ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM

Electricity

IPART

Safety Management System

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LORD HOWE ISLAND BOARD POLICY

TITLE	**Electricity Network Safety Management System Policy**		
DATE ADOPTED		**AGENDA ITEM**	8(iv) November 2016
CURRENT VERSION	June 2018	**AGENDA ITEM**	
REVIEW	**5 years**	**FILE REFERENCE**	EL0002
ASSOCIATED LEGISLATION	***Electricity Supply Act 1995*** (NSW) – Section 106 empowers regulations such as: ***Electricity Supply (Safety & Network Management) Regulation 2014*** – requires network operators to ensure safety of their distribution system which includes having a safety management system in accordance with AS5777 and this policy.		
ASSOCIATED POLICIES	Bushfire Mitigation Hardship Policy		

1. Background

As a network operator, as defined under the *Electricity Supply Act 1995*, the Lord Howe Island Board (LHIB) is required under the *Electricity Supply (Safety & Network Management) Regulation 2014* to have an "Electricity Network Safety Management System" (ENSMS). AS/NZS5577 *Electricity Network Safety Management Systems* provides guidance on establishing and maintaining an ENSMS that is consistent with industry engineering, technical and safety documents. More importantly, the LHIB seeks to provide a safe and reliable electricity supply for the benefit of the community.

2. The Island Group

The Lord Howe Island Group, located 700 kilometres north-east of Sydney, includes Lord Howe Island, Admiralty Islands, Mutton Bird Islands and Ball's Pyramid as well as the associated marine areas. The Lord Howe Island Group is part of the State of NSW. The island was first settled in 1834. Today, the main industry on the island is tourism. In 1982, the Lord Howe Island Group was included on the World Heritage List, and in 2007 was one of fifteen World Heritage places to be included in the National Heritage List.

The main and only inhabited island, which is volcanic in origin, is 11 km long and between 2.0 km and 0.3 km wide. It has an area of 14.55 km2, of which only 398 hectares is in the lowland settled area. The northern and southern mountainous ends of the Island and a central section, form part of the Permanent Park Preserve (similar to a National Park).

Most of the island is virtually untouched forest with many of the plants and animals found nowhere else in the world. Other natural attractions include the diversity of its landscapes, the variety of upper mantle and oceanic basalts, the world's southernmost barrier coral reef, nesting seabirds, and its rich historical and cultural heritage.

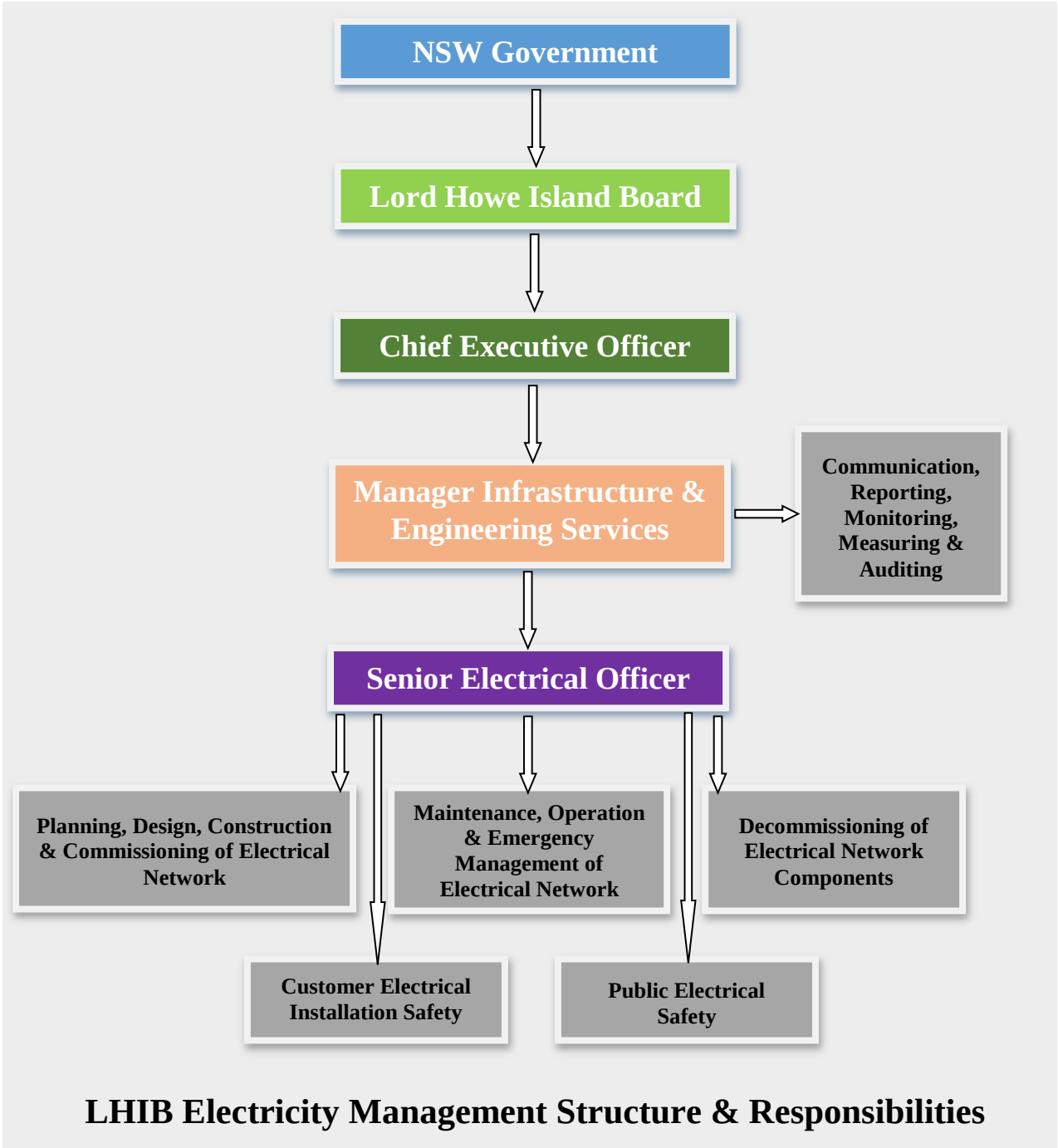
The Island's population comprises approximately 360 permanent residents and a maximum 400

tourists at any one time.

The LHIB is established under the Lord Howe Island Act 1953 and has responsibility for the care, control and management of the Lord Howe Island Group. Under the Act, the LHIB has a broad range of responsibilities and provides the majority of services and infrastructure on the Island. These include the airport, the wharf, waste management services, roads, tourism infrastructure, public buildings, wastewater oversight and the regulation, and generation and supply of electricity.

3. Management Structure and Responsibilities

The responsibility for electricity generation and reticulation on Lord Howe Island fits into the LHIB structure as follows:



LHIB Electricity Management Structure & Responsibilities

The LHIB believes that our management structure is appropriate for the small size and limited complexity of our electrical network, and we will resource any temporary deficiencies, including to fill any periods where our staff may be on leave, by the use of contractors or consultants.

The LHIB has empowered those detailed in the electricity management structure above to act in accordance with the relevant responsibilities, accountabilities and authorities detailed in the ENSMS.

4. Our Electricity Network

The Lord Howe Island Board's generates and distributes electricity via an underground electrical reticulation system servicing approximately 280 customers on Lord Howe Island only.

The electricity generation system is housed in a centrally located powerhouse and consists of 3 x 300kW Detroit Series 60 diesel generating units. In addition to this there is 1 x 450 kW Cummins C55 D5 diesel generating unit that provides backup power in the event of major failure of the Series 60 generators.

The underground electrical reticulation system is designed for a HV distribution voltage of 11kV but is currently utilized at a transmission voltage of 6.6 kV. There is approximately 13 kilometres of underground HV cable. There are no aerial conductors on the island distribution system.

Two 500 kVA padmount substations supply the HV reticulation system from the powerhouse and one 500 kVA padmount substation supplies the HV reticulation system from the standby generating unit. These three 500 kVA padmount substations utilize ABB Safelink SF6 ring main units for HV control. There are basically two 6.6kV feeders from the substations with an intertie between the two via the ABB ring main units.

The existing HV network protection systems at the Power House and standby generator are 25 amp, 6.6 kV transformer fuses.

Ten smaller padmounts substations ranging in size from 50 kVA to 150 kVA convert this HV distribution voltage to a nominal 400/230 volt 3 phase supply which is then distributed locally to all customers via underground mains. These substations utilize Hazemeyer Magnefix MD400 ring main units for HV control and both "F" frame and Quicklag circuit breakers for LV control.

The existing LV network protection systems in use on the network are:

- Eaton Series NRX 1000 amp Air Circuit Breakers with Digitrip 520 controllers located on the main powerhouse switchboard;
- Thermal/magnetic MCB's and moulded case CB's located in both padmount substations and LV distribution pillars.

Existing powerhouse generator protection is provided by Woodward EGCP-2 engine control units. Distillate fuel is stored in 1 x 34,000 litre and 2 x 17000 litre underground fuel tanks at the powerhouse and is delivered fortnightly by a contracted Lord Howe Island Sea Freight shipping agent.

The existing standby generator protection is provided by Cummins PowerCommand 2.2 engine control units with onboard diesel storage.

There is approximately 120 kW of private grid connected solar arrays on the system. These are controlled by SMA inverters with standard voltage, frequency and anti-islanding protection.

Electrical hotwater booster load is controlled by a frequency injection control system which limits the operational hours of the electrical booster systems to non- peak periods. This system is monitored on a 24 hour basis and adjusted to suit changing seasonal load profiles.

All electrical installations on the island must comply with local Lord Howe Island Electrical Service Rules which regulate electrical installations and connections in order to ensure a reliable, stable electrical supply for all customers. All electrical installations must also comply with AS/NZS 3000

Wiring Rules. All new electrical installations, additions or alterations to electrical services require the submission of appropriate application forms to allow a thorough assessment to be undertaken for these works.

All customer installations are fitted with standardized electrical demand metering and customers are charged on a quarterly basis for all electrical consumption.

The location of electrical network assets is recorded on paper and is being transferred to our Geographical Information System and a schematic representation of the network is included in our drawing system and as displayed and pinned in the Powerhouse.

Our electricity network is managed by our Senior Electrical Officer with assistance from his apprentice. Contractors are used for relief or special projects as required.

5. Purpose of the Policy

The purpose of the policy is to enable the Board to comply with the *Electricity Supply (Safety & Network Management) Regulation 2014* and more importantly to ensure:

a) The safety of members of the public, and

b) The safety of persons working on the LHIB network, and

c) The protection of property, and

d) The management of safety risks arising from the protection of the environment, and

e) The management of safety risks arising from the loss of electricity supply.

6. Policy Statement

The Lord Howe Island Board will take all reasonable steps to ensure that the design, construction, commission, operation, maintenance and decommissioning of its electrical network (or any part of its network):

- Fulfils the purpose of this policy
- Is as safe as possible and the risk from such activities is as low as reasonably practicable (ALARP) or presents a negligible risk
- Complies with relevant legislation
- Is supported by all necessary policies, plans, procedures, work instructions
- Complies with IPART electrical network safety management system reporting requirements.

When standards or requirements change, we will take steps to comply with the most recent edition to the extent that is reasonably practical.

7. Applicable Legislation

The LHIB will comply with the requirements of the following NSW legislation in regards to its electrical network:

- Electricity Supply Act 1995
- Electricity (Consumer Safety) Act 2004
- Electricity (Consumer Safety) Regulation 2015
- Electricity Supply (Safety & Network Management) Regulation 2014
- Environmental Planning and Assessment Act 1979

- Environmental Planning and Assessment Regulation 2000
- Work Health and Safety Act 2011
- Work Health and Safety Regulation 2011

8. Documents to Meet Policy Statement

The primary in-house documents that seek to fulfil the policy statement are:

- LHIB ENSMS Customer Electrical Installation Safety Plan
- LHIB ENSMS Planning, Design and Construction Plan
- LHIB ENSMS Maintenance Plan
- LHIB ENSMS Operations Plan
- LHIB ENSMS Bushfire Management Plan
- LHIB ENSMS Emergency Management Plan
- LHIB ENSMS Decommissioning Plan
- LHIB ENSMS Communication and Reporting Plan
- LHIB ENSMS Monitoring, Measurement and Audit Plan
- LHIB ENSMS Public Electrical Safety Awareness Plan
- LHIB ENSMS Formal Safety Assessments
- LHIB ENSMS Compliance Register
- LHIB Business Continuity Plan
- LHIB Risk Management Policy
- LHIB Risk Register
- Jacobs LHIB Renewable Energy Project Protection Study.

9. ENSMS Implementation

The ENSMS, including this policy and documents listed in Section 8 of this policy, have been developed to reflect existing practices and to extend on those to meet requirements introduced in recent times.

The ENSMS has been introduced in consultation with relevant stakeholders and so is considered to be implemented from the date the LHIB approves it.

10. Records

All documents that form part of the ENSMS shall be version controlled and old versions stored for future reference. All documents associated with the ENSMS shall also be stored for future reference including:

a) Legislation, standards, codes and guidelines

b) Plans for design, construction, commissioning, operation, maintenance and decommissioning of the network including and specific plans or procedures for a particular project.

c) Asset records including maps, databases, designs and as-built drawings.

d) Commissioning, operation, maintenance and audit records.

e) ENSMS records.

f) Accident/incident records.

The majority of these records will be stored at the Powerhouse by the Senior Electrical Officer and the remainder at the LHIB office. Progression to electronic copies on corporate drives is

planned in the future.

11. ENSMS Review

This policy and the complete ENSMS will be reviewed and amended as required, to meet the LHIB ENSMS Monitoring, Measurement and Audit Plan.

ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM

PART 2

CUSTOMER ELECTRICAL INSTALLATION SAFETY PLAN

This Plan was introduced in 2016 and will continue to be in effect until it is removed from service. This plan will undergo regular review in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 and AS5577-2013. This Plan will be systematically reviewed against legislation and regulation applicable to distribution and transmission network service providers, industry standards including AS5577, the Lord Howe Island Board's strategic plans and relevant internal policies, procedures and standards and our regulatory determination. This plan will be updated as necessary in line with the outcome of these reviews.

In accordance with the NSW Electricity Supply (Safety and Network Management) Regulation 2014, this Plan will be made available to all stakeholders who are likely to be involved in its implementation.

This Electricity Network Safety Management System Customer Electrical Installation Safety Plan is available on the Lord Howe Island Board's website (www.lhib.nsw.gov.au). Printed copies of this Plan are available at the Lord Howe Island Board's office – 5 Bowker Avenue, Lord Howe Island NSW 2898.

All correspondence in relation to this document should be directed to:

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Email: administration@lhib.nsw.gov.au Website: www.lhib.nsw.gov.au

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PART 2 - CUSTOMER ELECTRICAL INSTALLATION SAFETY PLAN

2.1. INTRODUCTION

This Plan is part of the Lord Howe Island Board's (LHIB) Electricity Network Safety Management System (ENSMS) and addresses the safety impacts of a customer's installation on the LHIB's electricity network.

