	<ol style="list-style-type: none"> <li>1. Implement GPS/vehicle telemetry solution to track vehicle location, speed, notify of impact or roll-over and other safety metrics</li> <li>2. Establish risk profile for drivers and implement tailored solutions e.g. defensive driver training</li> <li>3. Review the application of fair and just culture in relation to driver incidents.</li> </ol>	<ol style="list-style-type: none"> <li>1. Determined practicable. An opportunity to improve safety through technological improvement</li> <li>2. Determined practicable</li> <li>3. Determined practicable.</li> </ol>	<ol style="list-style-type: none"> <li>1. Ongoing. A Significant program redesign was required to meet quality and variability challenges. Rollout commenced in specific locations within Essential Energy which will continue in 2018-19</li> <li>2. Ongoing. External partnerships developed. Further leveraging of external partnership is required in unison with DriveSafe vehicle intelligence data. This will be completed as systems come online</li> <li>3. Ongoing. To be completed in line with DriveSafe program of work in 2018-19.</li> </ol>
Falling or moving objects.	High.	It may be practicable to reduce the risk from falling or moving objects with additional controls to eliminate or minimise the risk SFAIRP. Drop Zone and No-go Zone management activities are undertaken in accordance with the relevant sections for managing on site risks. An	Review standards for drop zones and implement outcomes of the review in managing onsite risks.	Determined practicable. Partially ineffective controls identified in the risk analysis.	Ongoing. As part of the Critical Control Framework review being undertaken in 2018/19 the risk controls for NFR 6 will be analysed to determine the most effective critical controls and identify any that need modifying or removal.

Hazardous event	Current residual risk	Would it be reasonably practicable to implement additional controls, or calibrate existing controls, to further reduce the risk?	Potential controls to eliminate or minimise threat	Comments on elimination or minimisation practicability	Status
		improvement opportunity exists to review standards for drop zones to ensure onsite risks are managed.			
Breach of a controlled worksite working near or around traffic.	Medium.	It may be practicable to reduce the risk from breach of a controlled worksite working near or around traffic with additional controls to eliminate or minimise the risk SFAIRP. Improvement opportunity to increase worker understanding of when external contractors are required to be engaged by Essential Energy to traffic control a worksite.	Review and update the Traffic Control policy for application to specific job types. Implement outcomes of the review.	Determined practicable.	Ongoing. The responsibilities and controls for traffic management have been developed into a training package that has been made available for all Essential Energy employees. This information will be reflected into relevant procedures in 2018-19.
Exposure to mental stress/ traumatic event.	Medium.	It may be practicable to reduce the risk from mental stress with additional controls to eliminate or minimise the risk SFAIRP. Improvement opportunity to develop a health and wellbeing framework to address evaluation findings and workplace survey results.	Develop a health and wellbeing framework.	Determined practicable. Organisational context in terms of restructure activities, leadership changes, new technology.	Ongoing. Mental health is one of the key pillars of the health and wellbeing framework. This work will continue to be reviewed from a mental wellbeing and risk perspective in 2018-19.

**Table 13 - Public Safety Risk Evaluation**

Hazardous event	Current residual risk	Would it be reasonably practicable to implement additional controls, or calibrate existing controls, to further reduce the risk?	Potential controls to eliminate or minimise threat	Comments on elimination or minimisation practicability	Status
<p>Failure to identify overhead electrical assets.</p>	<p>High.</p>	<p>It may be practicable to reduce likelihood of contact with overhead conductors (particularly in relation to low spans) in the following areas:</p> <ul style="list-style-type: none"> <li>&gt; General public</li> <li>&gt; Agribusiness (particularly grain industry)</li> <li>&gt; Transport</li> <li>&gt; Building / construction / demolition</li> <li>&gt; Aviation (particularly crop dusters and leisure gliders).</li> </ul>	<ol style="list-style-type: none"> <li>1. These include, Decommission overhead assets                             <ul style="list-style-type: none"> <li>&gt; Partial removal or relocation of at risk assets (poles and wires)</li> <li>&gt; Erect fences and barriers around electrical network assets (create public exclusion zones)</li> <li>&gt; Underground targeted at risk assets</li> <li>&gt; Improve visibility of powerlines</li> </ul> </li> </ol> <p>Reconfiguration of network protection operation (Implement Remote earth fault current limiting - REFCL)</p> <ol style="list-style-type: none"> <li>2. Deliver targeted safety campaigns based on the 2016/17 public safety incident data in</li> </ol>	<ol style="list-style-type: none"> <li>1. It is not reasonably practicable to remove network assets on a large scale. However, options could be applied to targeted high-risk assets. which include:                             <ul style="list-style-type: none"> <li>&gt; Targeted asset removals</li> <li>&gt; Improved targeting of high risk low spans e.g. using LiDAR and High Definition photography</li> <li>&gt; Targeted undergrounding of high risk assets</li> <li>&gt; Installation of Hi-vis markers to overhead conductors</li> <li>&gt; REFCL – dependent on findings from trials in Victoria.</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Ongoing. Strategic programs identified as part of the refreshed Network Safety &amp; Environment Strategy. Analysis of conductor strikes completed. The Low Span Rectification Strategy has been reviewed and a trial on the North Coast is currently underway as part of the implementation process. Strategy documents and a design portal are being developed as part of this process with implementation scheduled for 2018/19.</li> <li>2. Implemented.</li> </ol>

Hazardous event	Current residual risk	Would it be reasonably practicable to implement additional controls, or calibrate existing controls, to further reduce the risk?	Potential controls to eliminate or minimise threat	Comments on elimination or minimisation practicability	Status
			accordance with the plan (PESAP).		
Failure to identify underground electrical assets.	High.	It may be practicable to reduce likelihood of contact with underground cables in the following areas: <ul style="list-style-type: none"> <li>&gt; General public</li> <li>&gt; Transport</li> <li>&gt; Building / construction / demolition sector.</li> </ul>	<ol style="list-style-type: none"> <li>1. Remove/Decommission underground assets</li> <li>2. Deliver targeted safety campaigns based on the 2016/17 public safety incident data in accordance with the plan (PESAP).</li> </ol>	<ol style="list-style-type: none"> <li>1. It is not reasonably practicable to remove large sections of UG network. However, targeted removal or relocation may be an option for high risk assets</li> <li>2. Determined practicable.</li> </ol>	<ol style="list-style-type: none"> <li>1. Ongoing. Strategic programs identified as part of the refreshed Network Safety &amp; Environment Strategy</li> <li>2. Implemented.</li> </ol>
Breach of worksite control by public worker or members of the public.	High.	Determined that overall controls are working effectively for this public safety risk, but additional or recalibrated controls are being considered to address NFR 9 Breach of a controlled worksite when working near or around traffic.	Prevention of public access near all powerline work activities, including during fault and emergency works.	Whilst it is not reasonably practicable or excessively inconvenient to the public to exclude them completely where work sites exist, partial exclusion through appropriate traffic control measures is a commonly accepted approach. The extent of exclusion depends on risk factors (e.g. work type and environmental conditions). Breach of defined	Not applicable.

Hazardous event	Current residual risk	Would it be reasonably practicable to implement additional controls, or calibrate existing controls, to further reduce the risk?	Potential controls to eliminate or minimise threat	Comments on elimination or minimisation practicability	Status
				worksites by the public is very rare.	
Asset failure / inspection and maintenance issue.	High.	It may be practicable to reduce likelihood of asset failures inspection and maintenance issues.	<ol style="list-style-type: none"> <li>Investigate methods to prioritise low span defects in cultivated land areas. (This is related to the control discussed for the threat scenario Failure to identify overhead electrical assets)</li> <li>Establish process and system to identify low span defects in cultivated land areas across the footprint (low clearance maps).</li> </ol>	<ol style="list-style-type: none"> <li>Determined practicable</li> <li>Determined practicable.</li> </ol>	<ol style="list-style-type: none"> <li>Ongoing. Analysis of conductor strikes completed. A trial on the North Coast is currently underway as part of implementation process</li> <li>Ongoing. This action is impacted by the trial above. Strategy documents and a design portal are being developed as part of this process with implementation scheduled for 2018/19.</li> </ol>
Asset failure / design issues.	High.	It may be practicable to reduce likelihood of vehicle impact with roadside poles.	Prepare a priority list of black spot pole sites in consultation with the RMS and address on a case by case basis.	Determined practicable.	Implemented. Outcomes ongoing with the RMS.
Unauthorised access to network assets including	High.	Current controls for Unauthorised access to large scale network	Remove/Decommission electrical network assets.	This threat is considered to be SFAIRP. Essential Energy embarked on a	Not applicable.