The LHIB is committed to ensuring a safe and reliable electricity supply to all our customers by designing, operating and maintaining our electrical network to as high a standard as reasonably practicable. Our commitment also includes minimising/reducing the risk of harm to people within electrical installations.

The LHIB has developed this Plan to meet this commitment and to comply with the requirements of the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW) and AS5577-2013: Electricity Network Safety Management Systems.

2.2. INSTALLATION COMPLIANCE REQUIREMENTS

Electrical contractors and the LHIB are required to comply with but not limited to:

- LHIB Service Rules
- AS/NZS3000 Wiring Rules
- AS/NZS3000 Normative Referenced Documents
- AS/NZS3012 Electrical Installation – Construction and Demolition Sites
- Work Health and Safety Act and Regulation (NSW)

The NSW Service and Installation Rules will be used for guidance where the LHIB Service Rules are silent, but the LHIB decision on any provisions will be final.

Compliance with the following is recommended, but not essential, for all electrical contractors and the LHIB:

- AS/NZS3760 In Service Safety Inspection and Testing of Electrical Equipment
- AS/NZS4836 Safe Work on Low Voltage Electrical Installations
- National Code of Practice - Managing Electrical Risks in the Workplace

2.3. ELECTRICAL INSTALLATION WORK

2.3.1. Purchasing a Property

Prospective leaseholders on Lord Howe Island are encouraged to engage the services of a licensed electrical contractor to undertake a full electrical safety check to ensure the electrical installation within the building is safe and free from defects before purchase.

2.3.2. Maintaining an Electrical Installation

Electrical installation owners are required by law to maintain their installation so it remains safe. The LHIB encourages customers to organise regular safety checks of their electrical installations by engaging the services of a licensed electrical contractor.

2.3.3. DON'T Do-It-Yourself

Do-it-yourself (DIY) renovations and repairs have become more popular in recent times. However, DIY electrical work is not only dangerous but is also illegal in NSW. **You must always use a licensed electrical contractor** for any electrical repairs or installation work.

If you have any safety concerns, please contact the LHIB's Senior Electrical Officer for advice.

2.3.4. Process for New Installations or Additions and Alterations

The process for the connection of new installations to the network or for additions and alterations to existing installations is as follows:

a) Immediately it is known that a new supply or an addition and/or alteration is required, the appropriate application form or forms should be obtained from the LHIB's offices or website, filled in with all the required information, signed by the customer responsible for the payment of the accounts, and lodged with the LHIB.

   The 'New Installation Application for Supply' and "Notification of Proposed Additions and/or Alterations to Existing Electrical Supply" forms must indicate the full extent of the proposed installations where such information is known by the applicant at the time of making the application.

   No work should be undertaken on behalf of the customer until approval for the proposed installation has been given by the LHIB.

b) The leaseholder's licensed electrical contractor can then carry out the approved new installation or additions and alterations in accordance with the LHIB Service Rules, any conditions of the approval and AS/NZS3000 Wiring Rules including requirements for testing.

c) The LHIB Senior Electrical Officer will drill, fit and wire the Supply Authority supplied equipment on the meter panel where this is required.

d) Permission may be granted by the LHIB's Senior Electrical Officer to connect an addition to an existing final sub-circuit or the connection of an additional circuit pending a certificate of compliance and inspection. Check with the Senior Electrical Officer before connection to the supply.

e) Within 14 days of completion, the electrical contractor must submit a "Certificate of Compliance" to the Senior Electrical Officer.

f) The Senior Electrical Officer will inspect all commercial and industrial electrical works and all major works for domestic installations for all submitted "Certificates of Compliance".

   Minor electrical works for domestic installations will be inspected randomly and based on electrical contractor performance.

2.3.5. Unsafe or Defective Installations

The LHIB may disconnect premises from (or refuse to connect premises to) its distribution system if the Senior Electrical Officer reasonably considers that the electrical installation on the premises is (or is likely to become) unsafe in accordance with Section 39 of the Electricity Supply (Safety and Network Management) Regulation 2014. Section 40 of the same Regulation allows for immediate disconnection if it is reasonably considered that there is an immediate danger to life or property or an immediate risk of starting a fire if the premises continue to be connected to the distribution system.

2.3.6. Disciplinary Action for Electrical Contractors

LHIB may take disciplinary action against electrical contractors where it is known that they have:

- Undertaken defective or unsafe electrical work including non-conformance with AS/NZS3000;
- Failed to rectify breaches when notified;
- Failed to notify the LHIB of notifiable electrical installation work;

- Connected installations or electrical work without approval;
- Failed to test and therefore failed to comply with AS/NZS3000;
- Performed electrical work whilst unlicensed or using unlicensed/unqualified persons;
- Interfered with metering equipment.

Disciplinary actions are likely, depending on the seriousness of the breach, to include:

- Verbal or written notice;
- Formal interview or counselling session;
- Notification to NSW Fair Trading;
- Reassessment of the frequency and extent of electrical audits;
- Other actions as considered appropriate at the time.

The electrical contractor has the right of reply before any disciplinary action is taken.

2.4. REPORTING

LHIB will meet its reporting obligations to NSW Fair Trading for incidents involving electrical articles or electrical installations in accordance with the LHIB ENSMS Communication and Reporting Plan.

2.5. PLAN REVIEW

This plan will be reviewed and amended as required, to meet the LHIB ENSMS Monitoring, Measurement and Audit Plan.

ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM

PART 3

PLANNING, DESIGN, CONSTRUCTION & COMMISSIONING PLAN

This Plan was introduced in 2016 and will continue to be in effect until it is removed from service. This plan will undergo regular review in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 and AS5577-2013. This Plan will be systematically reviewed against legislation and regulation applicable to distribution and transmission network service providers, industry standards including AS5577, the Lord Howe Island Board's strategic plans and relevant internal policies, procedures and standards and our regulatory determination. This plan will be updated as necessary in line with the outcome of these reviews.

In accordance with the NSW Electricity Supply (Safety and Network Management) Regulation 2014, this Plan will be made available to all stakeholders who are likely to be involved in its implementation.

This Electricity Network Safety Management System Planning, Design, Construction and Commissioning Plan is available on the Lord Howe Island Board's website (www.lhib.nsw.gov.au). Printed copies of this Plan are available at the Lord Howe Island Board's office – 5 Bowker Avenue, Lord Howe Island NSW 2898.

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PART 3 - PLANNING, DESIGN, CONSTRUCTION & COMMISSIONING PLAN

3.1. INTRODUCTION

This Plan is part of the Lord Howe Island Board's (LHIB) Electricity Network Safety Management System (ENSMS) and addresses the planning, design, construction and commissioning for the LHIB's electricity network.

The LHIB is committed ensuring a safe and reliable electricity supply to all our customers through the planning, design, construction and commissioning of the electrical network and carrying out those functions to as high a standard as is reasonably practicable.

The LHIB has developed this Plan to meet this commitment and to comply with the requirements of the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW) and AS5577-2013: Electricity Network Safety Management Systems.

3.2. METHODOLOGY

3.2.1 Planning

The Senior Electrical Officer will use Maximum Demand Indicator (MDI) data to assist in planning any upgrades to the network. Planned network upgrades will be documented in the LHIB's Strategic Asset Management Plan, which is updated each year prior to March.

Other projects will be identified from time-to-time such as the Lord Howe Island Renewable Operations – Energy Supply Road-Map in 2012.

3.2.2 Project Justification

Projects will be justified through the LHIB based on:

- The need for the project including any regulatory requirement.
- Improvements to safety.
- Benefits to the environment including reduction in greenhouse gases or pollution.
- Reduction in operation and maintenance costs.
- Reduced whole of life costs.
- Consideration of alternatives, including demand management options.

3.2.3 General Requirements

All design, construction and commissioning works are to be performed in accordance with the documents as detailed in Sections 3 and 4.

Any deviation from such requirements are to be assessed and justified as to achieve at least an equivalent safety outcome through the following (as applicable):

- Formal safety assessments;
- Literature review;
- Consultant report; and
- Incident investigation outcomes.

3.2.4 Training and Qualifications

All staff, consultants and contractors involved in planning, design, construction and commissioning of the electrical network, or part thereof, shall be suitably qualified. The Senior Electrical Officer must be satisfied that all personnel involved in such activities are suitably trained, qualified and competent to perform the work.

3.2.5 Materials to be Used

All materials used for any network construction projects will comply with Australian Standards and where there is no applicable standard, with IEC standards (refer Section 4).

The standard high voltage cable to be used on the island is 16mm² Copper XLPE buried at a minimum depth of 700mm.

3.2.6 Design

Any additions or alterations to the existing network will:

- Provide safe outcomes for the community and staff.
- Use the hierarchy of safety controls to minimise risks and improve safety outcomes.
- Seek to maintain or improve reliability and availability of the electricity supply.
- Provide adequate capacity to supply present electrical needs, with allowance for future needs as deemed necessary.
- Provide adequate power quality.
- Allow detection, discrimination and clearance of faults on the network.
- Consider environmental issues and provide high quality environmental outcomes.

3.2.7 Construction

LHIB staff will complete any construction that is within their capability and if time permits. Otherwise, suitably qualified, experienced and adequately resourced contractors will be used to carry out specific projects.

Contractor selection will occur using NSW Government procurement guidelines and their safety is managed in accordance with ENA guideline NENS10 and industry practice.

3.2.8 Commissioning

Commissioning of any additions or alterations shall comply with industry standards, Australian Standards and codes of practice (refer Section 4).

Testing shall be carried out as deemed necessary to ensure the addition or alteration is safe and meets requirements.

3.3. PLANNING, DESIGN AND CONSTRUCTION STANDARDS

The following documents will be used in the design and construction of the network as required but not limited to:

- AS1824: Insulation Co-ordination
- AS2067: Substations and high voltage installations exceeding 1 kV a.c.
- AS2421: Guide to the selection and use of Power Transformers
- AS3953: Loading guide for dry-type power transformers
- Code of Practice: Electricity transmission and distribution asset management
- Code of Practice: Demand Management for Electricity Distributors
- ENA DOC 001: National Electricity Network Safety Code
- ENA DOC 014: National low voltage electricity network electrical protection guideline
- ENA DOC 015: National guidelines for prevention of unauthorised access to electricity infrastructure
- ENA DOC 019: Land Management Guidelines
- ENAEG1: Substations, earthing guide
- ENA DOC 025 EG-0 Power system earthing guide - Part 1: management principles

- ENANENS 010: National Guidelines for Contractor Occupational Health and Safety Management
- Safework Australia General Guide, Information Sheet and Code of Practice for Working in the Vicinity of Overhead and Underground Electric Lines
- Safework Australia Code of Practice - Excavation work

3.4. MATERIALS STANDARDS

Materials used in the construction of the network shall comply with but not limited to the following standards:

Low Voltage Insulated Cables	
AS 4026	Electric Cables - for underground residential distribution systems
AS 5000	Electric cables - Polymeric insulated - For working voltages up to and including 450/750 V
Low Voltage Switchgear	
AS/NZS60479	Low-voltage switchgear and controlgear - Switches, disconnectors, switch-disconnectors and fuse-combination units
AS/NZS61439	Low-voltage switchgear and controlgear assemblies
AS/NZS61009.1	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs)
HV Insulated Cables	
AS 1429	Electric cables - Polymeric insulated - For working voltages 1.9/3.3 (3.6) kV up to and including 19/33 (36) kV
High Voltage Switchgear	
AS 62271	High-voltage switchgear and controlgear
Conduit	
AS 2053	Conduits and fittings for electrical installations
Transformers	
AS 1767	Insulating oil for transformers and switchgear (IEC 296)
AS 2374	Power transformers
AS 60076.11	Power transformers - Dry-type transformers
Metering	
AS 60044.1	Instrument transformers - Current transformers
AS 60044.2	Instrument transformers - Inductive voltage transformers
AS 62052.11 AS 62053.21	Electricity metering equipment (AC)
Batteries	
AS 2676	Guide to the installation, maintenance, testing and replacement of secondary cells in buildings

3.5. RECORDS

All records pertaining to planning, design, construction and commissioning are to be retained for future reference.

“As constructed plans” are to be provided by staff or contractors for project work so the “as designed plans” on the LHIB system can be updated including any changes to but certainly not limited to:

- The island HV schematic;
- Cable route selection that will required updates to the LHIB’s GIS.

3.6. PLAN REVIEW

This plan will be reviewed and amended as required, to meet the LHIB ENSMS Monitoring, Measurement and Audit Plan.

ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM

PART 4

MAINTENANCE PLAN

This Plan was introduced in 2016 and will continue to be in effect until it is removed from service. This plan will undergo regular review in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 and AS5577-2013. This Plan will be systematically reviewed against legislation and regulation applicable to distribution and transmission network service providers, industry standards including AS5577, the Lord Howe Island Board's strategic plans and relevant internal policies, procedures and standards and our regulatory determination. This plan will be updated as necessary in line with the outcome of these reviews.

In accordance with the NSW Electricity Supply (Safety and Network Management) Regulation 2014, this Plan will be made available to all stakeholders who are likely to be involved in its implementation.

This Electricity Network Safety Management System Maintenance Plan is available on the Lord Howe Island Board's website (www.lhib.nsw.gov.au). Printed copies of this Plan are available at the Lord Howe Island Board's office – 5 Bowker Avenue, Lord Howe Island NSW 2898.

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4. ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM MAINTENANCE PLAN

4.1. INTRODUCTION

This Plan is part of the Lord Howe Island Board's (LHIB) Electricity Network Safety Management System (ENSMS) and addresses the maintenance aspects of the LHIB's electricity network.

LHIB is committed to ensuring a safe and reliable electricity supply to all our customers by maintaining our network.

The LHIB has developed this Plan to meet this commitment and to comply with the requirements of the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW) and AS5577-2013: Electricity Network Safety Management Systems.

4.2. MAINTENANCE PLAN

The LHIB electrical network must be maintained to ensure the electrical equipment is always in sound operating condition to perform the functions for which it was designed. This Plan lays out the maintenance requirements for the electrical network equipment.

4.2.1 Maintenance Standards

The LHIB will follow industry practice and use the guidance of manufacturer's instructions and the following documents for the maintenance of electrical network equipment on the island:

- AS2467 Maintenance of electrical switchgear
- AS2676 Guide to the installation, maintenance, testing and replacement of secondary cells in buildings
- AS60422 Mineral insulating oils in electrical equipment - Supervision and maintenance guidance
- AS61000.3.100 Electromagnetic compatibility (EMC) - Limits - Steady state voltage limits in public electricity systems
- LHIB Electrical Safety Rules
- EC12 Guide to working on underground cables
- EC19 Guide to the inspection of Customers' electrical installations
- ENA DOC 022 ENA Industry Guideline for SF6 Management.
- ENA DOC 025 EG-0 Power system earthing guide - Part 1: management principles
- ENA EG1: Substations, earthing guide
- ISSC3 Guide to tree planting and maintaining safety clearances near power lines
- ISSC24 Guide to Electricity Workers' Escape and Rescue Procedures
- LHIB ENSMS Operations Plan
- Safework Australia General Guide, Information Sheet and Code of Practice for Working in the Vicinity of Overhead and Underground Electric Lines
- Safework Australia Code of Practice - Excavation work

4.2.2 Non-Compliance with Standards

Should the LHIB need to perform maintenance that is a deviation from standards, codes, guidelines and/or statutory requirements, we will justify the deviation to achieve at least an equivalent safety outcome through the following (as applicable):

- A formal safety assessment
- Literature review
- Consultant report, and/or
- Incident investigation outcomes.