Hazardous event	Current residual risk	Would it be reasonably practicable to implement additional controls, or calibrate existing controls, to further reduce the risk?	Potential controls to eliminate or minimise threat	Comments on elimination or minimisation practicability	Status
electrical stations depots and pole yards.		assets including electrical stations depots and pole yards are considered to minimise SFAIRP the risk.	Erect fences and barriers around all electrical network assets which exceed current industry standards.	wide scale refencing program several years ago which included installation of high security fencing around ground substation sites. It is not considered reasonably practicable to decommission substations to eliminate the hazard or change current fencing standards.	

**Table 14 - Environmental Risk Evaluation**

Hazardous event	Current residual risk	Would it be reasonably practicable to implement additional controls, or calibrate existing controls, to further reduce the risk?	Potential controls to eliminate or minimise threat	Comments on elimination or minimisation practicability	Status
Polluting the environment.	Medium.	It may be practicable to reduce the risk of workers polluting the environment. The 2017/18 risk evaluation identified that the control for storing PCB waste requires improvement.	Implement a risk-based approach to comply with AS 1940 in relation to existing oil storage facilities. Ensure new oil storage facilities comply with the design standards in AS 1940.	Determined practicable. This approach will assist in ensuring existing oil storage facilities comply with AS 1940 wherever practicable.	Implemented. Tool developed to enable risk assessment approach to calculating splash angles in AS 1940.
Reportable unauthorised development or damage to flora, fauna or heritage.	Medium.	SFAIRP has been achieved for reportable unauthorised development or damage to flora, fauna or heritage.	Cease all (or in high risk areas) maintenance, inspection and operational activities on network assets in environmentally sensitive areas.	It is not reasonably practicable to implement this control at this time as it is grossly disproportionate to the benefit – does not maintain a responsible, prudent and sustainable cost, or acceptable solution for customers.  Notwithstanding, partial elimination options including those identified could be applied to targeted high-risk areas such as cease work in highly sensitive environmental areas	Not applicable.

Hazardous event	Current residual risk	Would it be reasonably practicable to implement additional controls, or calibrate existing controls, to further reduce the risk?	Potential controls to eliminate or minimise threat	Comments on elimination or minimisation practicability	Status
				where alternate options are available.	
Inappropriate management of waste and contaminated materials.	Medium.	It may be practicable to reduce the risk of workers inappropriate management of waste and contaminated materials. The 2017/18 risk evaluation identified that the control for following company rules for oil management requires improvement.	Finalise the development of an overarching oil management document and identify gaps in supporting documentation.	Determined practicable. This procedure will ensure a documented and consistent business-wide approach to oil management.	Ongoing. The overarching oil management document is 80 per cent complete. Finalisation is scheduled for 2018/19.
Emissions causing nuisance to the community.	Low.	SFAIRP has been achieved for Emissions causing nuisance to the community.	Never work outside standard work hours; 7am – 5pm.	It is not reasonably practicable to implement these controls at this time on mass, as it is grossly disproportionate to the benefit – does not maintain a responsible, prudent and sustainable cost, or acceptable solution for customers.  Notwithstanding, partial elimination options including those identified	Not applicable.

Hazardous event	Current residual risk	Would it be reasonably practicable to implement additional controls, or calibrate existing controls, to further reduce the risk?	Potential controls to eliminate or minimise threat	Comments on elimination or minimisation practicability	Status
				could be applied to targeted high-risk areas.	

**Table 15 - Loss of Supply Risk Evaluation**

Threat Scenario	Current residual risk	Would it be reasonably practicable to implement additional controls, or calibrate existing controls, to further reduce the risk?	Potential controls to eliminate or minimise threat	Comments on elimination or minimisation practicability	Status
Flora and fauna.	Low.	It may be practicable to reduce the likelihood of incidents relating to flora.	<ol style="list-style-type: none"> <li>1. Undergrounding the network or fully insulating</li> <li>2. Enhancement of the Vegetation program for more effective compliance with ISSC3 clearances.</li> </ol>	<ol style="list-style-type: none"> <li>1. It is not economically viable to eliminate the risk by undergrounding or insulating the whole network, but component sections can be targeted for undergrounding and insulating as part of the strategic planning process</li> <li>2. Determined reasonably practicable.</li> </ol>	<ol style="list-style-type: none"> <li>1. Not applicable</li> <li>2. Ongoing. Plan for ISSC3 compliance agreed with IPART.</li> </ol>

## 4. Safety Risk Management Actions

The following table provides a summary of the ENSMS risk management actions completed for 2017/18. Full details are provided in Tables 12 – 15 above.