4.3. SPECIFIC MAINTENANCE REQUIREMENTS

Maintenance tasks for specific items of plant and equipment shall be carried out as follows:

4.3.1 Powerhouse and Standby Generator

The Powerhouse and standby generator equipment will be maintained in accordance with manufacturer requirements and at least every 300 hours. “A”, “B” and “C” Maintenance Tasks sheets shall be used to ensure all maintenance tasks are completed and recorded.

The standby generator is to be:

- Visually inspected monthly and run off-load for approximately 60 minutes.
- Visually inspected and run every 3 months for approximately 6-7 hours at a minimum 50% of full island load.
- Protection relays to be tested every 5 years by current injection and timing trip tests.

4.3.2 Substations

Substations are to be maintained as follows:

- Visually inspected for defects and assessed for obvious signs of deterioration and/or malfunction every year.
- Transformers maintained as follows:
    - Free of rust and oil leaks.
    - Transformer oil to be sampled and tested every 5 years – water content, dissolved gas analysis, dielectric breakdown voltage.
    - Bushings and fuses cleaned yearly.
    - Thermography on the High Voltage (HV) and Low Voltage (LV) ends yearly.
- LV circuit breakers to have functional tests carried out annually.
- High voltage switchgear as provided by Section 3.3.
- Earths tested every 10 years initially and every 5 years once equipment is 20 years old.
- Earthing managed as required by ENA DOC 025 EG-0 Power system earthing guide - Part 1: management principles.

4.3.3 High Voltage Switchgear

4.3.3.1. Hazemeyer Switchgear

Hazemeyer high voltage switchgear is to:

- Have condition monitoring performed using a partial discharge tester and an infrared camera conducted annually.
- Be visually inspected for defects every year including checking of cable terminations for leaks and for evidence of surface tracking/partial discharge.
- Have cable terminations checked for tightness.
- Have the energy storage spring actions in the switch caps checked for integrity and suitability.
- Test using a micro ohmmeter to confirm modular joint connectivity.
- Have a fuse rotation/replacement program in place with change out fuses checked for d.c. resistance in a temperature stabilised ambient. Take care and use a heat resistant glove and carefully handle fuses to prevent damage to fragile silver elements inside the fuse.
- Be cleaned annually and maintained using the manufacturer’s procedure/guidance.

Hazemeyer switchgear is to therefore be maintained and the condition assessed annually and replaced as necessary.

N.B. All Hazemeyer cable terminations are to be replaced in the 2017/18 financial year with dry type terminations.

4.3.3.2. SF6 Switchgear

SF6 switchgear to be:

- Inspected annually to determine any further actions.
- Cleaned every 5 years.
- Insulation and contact resistance tested every 5 years.
- Partial discharge and corona tested every 5 years if possible.
- Operated to ensure functionality.
- Managed as required by the manufacturer and ENA DOC 022 *ENA Industry Guideline for SF6 Management*.
- Disposed of in accordance with environmental requirements at end of life.

4.3.4 Low Voltage Distribution Network

The following items of the Low Voltage network are to be inspected annually:

- Pillars
- Street lights and bollards
- Numbers, labels and warning/danger signs

Distribution substation Maximum Demand Indicators (MDIs) are to be read monthly and readings assessed to determine the status of the load on each transformer.

4.4. DEFECT RECTIFICATION

Any defects found by the inspection and maintenance regime shall be rectified according to priorities as assessed by the Senior Electrical Officer. Defects that do not pose a threat to safety or system reliability, what could be called “discretionary maintenance”, may be rectified as workloads permit.

4.5. REPAIRS

Supply should be restored to as much of the network as possible and repairs implemented as soon as possible using suitably qualified, competent and authorised persons. Isolation for repairs to the network shall be carried out in accordance with the LHIB Electrical Network Operations Plan.

Contractors may be required to implement repairs which are beyond the scope of island electrical staff.

4.6. NETWORK SPARES

Adequate spares shall be carried to allow immediate repair of the network should an unplanned outage occur as a result of equipment failure. The following is considered a minimum list of spares:

- 1 x Hazemeyer switchgear – circuits: in and out and transformer
- 50m x HV cable – 16mm² XLPE Copper
- 2 x inline cable joints for HV cable
- 1 x Termination kit and leads for Hazemeyer switchgear
- A full set of each relevant HV fuse size
- One distribution transformer
- 2 x LV circuit breakers for generator output
- Miscellaneous spares such as MDIs, F Frame circuit breakers, CT’s and Quicklag circuit breakers.

No spare generator output transformers are needed as the island could cope with just one if necessary. If a failure occurred, the minimum 20 week lead time on a transformer

to suit the Island's network would necessitate the immediate ordering of a replacement transformer.

4.7. RECORDS

All records of inspection and maintenance activities are to be stored by the Senior Electrical Officer for future reference, defect trend analysis, auditing and/or reporting.

4.8. PLAN REVIEW

This plan will be reviewed and amended as required, to meet the LHIB ENSMS Monitoring, Measurement and Audit Plan.

APPENDIX A – Revision History

VERSION NO	REASON FOR UPDATE	DATE ISSUED
1	Initial Release as Approved by the Board	December 2016
1.1	Updated: - Section 4.3. amended for condition monitoring.	October 2017

ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM

PART 5

OPERATIONS PLAN

This Plan was introduced in 2016 and will continue to be in effect until it is removed from service. This plan will undergo regular review in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 and AS5577-2013. This Plan will be systematically reviewed against legislation and regulation applicable to distribution and transmission network service providers, industry standards including AS5577, the Lord Howe Island Board's strategic plans and relevant internal policies, procedures and standards and our regulatory determination. This plan will be updated as necessary in line with the outcome of these reviews.

In accordance with the NSW Electricity Supply (Safety and Network Management) Regulation 2014, this Plan will be made available to all stakeholders who are likely to be involved in its implementation.

This Electricity Network Safety Management System Operations Plan is available on the Lord Howe Island Board's website (www.lhib.nsw.gov.au). Printed copies of this Plan are available at the Lord Howe Island Board's office – 5 Bowker Avenue, Lord Howe Island NSW 2898.

All correspondence in relation to this document should be directed to:

The Lord Howe Island Board
PO Box 5, Bowker Ave
Lord Howe Island
NSW 2898
Australia

Phone: (02) 6563 2066 Fax: (02) 6563 2127

Email: administration@lhib.nsw.gov.au Website: www.lhib.nsw.gov.au

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PART 5 - OPERATIONS PLAN

5.1. INTRODUCTION

This Plan is part of the Lord Howe Island Board's (LHIB) Electricity Network Safety Management System (ENSMS) and addresses the operation of the LHIB's electricity network.

LHIB is committed to ensuring a safe and reliable electricity supply to all our customers when we need to operate our electrical network.

The LHIB has developed this Plan to meet this commitment and to comply with the requirements of the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW) and AS5577-2013: Electricity Network Safety Management Systems.

5.2. OPERATIONS

The operation of network equipment shall be carried out safely by suitably qualified, competent and authorised personnel using suitable PPE and the guidance of LHIB's Electrical Safety Rules. Operational activities shall include isolating, testing de-energised, earthing and issuing/cancelling access permits.

Staff and contractors shall be inducted prior to any operational work and authorised in accordance with Section 4.

An operator shall seek guidance if operations fall outside normal operating parameters or if it lies outside their skillset. A suitably qualified consultant may also be contacted if the situation lies outside the skills and knowledge of the island electrical management team or the team is not contactable.

5.3. NETWORK SCHEMATICS & MAPPING

A High Voltage Operating Diagram is to be displayed at all times at the Powerhouse Operations Room and pinned to show the present state of the network.

Geographical mapping of electrical network assets is available within the LHIB Geographical Information System (GIS). This information is available to those with access to the LHIB network at the Bowker Avenue offices.

5.4. AUTHORISATION

LHIB shall ensure that ALL staff and contractors involved with the High Voltage (HV) and Low Voltage (LV) network are qualified and authorised for the work to be performed using Appendix A and recorded in an Excel spreadsheet titled "LHIB HV/LV Authorisation Register". This register shall be held and managed by the Senior Electrical Officer.

The LHIB must be satisfied that the person is qualified, experienced and competent to perform the required functions before the Senior Electrical Officer issues an authorisation card or when renewing authorisations. This authorisation allows staff to perform the identified functions on Lord Howe Island only for the period identified on their authorization card. Authorisations from other companies do not allow electrical workers to work or operate at Lord Howe Island.

Authorisation of staff and contractors will include the following:

(a) Plant room entry
(b) Generation plant operation
(c) Prepare switching sheets
(d) Issue and/or receive HV access permits
(e) Operate and isolate HV network
(f) Access HV and LV infrastructure
(g) Supervise works on HV network
(h) Operate/isolate LV distribution network
(i) Isolate/lockout LV Electrical plant

(j) Supervise works on LV network.

An authorisation card (refer Appendix A) may be issued or renewed at the discretion of the LHIB, dependent upon demonstration and/or maintenance of competence.

The “LHIB HV/LV Authorisation Register” will include:

(a) Authorisation number;
(b) Name of authorised person;
(c) Company;
(d) Authorisation type;
(e) Date of issue;
(f) Date of authorisation expiry.
(g) File reference for qualifications and/or evidence of competence.

Records used to issue an authorisation such as copies of qualifications or evidence of competence are to be stored for future reference.

LHIB may withdraw an authorisation at any time and the Authorisation Card is to be returned to the LHIB.

Authorisation in the future may be via the Australian Electricity Supply Industry (ESI) Skills Passport as may recording of all ESI training. Details of this system can be found at www.esipassport.com.au

5.5. COMPETENCY, QUALIFICATIONS & TRAINING

5.5.1. General

As stated previously, the LHIB must be satisfied that the person is qualified, experienced and competent to perform the required functions before issuing an authorisation card or when renewing authorisations. Qualifications, experience and competency will depend on the task to be performed.

All workers shall have a General Construction Induction Card and be appropriately supervised.

5.5.2 Suitable Qualifications and/or Experience

Competency/qualification requirements will depend the tasks to be performed and may include the qualifications and units of competence as detailed at Appendix B.

Qualifications alone do not ensure competence and so consideration should be given in the authorisation process to the following:

- Experience in the operation of HV and LV networks and equipment;
- Knowledge and experience using the HV and LV equipment utilised on Lord Howe Island.

Refreshers training is likely for some units of competence, as detailed in Appendix B, to ensure maintenance of skills and knowledge. Maintenance of other skills and knowledge is also important and so continuance of work in the Electricity Supply Industry and Generation sectors is also important and not just having a qualification.

5.6. AUTHORISED WORKER RESPONSIBILITIES

Authorised workers shall:

(a) Have authorisation cards readily available when working on the island;
(b) Produce their card when requested;
(c) Secure the card to reduce the likelihood of unauthorised use;
(d) Report lost or stolen cards to LHIB as soon as practical;

(e) Ensure all training and competencies are current and copies of certificates provided to LHIB; and
(f) Ensure that they only undertake work for which they are competent and authorised to perform.

5.7. SENIOR ELECTRICAL OFFICER UNAVAILABLE

The Senior Electrical Officer may be unavailable for reasons such as illness, injury, or on leave. In this absence, an authorised contractor shall be used to carry out any authorised operational activities.

If an authorised contractor is not on site and a safety issue or emergency arises, an authorised contractor or suitably qualified and experienced electrical engineer may direct LHIB staff to perform certain functions before an authorised contractor arrives on site.

5.8. PROTECTION COORDINATION

The high voltage protection for the island high voltage electrical network has been in place for some time. A review by Jacobs Group (Australia) Pty Limited in 2015 details the protection methodology and coordination details and forms part of this Operations Plan.

5.9. OPERATION OF HAZEMEYER SWITCHGEAR

The Hazemeyer switchgear is not to be operated on load or when fault finding. Arc-flash clothing and face shields are to be used when operating at no-load. These requirements and maintenance of Hazemeyer switchgear in accordance with Section 3.3.1 of Part 4 of the ENSMS (Maintenance Plan) are risk management strategies for this make and model of switchgear to ensure the safety of operators and members of the public.

Switching Hazemeyer switchgear at no load will necessitate opening off of low voltage loads. This is best achieved by operating all three phases at once wherever possible e.g. using a three phase LV circuit breaker, to minimize the risk of damage to three phase loads such as motors.

5.10. SWITCHING SHEETS

If an operator is required to operate the network a switching sheet should be developed by a suitably qualified and authorised person (which could be the operator) prior to the work commencing using the template provided at Appendix B. Standard sheeting sheets for operational arrangements that regularly occur will be stored at the Powerhouse.

5.11. ISOLATION, EARTHING AND ACCESS PERMITS

Isolation and lock out/tag out of the isolated equipment shall be in accordance with the LHIB Electrical Safety Rules as will earthing/shorting of the isolated equipment. Appropriate earthing/shorting equipment shall be used and installed and/or removed by authorised operators only.

The LHIB Access Permit shall be utilised to access isolated HV equipment using the guidance of LHIB's Electrical Safety Rules. Yellow or white tape barriers may be needed to define the isolated equipment and work area using the guidance of LHIB's Electrical Safety Rules.

5.12. ABNORMAL OPERATIONS

The Senior Electrical Officer shall use knowledge, skills and training to manage any abnormal situations including emergencies (also refer LHIB ENSMS Emergency Management Plan). Safety will always be a priority in any actions taken.

In an unplanned outage situation, the electricity supply can be restored very quickly due to the small size of the island. It is however a requirement that a patrol of assets be carried out before restoring supply for public safety reasons e.g. a car accident involving network assets or excavation damage to an underground cable.

Generation and network faults should be identified by:

- Using the skills and knowledge of the Senior Electrical Officer;
- Analysis of protection equipment that has operated;
- Visual inspection of the faulted section or equipment;
- "Test shot" where appropriate;
- Consideration of protection settings and/or circuit breaker or fuse rating versus load (load shedding in accordance with Section 14 or upgrade of electrical equipment may be required);
- Testing.

Items of plant that have failed or need repair are to be isolated and repaired using the guidance of the LHIBLHIB Electrical Safety Rules and supply should be restored to as much of the network as possible. Repairs are to be implemented using only authorised persons, along with relevant testing and recommissioning works.

Priority will be given to the hospital and any "life support" customers when restoring supply after an unplanned outage.

No further risk management planning is considered necessary for abnormal situations due to the small size and limited complexity of the network.

The LHIB Business Continuity Plan will include requirements for abnormal operations once updated.

Customers may be required to manage their electrical load where the protecting circuit breaker in the supply pillar has tripped due to overload or repair their equipment where a customer installation fault has caused the protecting circuit breaker in the supply pillar to trip.

5.13. BLOWN HIGH VOLTAGE FUSE

All three fuses must be replaced when one fuse has blown on any transformer on the island.

5.14. LOAD SHEDDING

It is not anticipated that load shedding should be necessary at any stage due to the sizing of the generators and the remote location of the backup generator which is capable of supplying all the electrical load to the island.

However, if load shedding was required, then all but the hospital load would be cycled on a three hourly basis. Any "life support" customers would also be excluded from the load shedding program unless other arrangements have been made.

5.15. BLACK START

Restoring the electricity supply after a complete outage to the island is easily achieved following standard restart procedures. Electrical supply restorations to the hospital is considered a priority under these circumstances.

5.16. LOSS OF VOLTAGE REGULATION

Loss of voltage regulation at the Powerhouse would necessitate swapping to the Standby Generator or manual control of voltage until repairs are implemented. The decision by the Senior Electrical Officer will depend on circumstances at the time.

5.17. COMMUNICATION OUTAGE

The loss of the LHIB radio network or phone service is not considered a serious issue for the management of the network due to the limited size of the island and network, and the number of network staff. The Senior Electrical Officer or authorised contractor are required to follow all parts of this plan and so the risk from a communication outage is minimal.

5.18. DIESEL STORAGE

Adequate quantities of diesel are to be stored at the Powerhouse and Backup Generator. Diesel will be cleaned on a six monthly basis to ensure trouble-free operation of the generator engines.

5.19. HV TOOLS

HV tools such as HV operating stick, earthing/shorting kits and tester are to be available. These are to be maintained in a suitable condition and the stick tested every 2 years. Records are to be recorded in the LHIB Electrical Equipment Safety Audit Register Excel spreadsheet.

5.20. NOTIFICATION OF PLANNED OUTAGES

Notification for planned outages will be in accordance with the LHIB Electrical Network Communications and Reporting Plan.

5.21. INCIDENT MANAGEMENT

The Senior Electrical Officer will take charge of electrical incidents to ensure electrical safety on behalf of the LHIB. The Senior Electrical Officer will work in with other emergency services during an incident.

All electrical incidents are to be investigated (refer LHIB Document 5 - Safety Incident Management, Reporting and Investigation), recorded and reported (refer LHIB ENSMS Communication and Reporting Plan) including unplanned outages.

Incidents investigations are to be overseen by the Manager of Infrastructure and Engineering Services and generally undertaken by the Senior Electrical Officer unless an assessment determines that an independent lead investigator is necessary. The independent lead investigator may be a manager from another department or an external consultant.

5.22. RECORDS

Records of planned and unplanned outages and incidents are to be retained by the Senior Electrical Officer in the Network Incident Register.

5.23. STANDARDS

The following documents provide guidance for the operation of the island network:

ENA Doc 024 National guideline for management of tools and equipment used in the electricity supply industry

ENA NENS03: National guidelines for safe access to electrical and mechanical apparatus

ENA NENS04: National guidelines for safe approach distances to electrical and mechanical apparatus

ENA NENS07: National guidelines for manual reclosing of high voltage electrical

apparatus following a fault operation (Manual Reclose Guidelines)

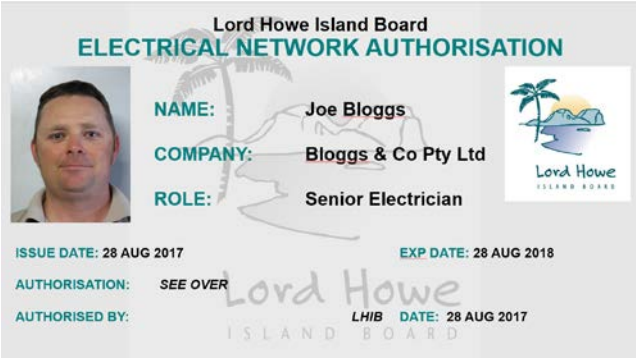
ENA NENS09: National Guideline for the Selection, Use and Maintenance of Personal Protection Equipment for Electrical Arc Hazards

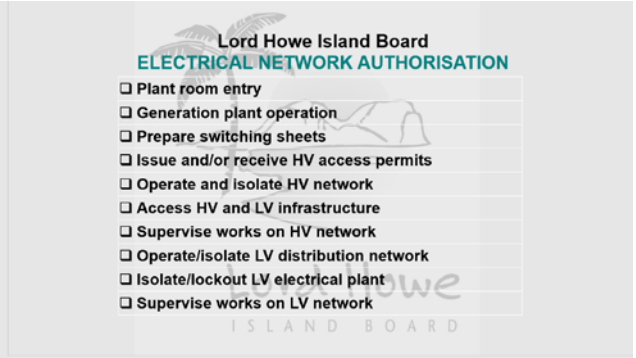
ENA NENS 010: National Guidelines for Contractor Occupational Health and Safety Management

5.24. PLAN REVIEW

This plan will be reviewed and amended as required, to meet the LHIB ENSMS Monitoring, Measurement and Audit Plan.

5.25. APPENDIX A – HV AUTHORISATION CARD





5.26. APPENDIX B –QUALIFICATIONS TABLE

AUTHORISATION	MINIMUM QUALIFICATION - TRANSMISSION & DISTRIBUTION SECTOR	TRANSMISSION AND DISTRIBUTION UNITS OF COMPETENCE	MINIMUM QUALIFICATION - GENERATION SECTOR	GENERATION SECTOR UNITS OF COMPETENCE
Plant room entry	N/A	N/A	Nil	UEPOPS211B - Clean Plant and Equipment
Generation plant operation	N/A	N/A	UEP30206 - Certificate III in ESI Generation (Operations)	UEPMNT416B - Overhaul Electrical Generators UEPMNT417B - Inspect Electrical Generators and Diagnose Faults
Prepare switching sheets	UET30812 - Certificate III in ESI - Power Systems - Distribution Cable Jointing UET40412 - Certificate IV in ESI - Network Systems UET50312 - Diploma of ESI - Power Systems Operations	UETTDRIS48A - Develop high voltage switching schedule UETTDRIS49A - Develop low voltage switching schedule		UEPOPS428B - Develop HV switching program UEPOPS422B - Schedule Generation UEPOPS423B - Plan a Scheduled Outage
Issues and/or receive HV access permits		UETTDRRF09B – Apply access procedures to work on or near electrical infrastructure UETTDRIS50A - Coordinate power system permit procedures		UEPOPS430B - Control permit to work operations UEPOPS402B - Conduct Multiple Energy Source Isolation Procedures for Permit to Work UEPOPS502B - Manage Permit to Work System
Operate and isolate HV network		UETTDRIS44A - Perform HV field switching operation to a given schedule UETTDRIS51A - Coordinate and direct power system switching schedules UETTDRIS67A - Solve problems in energy supply network equipment		UEPOPS349B - Operate local HV switchgear UEPOPS357B - Operate H.V. secondary switchgear UEPOPS456A - Perform switching to a switching program UEPOPS525A - Co-ordinate and direct switching program
Access HV and LV infrastructure		UETTDREL16A - Working safely near live electrical apparatus UETTDRCJ27A – Install and maintain de-		UEPMNT346B - Maintain Electrical Equipment UEPMNT351B - Test and Commission

		energised HIGH voltage underground polymeric cables UETTDRRF01B – Apply ESI safety rules, codes of practice and procedures for work on or near electrical apparatus UETTDRRF06B – Perform Rescue from a Live LV Panel* UETTDRRF10B – Provide First Aid in an ESI environment* UETTDRRF11A – Testing of connections to LV electrical networks UETTDRIS55A – Install and maintain LV underground services UETTDRCJ26A – Install and maintain de-energised LOW voltage underground polymeric cables		Electrical Equipment
Supervise works on HV network		All units of competence for "Access HV and LV Infrastructure" above BSBLDR403 - Lead team effectiveness		
Operate/isolate LV distribution network	UEE30811 - Certificate III in Electrotechnology Electrician Electrician (Supervisor) License NSW	UETTDRIS67A - Solve problems in energy supply network equipment All units of competence for "Access HV and LV Infrastructure" above		UEPOPS357B - Operate local LV switchgear
Isolate/lockout LV electrical plant		All units of competence for "Access HV and LV Infrastructure" above		
Supervise works on LV network		All units of competence for "Access HV and LV Infrastructure" above		

* Refreshers training should be performed every 2 years or as assessed necessary

5.27. APPENDIX C – Revision History

VERSION NO	REASON FOR UPDATE	DATE ISSUED
1	Initial Release as Approved by the Board	December 2016
1.1	Updated: - Section 4 and Appendix A updated. - Section 5 updated and Appendix B added. - Section 9 to include not operating Hazemeyer when fault finding - Section 10 to include switching sheet template and standard switching sheets. - Section 19 to include details of where test results are to be stored. - Minor other changes.	October 2017

5.28. APPENDIX D – REVISION HISTORY

VERSION NO	REASON FOR UPDATE	DATE ISSUED
1	Initial Release as Approved by the Board	December 2016
1.1	Updated: - Section 4 and Appendix A updated. - Section 5 updated and Appendix B added. - Section 9 to include not operating Hazemeyer when fault finding - Section 10 to include switching sheet template and standard switching sheets. - Section 19 to include details of where test results are to be stored. - Minor other changes.	October 2017

ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM

PART 6

BUSHFIRE MANAGEMENT PLAN

This Plan was introduced in 2016 and will continue to be in effect until it is removed from service. This plan will undergo regular review in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 and AS5577-2013. This Plan will be systematically reviewed against legislation and regulation applicable to distribution and transmission network service providers, industry standards including AS5577, the Lord Howe Island Board's strategic plans and relevant internal policies, procedures and standards and our regulatory determination. This plan will be updated as necessary in line with the outcome of these reviews.

In accordance with the NSW Electricity Supply (Safety and Network Management) Regulation 2014, this Plan will be made available to all stakeholders who are likely to be involved in its implementation.

This Electricity Network Safety Management System Bushfire Management Plan is available on the Lord Howe Island Board's website (www.lhib.nsw.gov.au). Printed copies of this Plan are available at the Lord Howe Island Board's office – 5 Bowker Avenue, Lord Howe Island NSW 2898.

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All correspondence in relation to this document should be directed to:

The Lord Howe Island Board
PO Box 5, Bowker Ave
Lord Howe Island
NSW 2898
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Phone: (02) 6563 2066 Fax: (02) 6563 2127

Email: administration@lhib.nsw.gov.au Website: www.lhib.nsw.gov.au

September 2016

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PART 6 - BUSHFIRE MANAGEMENT PLAN

6.1. INTRODUCTION

This Plan is part of the Lord Howe Island Board's (LHIB) Electricity Network Safety Management System (ENSMS) and addresses the management of bushfire risks relating to the LHIB's electricity network.

LHIB is committed to preventing bushfires initiated by the electrical network by designing, maintaining and operating our electrical network to as high as standard as reasonably practicable and in accordance with industry standards.

The LHIB has developed this Plan to meet this commitment and to comply with the requirements of the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW) and AS5577-2013: Electricity Network Safety Management Systems.

6.2. BUSHFIRE STATUS

The bushfire risk on Lord How Island is assessed as low due to the island being sub-tropical in nature and the lush vegetation that prevails.

6.3. PREVENTATIVE ELECTRICAL STRATEGIES

The whole electrical network on Lord Howe Island is installed underground and all future network extensions are to be installed underground. The high voltage network is also protected at the powerhouse and standby generator by high voltage fuses. The LHIB will comply with our design, construction, commissioning, maintenance, operations and decommissioning plans to assist with bushfire prevention.

The propensity to start a bushfire in such circumstances is extremely low.

6.4. HARDSHIP POLICY

The LHIB electrical network is underground, there are no private overhead power lines or high voltage customers and there is a low risk of a bushfire on the Island. For these reasons, electrical customers will not be in financial hardship as a result of a need to upgrade, repair or maintain their private overhead assets.

The LHIB has in place a Bushfire Mitigation Hardship Policy, to comply with the requirements of the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW) and AS5577-2013: Electricity Network Safety Management Systems.

6.5. PLAN REVIEW

This plan will be reviewed and amended as required, to meet the LHIB ENSMS Monitoring, Measurement and Audit Plan.

ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM

PART 7

EMERGENCY MANAGEMENT PLAN

This Plan was introduced in 2016 and will continue to be in effect until it is removed from service. This plan will undergo regular review in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 and AS5577-2013. This Plan will be systematically reviewed against legislation and regulation applicable to distribution and transmission network service providers, industry standards including AS5577, the Lord Howe Island Board's strategic plans and relevant internal policies, procedures and standards and our regulatory determination. This plan will be updated as necessary in line with the outcome of these reviews.

In accordance with the NSW Electricity Supply (Safety and Network Management) Regulation 2014, this Plan will be made available to all stakeholders who are likely to be involved in its implementation.

This Electricity Network Safety Management System Emergency Management Plan is available on the Lord Howe Island Board's website (www.lhib.nsw.gov.au). Printed copies of this Plan are available at the Lord Howe Island Board's office – 5 Bowker Avenue, Lord Howe Island NSW 2898.

All correspondence in relation to this document should be directed to:

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Email: administration@lhib.nsw.gov.au Website: www.lhib.nsw.gov.au

September 2016

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PART 7 - EMERGENCY MANAGEMENT PLAN

7.1. INTRODUCTION

This Plan is part of the Lord Howe Island Board's (LHIB) Electricity Network Safety Management System (ENSMS) and addresses the management of the LHIB's electricity network in an emergency.

The LHIB is committed to ensuring a safe and reliable electricity supply to all our customers even in extreme or emergency conditions.

The LHIB has developed this Plan to meet this commitment and to comply with the requirements of the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW) and AS5577-2013: Electricity Network Safety Management Systems.

7.2. EXTERNAL SUPPORTING PLANS

- Lord Howe Island Local Emergency Management Plan (EMPLAN)
- Lord Howe Island Tsunami Emergency Sub Plan

7.3. OVERARCHING CONTROL/RESPONSIBILITY

Under the EMPLAN, the Local Emergency Operations Controller (LEOCON), appointed as the Senior Police Officer on the Island, has overarching responsibility for "major failure of essential utility for unreasonable periods of time as a result of a natural or man-made occurrence."

7.4. INCIDENT CONTACTS LIST

ORGANISATION	EMAIL	NAME	CONTACT DETAILS
LORD HOWE ISLAND BOARD (Fax: 6563 2127)			
Chief Executive Officer	penny.holloway@lhib.nsw.gov.au	Penny Holloway	02 6563 2066 Ah: 02 6563 2449
Manager Infrastructure and Engineering Services	john.teague@lhib.nsw.gov.au	John Teague	02 6563 2066 Ah: 02 6563 2272
Senior Electrical Officer	greg.higgins@lhib.nsw.gov.au	Greg Higgins	02 6563 2066 Ah: 02 6563 2085
EMERGENCY SERVICES			
Hospital	kara.kulakowski@sesiahs.health.nsw.gov.au	Kara Kulakowski	02 6563 2000 Ah: 02 6563 2291
Ambulance Service	frankreed2898@gmail.com	Dr Frank Reed	000\0265632000 Ah: 0265632052
Police LHI	meeh2sim@police.nsw.gov.au	Simon Meehan	"000" or 02 6563 2199
Police Mid North Coast LAC – LHI LEOCON	feho1pau@police.nsw.gov.au	Paul Fehon	02 6583 0133
Fire Brigade LHI	cakawilson7@hotmail.com	Craig Wilson	"000" or 02 6563 2392
State Emergency Service LHI	james.mcfadyen@member.ses.nsw.gov.au	Jim McFadyen	02 6563 2066 Ah: 6563 2481

7.5. PRIORITIES

Priorities for the electrical network in an emergency condition including restoration of the electricity supply are in the following order:

1. Safety of LHIB electrical network staff and the community.
2. Electricity supply to the hospital, airport and Emergency Operations Centre.
3. Electricity supply to any “life support” customers.
4. Electricity supply to the telecommunications network.
5. Electricity supply to evacuation centres.
6. Electricity supply to the business community.
7. Electricity supply to residential areas.