**Table 16 - Risk Management Actions – open, completed and raised**

Criteria	Number
Number of risk management actions within the ENSMS scope that were raised in the reporting year.	20
Number of open safety risk management actions within the ENSMS scope from any reporting year.	12
Percentage of safety risk management actions within the ENSMS scope completed by the due date within the reporting year.	40%

## 5. Compliance with Directions

Essential Energy was not issued with any directions by IPART under clause 13 of the Electricity Supply (Safety and Network Management) Regulation 2014 during 2017/18. Table 17 below provides the status of any directions issued by IPART.

**Table 17 - Data on Directions issued by IPART**

Total number of directions issued by IPART	Total number of directions outstanding	Number of directions outstanding not complied with by the due date
0	0	1

## 6. Outstanding directions not complied with

Essential Energy has one direction outstanding that was not complied with by the due date. The Direction was issued by IPART on 5 August 2016 and required Essential Energy to amend its Safety Management System to address the minor non-compliance of Audit Criteria 13<sup>1</sup> identified in the Bushfire Risk Mitigation Audit of NSW Electricity Operators, Essential Energy audit report dated 31 March 2016. The date that Essential Energy was required to comply with the notice was the 30 November 2017. The Direction also required two subsequent audits to be conducted to provide assurance that the changes had been made and implemented. The second stage audit involved an audit of our 2017 Bushfire Preparedness report with the audit report submitted to IPART in November 2017. The report identified that our vegetation encroachments were not achieving compliance with ISSC3 Guideline for Managing Vegetation Near Powerlines. Essential Energy submitted to IPART in April 2018 an implementation plan to achieve compliance with ISSC3, with this plan being accepted by IPART in July 2018. Essential Energy is implementing the actions in the plan and is currently on schedule to achieve compliance with ISSC3 for:

- > P1 areas by 1 October 2018,
- > P2 areas by October 2020, and
- > P3 areas by October 2021.

<sup>1</sup> IPART Electricity Networks Audit Guideline - Audit criteria 13 – The asset management system allows for adequate maintenance and monitoring of assets associated with bushfire risk (Clause 6 of the *Electricity Supply (Safety and Network Management) Regulation 2014*)

## 7. Statistical Reporting

### 7.1 Network Asset Failures

Table 18 below shows Essential Energy's asset category population or length and the associated asset failure details. Essential Energy does not apply target functional failure rates for most asset categories but have provided these where applicable.

**Table 18 - Network Asset Failures**

Asset Type	Asset population or length	Target functional failure rate	Conditional failures past due in the reporting year	Functional Failures			
				Unassisted		Assisted	
				No Fire	Fire	No Fire	Fire
Pole/tower	1,382,438	N/A	775	94	16	253	33
Pole top structures / components <sup>2</sup>	1,774,712	N/A	3,332	441	9	371	9
Conductor – Transmission / sub-transmission <sup>3</sup>	11,209 km's	N/A	28	12	2	16	1
Conductor – High Voltage <sup>4</sup>	149,610 km's	N/A	499	317	3	393	20
Conductor – Low voltage <sup>5</sup>	26,202 km's	N/A	38	291	2	219	2
Service wire <sup>6</sup>	722,297	N/A	279	1,704	6	821	16
Primary plant – power transformers <sup>7</sup>	736	N/A	153	0	0	0	0
Primary plant – distribution transformers	140,983	N/A	301	108	1	444	4
Primary plant – reactive plant <sup>8</sup>	163	N/A	7	0	0	0	0
Primary plant – switchgear	15,502	N/A	110	1	1	0	0

<sup>2</sup> Pole top structures/components are any structure that is attached to a pole to support electricity mains and apparatus

<sup>3</sup> Transmission and sub-transmission is voltages 33kV AV nominal and above

<sup>4</sup> High voltage is voltage 1kV nominal and above up to 33kV AC nominal

<sup>5</sup> Low voltage is voltages below 1kV nominal

<sup>6</sup> A service wire is the wire connecting a distribution network to a private installation

<sup>7</sup> Primary Plant – Power Transformers are transformers where the secondary/output voltage is 5kV nominal or above

<sup>8</sup> Reactive Plant is reactors and capacitors

Asset Type	Asset population or length	Target functional failure rate	Conditional failures past due in the reporting year	Functional Failures			
				Unassisted		Assisted	
				No Fire	Fire	No Fire	Fire
Secondary plant – protection equipment <sup>9</sup>	5,417	0.05 (99.5% reliability)	54	0	0	0	0
Secondary plant - SCADA	358	0.05 (99.5% reliability)	18	0	0	0	0
Secondary plant – substation batteries	696	N/A	13	0	0	0	0

## 7.2 Encroachment on Network Assets

Essential Energy has developed an implementation plan for ISSC3 compliance as agreed with IPART to achieve clearance issues identified. A significant amount of work is occurring to comply with the implementation plan, with the Priority 1 (P1) bushfire areas the first milestone to be completed by October 2018.