7.6. RESOURCES

Existing staff resources are considered adequate for emergency conditions. However, contractors may be required to assist with repairs after an event, as detailed in the LHIB ENSMS Maintenance Plan.

Equipment spares are also detailed in the LHIB ENSMS Maintenance Plan.

7.7. ELECTRICAL STAFF SAFETY

A swift response in emergency situations is critical, but safety shouldn’t be compromised. It is therefore necessary for electrical staff when attending to an emergency and on their arrival at the site to:

- Visually check for hazards, assess the risk and establish risk controls to be implemented.
- Coordinate work activities with other emergency services.
- Continue with normal work procedures and manage hazards and risk.

Relief network operators shall seek guidance from the Senior Electrical Officer or the Manager of Infrastructure and Engineering Services if operations fall outside normal operating parameters or their skillset.

7.8. NETWORK RESPONSE TO EVENTS

The LHIB may need to respond to various natural and man-made events and isolate the electricity supply. Any advice to the community will be in accordance with the LHIB ENSMS Communication and Reporting Plan.

The following provides planning for specific foreseeable events:

7.8.1. High Seas

High seas would not normally pose a threat to the electricity supply on the island. However, sea levels and their effects will be monitored to ensure safety and isolation of the supply to affected electrical assets would occur if necessary.

7.8.2. Storm Water

Excessive rain may cause storm water to inundate low lying areas of the township, particularly around the school area. This may necessitate isolation of the electricity supply to parts of the network in that area to ensure safety and prevent electrical damage to the electrical assets.

The Senior Electrical Officer shall monitor Bureau of Meteorology predictions and will determine in conjunction with the LHIB Manager Infrastructure and Engineering Services / Chief Executive Officer if the electricity supply shall be isolated.

Once water levels have receded and are considered unlikely to inundate electricity assets again, the assets shall be inspected and cleaned if required, dried and tested as necessary before the supply is restored.

7.8.3. Tsunamis

A land inundation type tsunami has the potential to damage electrical assets, particularly if the electricity supply has not been isolated beforehand. The Senior Electrical Officer in conjunction with the LHIB Manager Infrastructure and Engineering Services / Chief Executive Officer, will decide if the electricity supply to areas that may be affected should be isolated prior to any predicted tsunamis. The Senior Electrical officer may have to make the decision to isolate if senior LHIB staff are unavailable and time is short.

The electricity supply to Evacuation Centres for tsunamis at the Golf Club and corner of Anderson Road and Middle Beach Road is to be maintained whenever possible and if safe to do so.

Once the tsunami threat has abated, the assets shall be inspected and cleaned, dried and tested if necessary by the LHIB electrical staff before the supply is restored.

7.8.4. Vandalism

Vandalism of network assets on the island generally takes the form of graffiti on substations and minor damage to street lighting and poses little threat to electricity supply security.

The response to more serious vandalism will depend on the extent of damage. The community are encouraged to report any suspicious behaviour to the police to prevent or limit vandalism.

7.8.5. Terrorism

Threat of terrorism is very low on the island given that the primary means of access to the island is via air and the associated security screening. Members of the public are encouraged to report any suspicious activity to the local police.

The network response to any terrorism act will depend on the assets damaged or destroyed. The backup generator at its remote location from the powerhouse helps provide security of supply if the powerhouse was destroyed or damaged by a terrorist attack.

Spare equipment for network repairs and repair strategy following a terrorist attack, or from any source of damage, is detailed in the LHIB ENSMS Maintenance Plan.

7.8.6. Fire

Bushfires are unlikely due to the nature of the island (refer LHIB ENSMS Bushfire Management Plan).

The LHIB has emergency and evacuation plans for fires at their office, depot and powerhouse to help ensure the safety of personnel. Plans are displayed prominently on notice boards throughout the office and buildings.

Any electrical assets that catch fire will be electrically isolated as soon as practicable before the Rural Fire Service, if required, controls the fire.

7.8.7. General Network Faults

Miscellaneous network faults will occur from time-to-time. The Senior Electrical Officer will isolate the affected part of the network, restore supply to as much of the network as possible and then organise repairs (in accordance with the LHIB ENSMS Operations Plan).

7.9. PLAN REVIEW

This plan will be reviewed and amended as required, to meet the LHIB ENSMS Monitoring, Measurement and Audit Plan.

APPENDIX A – REVISION HISTORY

VERSION NO	REASON FOR UPDATE	DATE ISSUED
1	Initial Release as Approved by the Board	December 2016
1.1	John Teague's details added instead of Andrew Logan	May 2018

ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM

PART 8

DECOMMISSIONING PLAN

This Plan was introduced in 2016 and will continue to be in effect until it is removed from service. This plan will undergo regular review in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 and AS5577-2013. This Plan will be systematically reviewed against legislation and regulation applicable to distribution and transmission network service providers, industry standards including AS5577, the Lord Howe Island Board's strategic plans and relevant internal policies, procedures and standards and our regulatory determination. This plan will be updated as necessary in line with the outcome of these reviews.

In accordance with the NSW Electricity Supply (Safety and Network Management) Regulation 2014, this Plan will be made available to all stakeholders who are likely to be involved in its implementation.

This Electricity Network Safety Management System Decommissioning Plan is available on the Lord Howe Island Board's website (www.lhib.nsw.gov.au). Printed copies of this Plan are available at the Lord Howe Island Board's office – 5 Bowker Avenue, Lord Howe Island NSW 2898.

All correspondence in relation to this document should be directed to:

The Lord Howe Island Board
PO Box 5, Bowker Ave
Lord Howe Island
NSW 2898
Australia

Phone: (02) 6563 2066 Fax: (02) 6563 2127

Email: administration@lhib.nsw.gov.au Website: www.lhib.nsw.gov.au

December 2016

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PART 8 - SYSTEM DECOMMISSIONING PLAN

8.1. INTRODUCTION

This Plan is part of the Lord Howe Island Board's (LHIB) Electricity Network Safety Management System (ENSMS) and addresses the safety and environmental impacts of decommissioning of any component of the LHIB's electricity network.

8.2. GENERAL REQUIREMENTS

All decommissioning works are to be performed in accordance with Australian Standards, codes, guidelines, and statutory requirements. Any deviation from such requirements are to be assessed and justified as to achieve at least an equivalent safety outcome through the following (as applicable):

- Formal safety assessments;
- Literature review;
- Consultant report; and\or
- Incident investigation outcomes.

All staff, consultants or contractors involved in decommissioning of the electrical network, or part thereof, shall be suitably trained, qualified and competent. The Senior Electrical Officer must be satisfied that all personnel involved in decommissioning works are suitably trained, qualified, competent and equipped to perform the work.

8.3. SAFETY

Any component of the network that is to be de-energised must be isolated, locked and tagged, tested de-energised and earthed/short circuited. An access permit must be issued before any network component can be removed. LHIB's Electrical Safety Rules shall be followed for this process to ensure safety. The integrity of any remaining network assets is not to be compromised.

Any isolated cables left in the ground that may have unwanted voltages induced or transferred into them are to be suitably terminated and/or insulated at any exposed parts.

No asbestos or PCBs are expected to be found as part of the electrical network as no equipment has been identified containing either.

8.4. ENVIRONMENTAL

As much of the removed network components shall be recycled as possible when any decommissioning of the network or parts thereof occurs. Recycling particularly applies to transformer oil and SF6 and these shall be suitably contained and then recycled. Spill kits are likely to be required in case of accidental transformer oil escape when transformer works are in progress.

Disposal of goods will be in accordance with environmental laws and guidelines including the Protection of the Environment Operations Act 1997 and requirements of the NSW Environmental Protection Authority.

8.5. PLAN REVIEW

This plan will be reviewed and amended as required, to meet the LHIB ENSMS Monitoring, Measurement and Audit Plan.

ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM

PART 9

COMMUNICATION AND REPORTING PLAN

This Plan was introduced in 2016 and will continue to be in effect until it is removed from service. This plan will undergo regular review in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 and AS5577-2013. This Plan will be systematically reviewed against legislation and regulation applicable to distribution and transmission network service providers, industry standards including AS5577, the Lord Howe Island Board's strategic plans and relevant internal policies, procedures and standards and our regulatory determination. This plan will be updated as necessary in line with the outcome of these reviews.

In accordance with the NSW Electricity Supply (Safety and Network Management) Regulation 2014, this Plan will be made available to all stakeholders who are likely to be involved in its implementation.

This Electricity Network Safety Management System Communication and Reporting Plan is available on the Lord Howe Island Board's website (www.lhib.nsw.gov.au). Printed copies of this Plan are available at the Lord Howe Island Board's office – 5 Bowker Avenue, Lord Howe Island NSW 2898.

All correspondence in relation to this document should be directed to:

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Email: administration@lhib.nsw.gov.au Website: www.lhib.nsw.gov.au

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PART 9 - COMMUNICATION AND REPORTING PLAN

9.1. INTRODUCTION

This Plan is part of the Lord Howe Island Board's (LHIB) Electricity Network Safety Management System (ENSMS) and addresses the communication and reporting related to the LHIB's electricity network.

The LHIB is committed to ensuring a safe and reliable electricity supply to all our customers by implementing an Electrical Network Safety Management System.

The LHIB has developed this Plan to

- Identify key stakeholders and communication requirements with those stakeholders.
- Identify statutory reporting requirements.
- Comply with the requirements of the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW) and AS5577-2013: Electricity Network Safety Management Systems.

9.2. COMMUNITY

Electricity customers are to be notified of planned outages at least 4 business days before the date of the interruption.

Extended unplanned outages will also require some community notification.

We will consult with the community as appropriate when changes to electricity generation or the distribution network are likely to have an effect on the community or environment. The level of consultation will be determined by the issue at the time and the likely significance to the community.

The dissemination of information and consultation for the above scenarios may include:

- Mail outs (householders) through the local Post office
- Community meetings
- Quarterly LHIB meetings
- Radio
- Local newspaper
- LHIB Website
- Social media
- Development application process.

The community are encouraged to contact the Senior Electrical Officer if there are any concerns about electrical safety or excavation works in case of underground electrical mains. There is no formal Dial Before You Dig service like that found on the mainland. The same service on the Island is initiated through contact with the Senior Electrical Officer and does not incur costs to any customers.

9.3. LOCAL EMERGENCY SERVICES

The Local Emergency Management Committee comprises representatives from all local emergency and support agencies i.e. State Emergency Service and Rural Fire Service (additional information is provided on the LHIB website - http://www.lhib.nsw.gov.au/services/emergency-services). The committee is supported by the LHIB through the provision of administrative services. It is responsible for the planning, preparation, response and recovery of all matters relating to emergencies that may affect the local community.

This close relationship ensures that consultation and management of issues associated with the electrical network does occur.

9.4. ELECTRICAL CONTRACTORS

Electrical contractors are required to comply with our Service Rules and submit applications for supply, and Certificates of Compliance for Electrical Work in accordance with the LHIB ENSMS Customer Electrical Installation Safety Plan. Information and forms are as provided on the LHIB website - http://www.lhib.nsw.gov.au/infrastructure/electricity

Electrical contractors new to the island are encouraged to contact our Senior Electrical Officer at the Powerhouse before commencing work for the first time.

9.5. EMPLOYEES

LHIB electrical staff will be consulted with any changes to electrical requirements or procedures as required by Work Health and Safety legislation.

9.6. LHIB NETWORK CONTRACTORS

LHIB network contractors will be required to comply with all requirements that electrical staff are required to comply with and any specific contract conditions. Contractors will be inducted onto the site and may manage the site from thence on.

Network contractors are encouraged to consult with the Senior Electrical Officer as required to ensure safety and contract compliance. Any contract reporting obligations are to be fulfilled including providing “as completed” plans.

9.7. LORD HOWE ISLAND BOARD

The ENSMS is subject to approval by the LHIB, as part of their quarterly meetings.

A report on the ENSMS implementation and audit findings shall be provided to the LHIB meeting on an annual basis.

9.8. INCIDENT REPORTING

All electrical incidents involving the network will be reported as required by Section 9 and those involving electrical articles or electrical installations in accordance with Section 10.

The flow chart provided at Appendix A provides guidance in reporting requirements for electrical incidents.

9.9. ELECTRICAL WORKS REPORTING

9.9.1. Annual Reporting

The LHIB will communicate with IPART as necessary including providing annual reports as required by the IPART Electricity Networks Reporting Manual as follows:

- ENSMS performance report
- Bushfire preparedness report.

9.9.2. Notification for Accidents/Incidents Involving Electricity Works

The LHIB will report accidents/incidents involving electricity works as required by the Electricity Supply Act 1995 and IPART’s Electricity Networks Reporting Manual.

Depending on the category of incident, reports may be staged to accommodate the investigation process. The notification and reporting requirements for each category of incident is summarised in Table 2.1 from IPART’s Electricity Networks Reporting Manual as provided on the following page.

SafeWork NSW are to be notified of Category 1 and Category 2 SEWAs by telephoning 13 10 50. SafeWork will also consider any requests for permission to disturb the site of

any SEWA on IPART's behalf.

IPART are to be notified for Category 3 incidents via IPART's online incident reporting portal at https://ipart.huegin.com.au/Account/Login?ReturnUrl=%2F without requiring verbal or written correspondence or via email to energy@ipart.nsw.gov.au

Further details can be found in IPART's Electricity Networks Reporting Manual at Section 2 and Appendices A, B, and C, including items such as the following:

- Obtaining permission for anyone seeking to disturb or interfere with an accident site
- Incident definitions for the five event categories
- Non reportable incidents
- Reporting requirements for:
    - Stage 1 – Initial Report
    - Stage 2 – Interim Report
    - Stage 3 – Final Report
- Definitions and/or details of Serious Electricity Works Accidents and reporting categories
- Event classifications
- Classification of casual factors.

Table 2.1 Notification and reporting requirements for incident categories

Category	Notification of SEWAs to SafeWork NSW	SEWA Site disturbance permission request to SafeWork NSW	Stage 1 report	Stage 2 report	Stage 3 report
1. Major Incident	✓	✓	✓	✓	✓
2. Incident	✓	✓	✓	✓	✓
3. Other SEWAs	×[a]	✓	✓[a]	×	×
4. Significant near miss	×	×	✓	✓[b]	✓
5. Near miss	×	×	✓	✓ [b]	×

[a] The stage 1 report to IPART meets the notification requirement for category 3 incidents

[b] Stage 1 and stage 2 reports are combined with a due date of 30 days after the incident for category 4 and 5 incidents

Category 2/Incidents are incidents that do not meet Category 1 but are SEWAs but leads to a person/s:

- being hospitalised (where hospitalised means 'is admitted as an in-patient'), or
- receiving treatment from a health care professional and is unable to attend work for a full shift or more (this does not include the shift during which the incident occurred).

Category 3/Other SEWAs are SEWAs that do not meet a category 1 or category 2 incident, including motor vehicle accidents (eg, vehicle impact to a pillar or substation) where electricity did not contribute to the fatality/injury.

Category 4/Significant near Miss are where a dangerous incident relating to electricity works has occurred or, as a result of failures in procedural controls (eg, network access permits/authorities), may have occurred resulting in a serious risk to any person's health or safety (including if no injury was received) emanating from an immediate or imminent

exposure to:

- an uncontrolled escape, spillage or leakage of a substance;
- an uncontrolled implosion, explosion or fire;
- an uncontrolled escape of gas or steam;
- an uncontrolled escape of a pressurised substance;
- electric shock where only diagnostic monitoring eg, ECG, has been carried out;
- the fall or release from a height of any plant, substance or thing;
- the collapse, overturning, failure or malfunction of, or damage to, any plant that is required to be authorised for use in accordance with the regulations;
- the collapse or partial collapse of a structure
- the collapse or failure of an excavation or of any shoring supporting an excavation;
- the inrush of water, mud or gas in workings, in an underground excavation or tunnel; or
- the interruption of the main system of ventilation in an underground excavation or tunnel.

Also included are electric shock, electrical burns or flash burns that cause fatalities only of livestock or domestic pets as a result of contact with electricity works.

Category 5/Near Misses are where an event meeting one of more of the categories below occurred and a person could have been injured due to electricity works:

- contact made with UG assets by public workers or general public;
- breach of network operator's safe approach distances to network assets. This distance is as defined by the network operator's safety management system for the authorisation/class of the person;
- unauthorised access of a person to electricity works (including substation grounds and buildings) by public;
- reverse polarity or defective neutral connections of service connections that resulted from work carried out by a network operator work.

9.9.3 Property Damage

Damage to property, other than loss or damage to network assets, is to be reported where:

- Loss or damage greater than $500,000 – Major Incident as per Table 2.1 and required Stage 1, 2 and 3 reports.
- Loss or damage greater than $100,000 – Incident as per Table 2.1 and required Stage 1, 2 and 3 reports.

9.9.4 Loss of Supply

Widespread supply interruptions are regarded as a Major Incident as provided in Table 2.1 above and required Stage 1, 2 and 3 reports. LHIB will provide report as follows:

- Where a state of emergency has been declared under the State Emergency and Rescue Management Act 1989 (NSW) due to the impact of an outage, or the cause of the state of emergency places the network at risk of loss of supply/failure.
- A significant outage due to adverse impact or disruption to the whole community.
- Where the outage causes the loss of network supply, for greater than 2 hours, to significant community infrastructure such as:
    - The island hospital.
    - The air transport systems where travel is affected.

9.10. NSW FAIR TRADING

9.10.1. Annual Reports

There are no LHIB annual reporting requirements for NSW Fair Trading.

9.9.2. Notification of Serious Electrical Accidents

Serious electrical accidents must be reported to NSW Fair Trading as required by the Electricity (Consumer Safety) Act and Regulation where the following applies

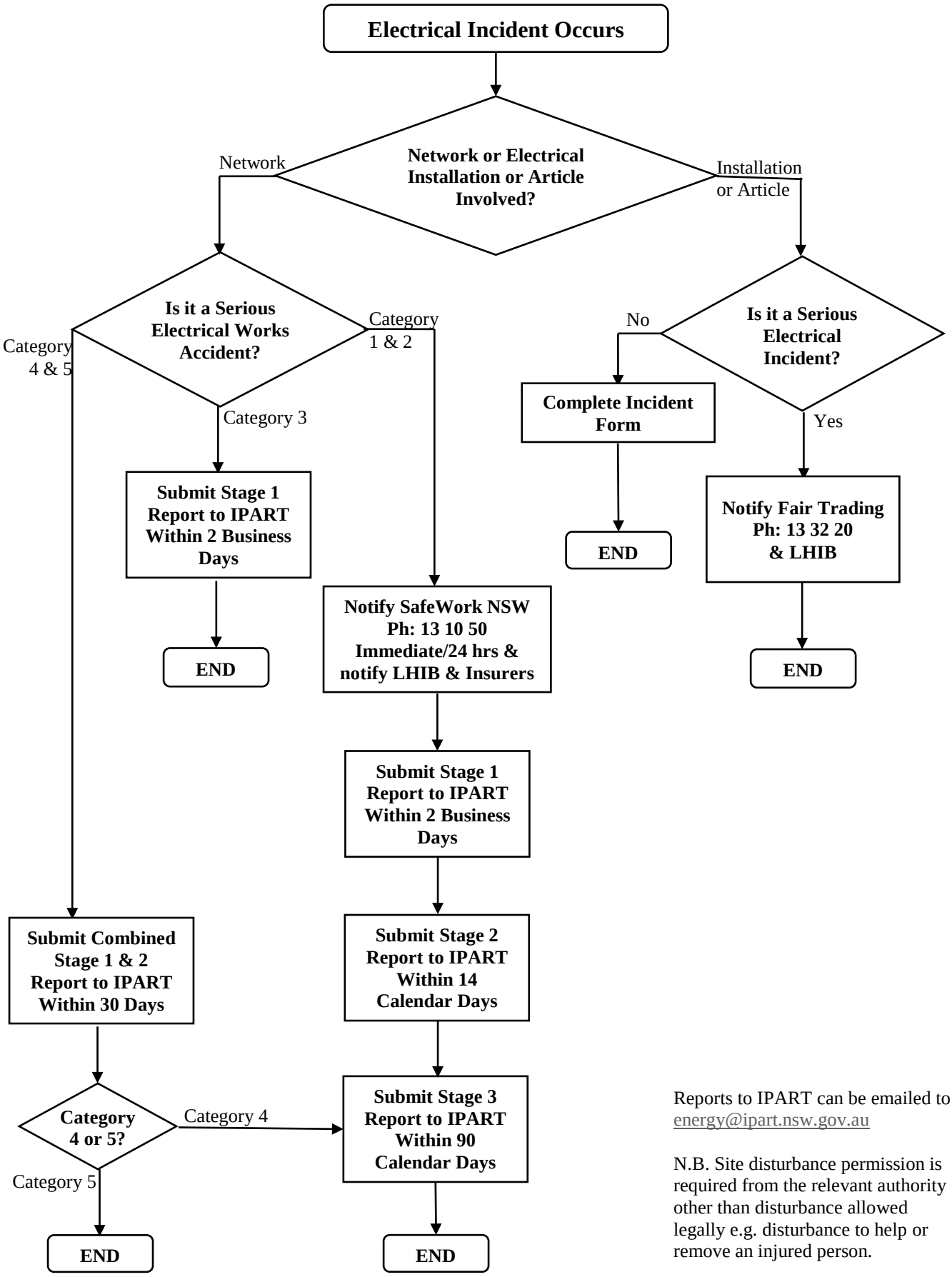
a) in which an electrical article or electrical installation is involved that is or was used for (or for purposes incidental to) the conveyance, control and use of electricity and electricity was, at the time of the accident, being so conveyed, controlled and used, and
b) as a consequence of which a person dies or suffers permanent disability, is hospitalised, receives treatment from a health care professional or is unable to attend work for any period of time.

Serious electrical accidents are to be reported by telephoning NSW Fair Trading on 13 32 20 but written notice or electronic communication may be acceptable (as allowed by the Regulation).

9.11. PLAN REVIEW

This plan will be reviewed and amended as required, to meet the LHIB ENSMS Monitoring, Measurement and Audit Plan.

APPENDIX A – Electrical Incident Reporting Process



Reports to IPART can be emailed to energy@ipart.nsw.gov.au

N.B. Site disturbance permission is required from the relevant authority other than disturbance allowed legally e.g. disturbance to help or remove an injured person.

APPENDIX B – Revision History

VERSION NO	REASON FOR UPDATE	DATE ISSUED
1	Initial Release as Approved by the Board	December 2016
1.1	New sections: 8 – Incident Reporting 9.3 – Property Damage 9.4 – Loss of Supply Appendix A Electrical Incident Reporting Process flowchart A few other minor changes.	October 2017

ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM

PART 10

MONITORING, MEASUREMENT AND AUDIT PLAN

This Plan was introduced in 2016 and will continue to be in effect until it is removed from service. This plan will undergo regular review in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 and AS5577-2013. This Plan will be systematically reviewed against legislation and regulation applicable to distribution and transmission network service providers, industry standards including AS5577, the Lord Howe Island Board's strategic plans and relevant internal policies, procedures and standards and our regulatory determination. This plan will be updated as necessary in line with the outcome of these reviews.

In accordance with the NSW Electricity Supply (Safety and Network Management) Regulation 2014, this Plan will be made available to all stakeholders who are likely to be involved in its implementation.

This Electricity Network Safety Management System Monitoring, Measurement and Audit Plan is available on the Lord Howe Island Board's website (www.lhib.nsw.gov.au). Printed copies of this Plan are available at the Lord Howe Island Board's office – 5 Bowker Avenue, Lord Howe Island NSW 2898.

All correspondence in relation to this document should be directed to:

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Email: administration@lhib.nsw.gov.au Website: www.lhib.nsw.gov.au

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PART 10 - MONITORING, MEASUREMENT AND AUDIT PLAN

10.1. INTRODUCTION

This Plan is part of the Lord Howe Island Board's (LHIB) Electricity Network Safety Management System (ENSMS) and addresses the monitoring, measurement and auditing for the LHIB's electricity network.

The LHIB is committed to ensuring a safe and reliable electricity supply to all our customers through the monitoring, measuring and auditing of the electrical network performance.

The LHIB has developed this Plan to meet this commitment and to comply with the requirements of the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW) and AS5577-2013: *Electricity Network Safety Management Systems*.

10.2. MONITORING AND MEASURING

All elements of the LHIB ENSMS shall be internally checked at the end of each IPART reporting period to ensure all requirements have been achieved. Failure to meet requirements will require an action plan to be developed to ensure compliance and/or a review of requirements to ensure they are realistic and in accordance with industry standards and practice at the time.

10.2.1 Planning, Design, Construction, Commissioning, Decommissioning

The annual review by the Senior Electrical Officer prior to the external IPART audit shall check that all requirements for planning, design, construction, commissioning and decommissioning has been performed in accordance with the relevant LHIB Plans, Australian Standards, codes and guidelines for these items.

The Senior Electrical Officer shall also monitor and audit contractor projects relevant to the network, to ensure compliance with requirements.

10.2.2 Maintenance

Maintenance works as described in the LHIB ENSMS Maintenance Plan shall be audited to ensure scheduled targets have been achieved. Failure to meet targets will require an action plan to ensure compliance and/or a review of targets to ensure that the targets are realistic and in accordance with industry standards and practice at the time.

10.2.3 Reliability

The number and length of unplanned outages will be monitored to ensure the number and frequency of interruptions to the electricity supply does not deteriorate over time without relevant cause.

10.2.4 Power Quality

The voltage output at the Powerhouse is monitored and alarms will highlight if there is an excessive deviation in Powerhouse output voltage.

The Senior Electrical Officer will respond to power quality complaints from customers and may use spot checks or loggers to check power quality.

10.3. AUDITING

The LHIB ENSMS will be audited for/by IPART annually in accordance with IPART's 'Electricity Networks Audit Guideline'. The Senior Electrical Officer will conduct a review to ensure that the ENSMS is in order prior to the audit using the checklist provided at Appendix A. This checklist will be reviewed and updated as necessary following any audit where gaps in the ENSMS are identified.

Due to size of the network and associated operations, we believe that an external audit should not normally be necessary and the annual review by the Senior Electrical Officer and the audit for IPART will be adequate. We will however, carry out internal or independent auditing of our ENSMS on an as needs basis.

Auditing of electrical staff and LHIB electrical network contractors will be carried out on an informal basis.

10.4. ENSMS REVIEW

The ENSMS is to be amended as required to meet legislative, organisational structure changes, operational experience or events, coronial findings and Royal Commission recommendations. Changes to the ENSMS will require approval from the Manager of Infrastructure and Engineering Services.

A review and update to the ENSMS shall be carried out at least every 5 years.

10.5. ADDRESSING AUDIT OR REVIEW FINDINGS

Changes identified to the LHIB ENSMS as part of an audit or review shall be made as soon as reasonably practical and communicated to relevant staekholders.

10.6. PLAN REVIEW

This plan will be reviewed and amended as required, to meet the LHIB ENSMS Monitoring, Measurement and Audit Plan.

APPENDIX A – LHIB Electricity Network Safety Management System Review Checklist

Item #	Description	Compliant	Identified Gaps or Comments	Action	Responsible Person	Due Date
1	Check if AS 5577, Electricity Supply (Safety and Network Management) Regulation and IPART Electricity Networks Audit Guideline have been updated or replaced since last review and how this might impact on the review/audit.					
2	Objectives of the Regulation (Section 6) have been met.					
3	All network incidents required to be reported in accordance with Chapter 2 of IPART's Electricity Networks Reporting Manual have been notified and reported and any corrective and preventative actions have been implemented. Also check any incidents to be reported to Fair Trading have been. (See also Part 9 of LHIB's ENSMS)					
4	ENSMS performance report submitted for preceding reporting					

Item #	Description	Compliant	Identified Gaps or Comments	Action	Responsible Person	Due Date
	period by 31 August (refer Annexure 1 of IPART's Electricity Networks Reporting Manual).					
5	Bushfire preparedness report submitted for preceding reporting period by 31 October (refer Annexure 2 of IPART's Electricity Networks Reporting Manual).					
6	ENSMS and Bushfire Preparedness Reports – • Non-conformance(s) reported have been rectified. • Deviations from established internal or external standards, codes and guidelines have been justified. • Written notice to IPART of intention to publish reports. • Kept at principal office. • Published on website. • Bought to the attention of customers and general public as far as reasonably practicable.					