Vegetation encroachments on our network both inside and outside Bushfire prone areas by defect category<sup>10</sup> as well as encroachments as a result of third parties are captured in Table 19 below.

**Table 19 - Vegetation**

Criteria	Inside Bushfire prone areas <sup>10</sup>	Outside Bushfire prone areas
Category A1 defects	2,697	7,867
Category A2 defects overdue	504	400
Category A3 & A4 defects overdue	1,148	744
Total vegetation encroachments as a result of third parties	0	0

<sup>9</sup> Note that proper operation of fuses does not constitute a functional or conditional failure. Mal operation of fuses is regarded as a functional failure

<sup>10</sup> Essential Energy categorises vegetation defects as a percentage of encroachments into the minimum vegetation clearance by A1-A4. These are A1 ≥75%, A2 ≥50% and <75%, A3 ≥25% and <75%, A4 <25%

Low Ground Clearance inspections and defects are captured in Table 20 below.

**Table 20 - Ground Clearance**

Criteria	Inside Bushfire prone areas <sup>11</sup>	Outside Bushfire prone areas
Number of OH <sup>12</sup> spans for which inspections were planned	130,794 (Lidar)	57,761 (Asset Inspector)
Number of OH spans for which inspections became overdue	0	20,974
Number of OH spans for which LIDAR <sup>13</sup> inspections became overdue	0	0
Number of defects identified <sup>14</sup>	3,081	13
Number of defect rectifications that became overdue	38	0
Total ground clearance encroachments as a result of third parties	52	0

Clearance to structures defects both inside and outside Bushfire prone areas and encroachments as a result of third parties are captured in Table 21 below.

**Table 21 - Clearance to Structures**

Criteria	Inside Bushfire prone areas	Outside Bushfire prone areas
Category 1 defects	0	0
Category 2 defects overdue	0	0
Category 3 & 4 defects overdue	0	0
Total structure encroachments as a result of third parties	12	31

Rural encroachments are generally farm sheds, silos etc that reduce clearances.

Urban encroachments are most commonly associated with work on buildings – roofing, painting, extensions etc.

<sup>11</sup> EE defines Bushfire prone as “rural” network. EE does not rely on report by RFS/LGA definition

<sup>12</sup> Overhead

<sup>13</sup> Light Detecting and Ranging

<sup>14</sup> A ground clearance defect is where power lines are below the minimum safe height of that power line. Where the operating context is changed and the minimum safe height is reduced below the height of the power lines.

### 7.3 Unauthorised Access to the Network

The information provided in table 22 below relates to the number of times in 2017/18, where there has been unauthorised access to the Essential Energy Network, being either Essential Energy employees, contractors or other parties. These incidents are all logged and reported through the TotalSafe system, which is Essential Energy's reporting tool to capture Health, Safety and Environmental incidents.

**Table 22 - Unauthorised access to the network**

Criteria	Network Operator	Accredited Service Providers	General Public
Major substations and switching stations	0	0	0
Distribution substations, regulators, switches and associated equipment	0	1	14
Electricity mains outside major substations	0	0	0
Communications equipment outside major substations	0	0	0

### 7.4 Customer Safety Reporting

As shown in Table 23, there were 231 reported shocks attributed to the Essential Energy Network in 2017/18. The result is an increase of 27 per cent (49 more) compared to the current year.

The major cause continues to be Faulty Over Head Service Joints (79) and Faulty Over Head Mains Joints (48). When combined, 54 per cent of the joint failures were caused by Faulty Line Tap connectors. Essential Energy's ongoing service mains replacement program will assist in addressing faulty line tap connections as these are replaced with Insulation Piercing Connections.

When comparing overhead and underground joint failures, 65 per cent of joint failures were attributable to overhead connections, while underground connections account for just 11 per cent of the total failures.

There was a total of 338 shocks reported in 2017/18 attributable to customer installations.

**Table 23 - Customer safety reporting**

Criteria	Number
Number of customer shocks from installations caused by the ENO's electricity network	231

## 8. Appendix

Public Electrical Safety Awareness Plan 2017/18

Annual Bushfire Risk Management Report 2016/17