Item #	Description	Compliant	Identified Gaps or Comments	Action	Responsible Person	Due Date
7	Audits carried out as required by IPART and non-compliance issues or directions from IPART rectified/actioned for the preceding reporting period.					
8	Auditor nominated for any required forthcoming audit(s) to IPART using guidance of IPART's Electricity Networks Audit Guideline.					
9	ENSMS reviewed in the last 5 years or as soon as practicable after any significant change (including any significant incremental change) to design, operation and maintenance of the network or safety risk.					
10	Formal safety assessments reviewed and updated if required (consider any incidents or changes in the preceding period).					
11	Single line diagrams and geographic database updated with any changes made during					

Item #	Description	Compliant	Identified Gaps or Comments	Action	Responsible Person	Due Date
	preceding period.					
12	Review programs and activities undertaken to maintain or improve safety and reliability to determine effectiveness for the preceding period and identify and develop new safety program for the forthcoming period. (See Part 4 of LHIB's ENSMS).					
13	Review programs and activities undertaken to promote public knowledge and understanding of electrical network safety hazards to determine effectiveness for the preceding period and identify and develop new safety program for the forthcoming period. (See Part 11 of LHIB's ENSMS).					
14	Review statutory requirements, international and Australian standards, industry codes and guidelines and update internal documents as necessary to comply with any changes or document reason for non-use,					

Item #	Description	Compliant	Identified Gaps or Comments	Action	Responsible Person	Due Date
	non-compliance or alternate provisions. (See Part 3 of LHIB's ENSMS).					
15	Review resourcing, management structure, responsibilities, accountabilities and authorities including network authorisations. Review: • Part 1 of LHIB's ENSMS • LHIB HV/LV Authorisation Register – Excel spreadsheet • etc.					
16	Training and competency of staff and contractors is satisfactory and meets requirements. Review: • LHIB HV/LV Authorisation Register – Excel spreadsheet. • Part 5 of LHIB's ENSMS. • etc.					
17	Resource requirements are adequate including for planned and unplanned outages, worker					

Item #	Description	Compliant	Identified Gaps or Comments	Action	Responsible Person	Due Date
	leave entitlements, worker training requirements.					
18	Consultation with landowners, employees, employee representative organisations, contractors, other departments, emergency authorities, regulatory authorities' government agencies has occurred as necessary. Review: • Notification of outages • etc.					
19	Records for the safe design, construction, commissioning, operation, maintenance and decommissioning of the network including legislation, standards, codes, guidelines, procedures, and incidents have been maintained. Review: • Old and new versions of documents stored. • Incident records maintained. • Switching sheets. • Access permits.					

Item #	Description	Compliant	Identified Gaps or Comments	Action	Responsible Person	Due Date
	• HV sticks test results • etc.					
20	Part 2 - Customer installation safety effectively managed. Review: • Process for new installation or additions and alterations complied with • Unsafe or defective installation management • Disciplinary action taken against electrical contractors where necessary • Reporting to Fair Trading of incidents involving electrical articles or electrical installations.					
21	Part 3 - Planning, design, construction & commissioning compliance. Review: • Plans for new work or alterations meet justification and other requirements • Construction -suitable contractors used					

Item #	Description	Compliant	Identified Gaps or Comments	Action	Responsible Person	Due Date
	• Commissioning meets requirements • Materials used meet Australian Standards					
22	Part 4 - Network maintenance compliant. Review: • Review maintenance standard comply with Australian Standards, ENA guides, WH&S requirements etc. • Powerhouse, substations, HV switchgear and LV switchgear maintained as specified in manufacturer and Part 4 of LHIB's ENSMS docs • Defects rectified/repaired within suitable timeframes • Adequate network spares					
23	Part 5 - Operational issues compliant. Review: • Network schematic displayed at the Powerhouse • Suitably qualified staff • Authorised staff/contractors					

Item #	Description	Compliant	Identified Gaps or Comments	Action	Responsible Person	Due Date
	• PPE suitable and used • Staff inducted • Electrical Safety Rules compliance • HV permit system compliance • Geographical and schematics maintained • Workers understand their responsibilities • Hazemeyer not operated on load or when fault finding - LV opened off before • Switching sheets used • Patrol of assets before restoration • Priority to hospital and life support customers with restoration • Replace all three HV fuses when one blown • Adequate stores of clean diesel • HV tools tested and tagged					
24	Part 7 – Emergency management complaint. Review: • Emergency plan (Part 6) understood					

Item #	Description	Compliant	Identified Gaps or Comments	Action	Responsible Person	Due Date
	• Plan enacted if necessary					
25	Part 8 – Decommissioning of network assets meets Australian Standards, codes, guidelines, and statutory requirements including those for: • Safety outcomes • Environmental outcomes					
26	Part 9 – Communication and reporting compliance. Review: • Community consultation • Local emergency service consultation • Electrical contractor consultation • Reporting to the LHIB • Annual performance and bushfire preparedness reports and incident reports to IPART • Incident reporting to NSW Fair Trading					
27	Part 10 – Monitoring, measurement and auditing meet requirements. Review:					

Item #	Description	Compliant	Identified Gaps or Comments	Action	Responsible Person	Due Date
	• Maintenance targets meet • Number and length of outages • Power quality complaints investigated					
28	Part 11 – Public Safety Plan compliance. Review: • Previous safety campaigns • Establish upcoming campaigns					
29	Part 12 – Electrical Safety Rules compliance. Review: • Incidents • Australian Standards, etc.					

Review Completed By: _____Date: _____

APPENDIX B – Revision History

VERSION NO	REASON FOR UPDATE	DATE ISSUED
1	Initial Release as Approved by the Board	December 2016
1.1	Audit checklist update with new items 20 to 29. Some existing items updated.	October 2017

ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM

PART 11

PUBLIC ELECTRICAL SAFETY AWARENESS PLAN

This Plan was introduced in 2016 and will continue to be in effect until it is removed from service. This plan will undergo regular review in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 and AS5577-2013. This Plan will be systematically reviewed against legislation and regulation applicable to distribution and transmission network service providers, industry standards including AS5577, the Lord Howe Island Board's strategic plans and relevant internal policies, procedures and standards and our regulatory determination. This plan will be updated as necessary in line with the outcome of these reviews.

In accordance with the NSW Electricity Supply (Safety and Network Management) Regulation 2014, this Plan will be made available to all stakeholders who are likely to be involved in its implementation.

This Electricity Network Safety Management System Public Electrical Safety Awareness Plan is available on the Lord Howe Island Board's website (www.lhib.nsw.gov.au). Printed copies of this Plan are available at the Lord Howe Island Board's office – 5 Bowker Avenue, Lord Howe Island NSW 2898.

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PART 11 - PUBLIC ELECTRICAL SAFETY AWARENESS PLAN

11.1. INTRODUCTION

This Plan is part of the Lord Howe Island Board's (LHIB) Electricity Network Safety Management System (ENSMS) addresses the methods of informing the public of electrical safety issues related to the LHIB's electricity network and electrical safety issues with customer's electrical installations.

The LHIB is committed to ensuring a safe and reliable electricity supply to all our customers by operating and maintaining our electrical network to as high as standard as reasonably practicable.

The LHIH has developed this Plan to meet this commitment and to comply with the requirements of Electricity Supply (Safety and Network Management) Regulation 2014 (NSW) and AS5577-2013: Electricity Network Safety Management Systems.

Our initiatives (see Section 11.3) are identified from incidents and accidents, our network risk analysis and other data sources.

The LHIB will inform the Island community of the identified risks and recommended controls using all reasonable means. These means are likely to include specific newsletters, board newsletters, local radio, community noticeboards, school visits and the web (refer LHIB ENSMS Communication and Reporting Plan).

11.2. OBJECTIVES

The LHIB's ENSMS Public Electrical Safety Awareness Plan objectives are to:

- Reduce the risk of harm to the community from electrical issues;
- Raise awareness of the hazards related to the Island's electricity network;
- Raise awareness of electrical issues identified through our electrical safety initiatives;
- Encourage the safe electrical practices.

11.3. ELECTRICAL SAFETY INITIATIVES

11.3.1 Underground Cable Safety

The LHIB has an underground cable network for the distribution of electricity on the Island. You should check with us before carrying out any excavation works to ensure safety at the site and eliminate electrical network damage. This applies to works on both private and public lands.

The LHIB's Senior Electrical Officer will provide advice and/or conduct a cable location as required - this is a free service.

Any suspected damage to the electricity network should be immediately reported to the LHIB's Senior Electrical Officer.

The Safework Australia's *General Guide for Working in the Vicinity of Overhead and Underground Electric Lines* and *Working in the Vicinity of Overhead and Underground Electric Lines Information Sheet* provides useful guidance for work near underground powerlines.

11.3.2 Damaged Network Equipment

LHIB encourages members of the public to report any damage to network equipment such as transformers, pillar boxes, underground cables or streetlights.

11.3.3 Switchboard Upgrades

Residual current devices, or safety switches as they are often called, are now used to protect electrical circuits when constructing or modifying a new building. These safety switches help to significantly improve customer safety on outgoing installation circuits. Safety switches are easily identified by a “test button” located on the front of the switch.

The LHIB strongly recommends that you replace all old circuit protection with safety switches. You will need to contact your electrical contractor to arrange for the replacement works.

11.3.4 Electric Shocks

Electric shocks, no matter how small, from appliances, switchboard boxes, water taps, metallic downpipes and roofs, require investigation from suitably qualified personnel. Contact the LHIB’s Senior Electrical Officer as soon as possible for assistance if this occurs. In the meantime, ensure you and your family stay clear of all metallic items.

11.3.5 Electrical Product Safety Recalls

Electrical products are recalled from time-to-time due to safety concerns. We recommend that the community regularly check the ACCC’s Product Safety Recall Australia’s website, www.recalls.gov.au and/or sign up for their email alerts.

The LHIB will seek to notify the Island community where we are aware of electrical products that we believe are likely to affect the wider community.

11.3.6 DIY Electricity Safety

Do-it-yourself (DIY) renovations and repairs have become more popular in recent times. However, DIY electrical work is not only dangerous but is also illegal in NSW. **You must always use a licensed electrical contractor** for any electrical repairs or installation work.

If you have any safety concerns, please contact our Senior Electrical Officer for advice.

11.3.7 Lightning Awareness

Lightning can have disastrous and devastating consequences. The Island community should take precautions when storms are likely. Precautions for lightning include:

- Install lightning protection in switchboards and/or use surge protection boards on sensitive electronic equipment;
- Shut down computers and unplug appliances before any storm activity.
- Seek shelter indoors and avoid contact with electrical appliances, metal pipes and metal fixtures, stay clear of windows and glass doors and avoid using fixed telephones.

11.3.8 General Electrical Safety

The following advice should be used as a guideline for electrical installations:

- Install safety switches on all circuits (see Section 11.3.3)
- Test safety switches with the “test button” every 6 months if possible;
- Never put a metal object in a toaster or power point.
- Don’t use electrical appliances or power cords where there is water;
- Use an appropriately rated extension lead and one that is not too long;
- Unwind extension leads before use to help prevent overheating;
- Never use more than one double adaptor in a single power point and try to avoid their use altogether;
- Don’t overload power boards;
- Use a licensed electrical contractor if renovating;
- Contact us before digging (see Section 3);

- Replace damage appliances or leads;
- Check for wires before drilling into walls, floors and ceilings;
- Keep a battery-operated torch in case of a blackout.

11.3.9 Electrical Safety of Emergency Safety Personnel

ENA DOC 008 provides guidance on electrical safety of emergency safety personnel. The LHIB encourages emergency service personnel to become familiar with the requirements of this document.

11.4. PLAN REVIEW

This plan will be reviewed and amended as required, to meet the LHIB ENSMS Monitoring, Measurement and Audit Plan.

Part 12
Electrical Safety Rules

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PART 12 ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM ELECTRICAL SAFETY RULES

12.1 SCOPE AND PURPOSE

These Lord Howe Island Board Electrical Safety Rules are mandatory and minimum requirements for ensuring the safety of employees and contractors when working on, near or testing electrical apparatus associated with the generation and distribution of electricity at Lord Howe Island.

A contractor may use their own Rules if their Rules are equal to or more stringent and provide safer outcomes than these Rules.

These Rules will be supplemented, where necessary, by documented procedures which provide for the safe application of these Rules.

In addition to these rules the specific requirements of the following also apply:

- Electricity Supply (Safety & Network Management) Regulation 2014;
- AS/NZS 4836 Safe working on low-voltage electrical installations;
- Safe Work Australia – Managing electrical risk in the workplace;
- Safe Work Australia – General guide for working in the vicinity of overhead and underground electric lines

12.2 REFERENCES

AS/NZS 4836 Safe working on low-voltage electrical installations

Electricity Supply (Safety & Network Management) Regulation 2014.

Work Health and Safety Act 2011 (NSW)

Work Health and Safety Regulation 2011 (NSW)

Section 7 NSW Service and Installation Rules

Safe Work Australia – Managing electrical risk in the workplace

Safe Work Australia – General guide for working in the vicinity of overhead and underground electric lines

12.3 DEFINITIONS

Access permit earths - means earthing and short circuiting equipment applied to electrical apparatus to ensure the safety of persons working on or near electrical apparatus.

Apparatus - means an item or combination of items of plant or equipment.

Approach distance – means the minimum separation in air from an exposed conductor that must be maintained by a person, or any object held by or in contact with the person.

Approved - means approved in writing.

Authorised - means a person approved in writing to carry out designated functions associated with the supply and use of electricity.

Cable - means an insulated conductor, or two or more such conductors, laid together, whether with or without fillings, reinforcements or protective coverings e.g. an underground cable.

Conductor - means a wire, cable or form of metal designed for carrying electric current.

Danger tag - means an approved tag, in accordance with Australian Standard 1319, affixed to a device as an instruction against the operation of the device.

De-energised - means separated from all source of supply but not necessarily isolated, earthed, discharged or out of commission.

Designated working area - means that area, defined by an approved method, where it is safe to carry out

work or test on or near high voltage exposed conductors.

Disconnected high voltage apparatus - means high voltage electrical apparatus which cannot be energised by operating work because of the absence of electrical connections to all sources of electrical supply.

Earthed - means directly electrically connected to the general mass of earth to ensure and maintain the effective dissipation of electrical energy.

Electrical apparatus - means any apparatus including an overhead line, cable, conductor, generator, machine, motor, transformer or switchgear, supplied at high or low voltage used in the generation, transmission and distribution of electricity.

Electrical station - means any enclosed substation or switching station, whether of the indoor, outdoor or underground type.

Electrical worker - means a worker in the employment of Lord Howe Island (whether under a contract of employment or apprenticeship) and includes a contractor, and a person employed by a contractor, who carries out work for Lord Howe Island.

Employer - means Lord Howe Island.

Energised (live) – means connected to a source of electrical supply or subject to hazardous induced or capacitive voltages.

Exposed conductors - means an electrical conductor that is hazardous because it has not been protected by a barrier or rigid material or by insulation that is adequate for the voltage concerned, under a relevant Australian Standard.

Extra Low Voltage – means a voltage not exceeding 50 volts a.c. or 120 volts ripple free d.c.

Fault finding – means a process of making measurements or carrying out tests on the electrical installation in order to prove operability or locate faults.

Generating station - means a building or enclosure where electrical energy can be generated at high voltage or generated at low voltage and subsequently transformed to high voltage.

High voltage - means an operating voltage of more than 1000 volts alternating current or 1500 volts direct current between phase conductors or between phase conductor and earth.

Isolated - means disconnected from all possible sources of electrical energy by opening switches, opening or withdrawal of circuit-breakers removal of fuses, links, connections and the like and rendered incapable of being energised unintentionally.

Live - means connected to a source of electrical supply or subject to hazardous induced or capacitive voltages.

Low voltage - means a voltage exceeding extra low voltage, but not exceeding 1000 volts alternating current or 1500 volts direct current.

Near - means, when there is a reasonable possibility of a person's body; or any object which the person might be carrying or touching during the course of work or test (other than an object that is designed for use on energised conductors of the same voltage), coming closer to the conductor than the minimum safe working distances.

Operating work - means work involving the operating of switches, the opening or closing of links or other connections intended for ready removal, the removal or replacement of fuses, proving that electrical conductors are de-energised and the earthing and short circuiting of electrical apparatus.

Permit - means a pre-printed form which, when issued in accordance with a documented procedure approved by Lord Howe Island, gives permission to the recipient to work or test, as described, on defined apparatus. A Permit may take the form of an Access Permit or Permit To Work.

Safety Observer – is a person specifically designated the duty of observing and warning against unsafe approach to electrical apparatus or other unsafe conditions.

Shall - is to be understood as mandatory.

Should – indicates a recommendation.

Supply - means all forms of energy including electrical, nuclear, thermal, mechanical, pneumatic, hydraulic, chemical or stored energy.

Tape Barrier - is a marker to delineate between areas having energised electrical apparatus and the de-energised electrical apparatus i.e. it defines the safe work area. It is used in connection with isolation, working earths and access permits and shall be coloured yellow.

Testing – means the use of logical methodology or test instruments or test equipment by an electrical

worker to test for the integrity and operability of energised circuits and apparatus of an electrical installation or electrical equipment

Working earths - means earthing and short circuiting equipment that ensures equipotential conditions at the location where work is to be performed on electrical apparatus. **NOTE:** These earths are applied additional to access permit earths.

12.4 GENERAL

12.4.1 TRAINING, ASSESSMENT AND AUTHORISATION

Electrical workers must be authorised by the Lord Howe Island Board (LHIB) to carry out any designated functions under these safety rules and should be assessed as competent to perform such tasks. They shall be reassessed at regular intervals to ensure their competency is maintained.

Training and authorisation requirements are detailed in the LHIB Electrical Network Safety Management System (ENSMS) Operations Plan.

12.4.2 HAZARD ASSESSMENT AND RISK CONTROL AND SITE INDUCTION

All work must first be assessed to ensure safety and risk control measures are introduced as required. If hazards cannot be adequately controlled then work should cease. This process should be carried out to meet the requirements of LHIB's standard work procedures and Safe Work Methods Statements.

A site specific induction shall be carried out to ensure that all workers are aware of hazards, control measures to be used and workers responsibilities and duties.

Care should be taken when working areas of reduced mobility because of the restriction of movement and the inability to readily escape from the area. Control measures are needed in areas of vehicular or pedestrian movement.

Work areas shall be provided with adequate and suitable lighting.

12.4.3 AWARENESS

All persons, including electrical workers and safety observers, working near electrical equipment shall understand the potential hazards involved. They should be capable of always maintaining an adequate physical and mental ability when working on or near electrical equipment.

Work shall not be undertaken if personnel are temporarily or permanently physically or mentally impaired from such things as influence of alcohol, drugs, fatigue or are injured to a level that adversely affects work performance.

12.4.4 NO WORK ON LIVE ELECTRICAL APPARATUS

The NSW Work Health and Safety Regulation has strict requirements for work on 'live' electrical apparatus. Lord Howe Island Board has a general policy of no work on 'live' Low Voltage (LV) electrical equipment and apparatus except for testing as allowed by the Regulation.

Compliance with the Part 4.7 of the NSW Work Health and Safety Regulation 2011 will be required for any electrical work on 'live' LV electrical apparatus but only where:

(a) it is necessary in the interests of health and safety that the electrical work is carried out on the equipment while the equipment is energised, or

> **Example.** It may be necessary that life-saving equipment remain energised and operating while electrical work is carried out on the equipment.

(b) it is necessary that the electrical equipment to be worked on is energised in order for the work to be carried out properly, or

(c) it is necessary for the purposes of testing de-energised (see Section 5.5), or

(d) there is no reasonable alternative means of carrying out the work.

A Safe Work Method Statement will need to be developed for the 'live' work and work shall follow a standard work procedure. Both documents and the 'live' work shall comply with the Code of Practice for Managing Electrical Risks in the Workplace and the NSW Work Health and Safety Regulation.

12.4.5 Minimum Safe Working Distances for Accredited Personnel

No part of an accredited person's body or material or equipment not insulated for the voltage concerned must come closer than the following minimum safe working distances for energised exposed electricity works specified in Table A. A safety observer must be used when inside the ordinary person's safe approach limits.

TABLE A

Nominal phase to phase a.c. voltage (Volts)	Approach Distance (m) for Accredited Persons with a Safety Observer	Ordinary Persons (m)
Insulated low voltage conductors up to 1,000, including LV ABC	0.5	3.0
Uninsulated low voltage conductors up to 1000	1.0	3.0
Above 1,000 up to and including 33,000	1.2	3.0

12.4.6 PROTECTIVE CLOTHING AND EQUIPMENT

Personal protective equipment worn by electrical workers shall be appropriate for the purpose, fit correctly, be maintained in good condition and conform to relevant Australian Standards. Arc rated clothing shall be worn by all electrical workers when working on, near or operating 'live' electrical equipment.

The personal protective equipment worn will depend upon the situation and work being performed. It may include face protection, eye protection, footwear, insulating gloves, noise protection, face shields, clothing and safety helmets.

12.4.7 INAPPROPRIATE PERSONAL EQUIPMENT

Metallic personal items including watches and watchbands should not be worn by workers carrying out work near exposed energised parts. Metal objects worn on or close to the body increase the risk of electric shock. Additionally, electrical burns can be more serious because these objects retain heat and provide contact points for current to flow.

Examples of metallic personal items include jewellery, body piercings and metal spectacle frames.

12.4.8 TOOLS AND EQUIPMENT

12.4.8.1 Inspection and testing

Tools, instruments and equipment shall be fit for purpose, in good order, regularly maintained and tested, where required. Where doubt exists to the suitability or adequacy of tools and equipment, they should not be used.

Tools shall be inspected for suitability and safety before use. Tools, instruments and equipment that are poorly maintained, inappropriately used or not fit for purpose can cause injuries and shall not be used.

Maintenance and inspection should be carried out according to manufacturer's instructions.

Workers should be trained and competent in the safe and effective use of tools and equipment or they shall not be used.

12.4.8.2 Insulated Tools

Insulated tools and equipment must be suitable for the work and be maintained in good working order, including by regular maintenance, inspection and testing. Where any doubt

exists that the insulation of tools and equipment might not be adequate they should not be used.

When working near exposed energised parts or working energised, the tools and equipment used should be non-conductive or insulated including:

- torches;
- telescopic devices;
- rulers and tape measures;
- insulated hand tools, for example screwdrivers, pliers, cable cutters, spanners and crimpers;
- electrical or hydraulic powered tools.

12.4.8.3 Tool Holders and Restraints

Unrestrained tools may fall into energised switchboards and compromise the integrity (including safety) of the equipment or drop and injury persons. The use of lanyards around wrists, tool holders and restraints such as tool pouches and baskets may be used to address these risks.

12.4.8.4 RCD Protection

All portable electrical tools shall be supplied through a fixed or portable 30mA RCD. Portable RCD's should be used at the supply end of extension cords. Caution shall be exercised when using portable electrical tools and equipment having exposed conductive parts where there is a risk of coming into contact with energised parts e.g. drilling into concealed conductors.

12.4.8.5 Ladders

Metallic, wire reinforced or otherwise conductive ladders shall not be used in close proximity to equipment where an electrical hazard may result from their use. They shall not be used for any kind of electrical work.

Ladders shall:

- Comply with Australian Standards;
- Be capable of carrying 120kg;
- Be the correct size and length;
- Be provided with anti-slip feet where practicable;
- Carry only one person unless a rescue is being performed;
- Be located and positioned to provide a safe and secure working medium;
- Be secured at the top by securing the ladder head, or held secure by other means e.g. held at the base by an assistant.

Persons should not over reach when working from ladders.

Persons working at heights shall be, wherever practicable, constrained by an appropriate fall arrest device e.g. safety harness. Safety harnesses shall be worn and suitably attached when working from an elevated work platform.

12.4.8.6 Insulated Covers and Mats

Electrical insulating covers and mats shall comply with AS/NZS 2978. Insulating barriers shall be made of a suitable material to effectively isolate electrical workers from adjacent energised equipment.

Insulated covers and mats shall be visually inspected for possible defects before and after each use.

12.4.8.7 Test Instruments

Instruments and test devices shall be:

- suitable for the testing or measurement application in terms of functions that they perform, operating voltage, voltage range and accuracy;
- be properly maintained and in good condition and working order, clean and have no cracked or broken insulation. Particular care must be taken regarding the condition of the insulation on leads, probes and clips of test equipment;
- pose no danger of electrocution to workers or damage to the electrical equipment during testing;
- suitably insulated to minimise risk to the electrical worker;
- have suitably insulated leads and connection probes that enable connection or contact with energised parts to be made with minimal risk to the electrical worker
- provide suitable protection against hazards arising from over-voltages that may arise from or during the testing or measurement process;
- suitably protected against hazards arising from overvoltages that may arise during the testing or measurement process. At low voltage, this relates to the category rating and voltage as provided by Australian Standard AS61010.1 e.g. Cat III 600 Volts;
- inspected before and after use to confirm the device is operating correctly;
- used in accordance with the manufacturers operating instructions;
- used by electrical workers trained and competent in test procedures and in the use of test equipment;
- used to TEST BEFORE YOU TOUCH.

Voltage or electric field strength proximity testers;

- Shall not be used to test cables surrounded with metallic screen, enclosed in metallic pipe or duct or cables carrying direct current;
- Shall be tested before and immediately after use when used to prove de-energisation, particularly if the test result indicates zero voltage, to confirm the instrument is still working correctly;
- Should not be relied upon to prove isolation in all circumstances;
- Show a positive indication then an alternate test instrument shall be used, that incorporates a visual display, to establish the circuit voltage before commencing work.
- Shall be supplemented with a volt meter when proving LV de-energised before commencing work.

12.4.8.8 Earthing and Short Circuiting Equipment

Earthing and short circuiting equipment must be:

- capable of carrying the prospective peak fault current for a period equal to back up protection clearing time; and
- approved for its intended use; and
- applied immediately after proving de-energised; and
- specifically designed for the type of switchgear concerned.

12.4.9 SAFETY OBSERVERS

Safety observers shall be present when electrical work is performed near energised circuits and wherever the risk assessment process identifies the need.

A safety observer shall be used as a control measure wherever the risk assessment process identifies the need when testing is carried out on an energised circuit or apparatus.

The safety observer shall be competent to perform the particular task that is being carried out and also competent in isolation techniques, electrical rescue and cardiopulmonary resuscitation.

The safety observer shall:

- Be specifically instructed in their duties on each occasion;
- Be hazard and risk aware;
- Be positioned at a suitable location to effectively observe;
- Continuously observe that safety procedures are carried out by the workers performing the work;
- Give warning when necessary to warn of dangers including inadvertent contact with energised electrical circuits and apparatus;
- Be able to warn and if necessary stop the work before the risks become too high;
- Not carry out any other work or function that compromises their role as a safety observer;
- Must not observer more than one task at a time;
- Be able to communicate quickly and effectively with the electrical workers performing the work including operators of mobile plant if observing for mobile plant;
- Ensure that all personnel stay outside specified approach distances;
- Be capable of providing assistance in the case of emergency;
- Be suitably attired with personal protective equipment appropriate for the situation;
- Not have temporarily or permanently disabilities that would adversely affected their role and performance;
- Remain at the work site at all times while a potential hazard exists;
- Have a low voltage rescue kit available at the site for low voltage work.

12.4.10 IDENTIFICATION OF APPARATUS

All apparatus shall be clearly identified by labels or signs, which shall be updated if any alterations have taken place.

12.5 REQUIREMENTS TO MAKE APPARATUS SAFE FOR WORK OR TEST

12.5.1 Isolation

Electrical equipment and apparatus must not be inadvertently re-energised while work is being carried out.

All points of supply and sources of energy shall be correctly identified and isolated by an authorised person.

12.5.2 Lock Out

Energy sources shall be isolated at all sources of supply as provided by Section 5.1 and locked out.

If more than one person is working on the same de-energised electrical equipment, individuals should ensure their own personal lock is applied to the isolation point, wherever possible.

12.5.3 Danger Tags

Danger tags should be attached to normal locks on electrical equipment or where the isolation is carried out by an operator and the isolation is remote to the site. Any device used as a point of isolation shall have a danger tag affixed.

Danger tags do not replace the use of locks.

Danger tags are used for the duration of the electrical work to warn persons at the workplace that:

- the electrical equipment is isolated or out of service
- the electricity supply must not be switched back on or reconnected
- reconnecting electricity may endanger the life of the electrical worker(s) working on the equipment.

The danger tag should:

- be durable and securely fixed to the isolator
- clearly state the warning, including any warning about specific hazards relating to the isolation (for example, multiple points of supply)
- be dated and signed by the worker or workers involved in carrying out the work or, where appropriate, by the supervisor in charge of the workers
- be attached in a prominent position on each isolation point (i.e. the point or one of many points used to isolate electrical parts) or device
- only be removed by the signatories to the tag.

If the work is incomplete, for example at a change of shift, the last person removes their danger tag or lock and replaces it with a warning tag e.g. out of service or caution.

When work is resumed, the person in charge of the work removes the warning tag (out of service or caution) and each person then applies their danger tag and/or lock.

When work is finally completed, each person removes their danger tag and/or lock.

Section 5.3 shall be followed where an access permit is used.

If a danger tag signatory or owner of a lock is unavailable and unable to return, the manager for the electrical department shall take the following measures before removing the lock and/or tag:

- thoroughly investigate to ensure all workers and others at the workplace are safe;
- ensure the worker has left the site and will not be returning;
- advise the worker that his/her lock has been removed and supply will be restored;
- Discuss and/or check that work has been completed and all necessary safe checks and tests have been performed.

12.5.4 Out of Use Tags

Out of service or caution tags are used to identify electrical equipment that is not safe to use or fit for purpose. The out of service or caution tag should:

- be durable and securely attached
- clearly state the nature of the defect or reason why the electrical equipment is unsafe
- be attached on a prominent position on each isolation point
- only be removed by a competent person after fixing or rectifying the defect and making the electrical equipment safe, or replacing with a danger tag in preparation to work on the equipment.

The equipment to which the tag is attached must NOT be operated for the period that the tag is attached.

Example of a danger tag and out of service tags

12.5.5 Testing

The safe work principle 'TEST FOR 'DEAD' BEFORE YOU TOUCH' must be applied at all times.

Even if the electricity supply is believed to have been isolated, it must be assumed that all conductors and electrical components are energised until they have been proven deenergised.

Testing for 'dead' must be undertaken as appropriate for the duration of the electrical work. Testing is undertaken prior to touching, taking into account all relevant factors including the nature of the conductor, nature of the isolation, nature of work, if there has been a change or the area has been left idle (unattended) for a period.

The testing method (including the tester used) must be safe and effective. The electrical worker carrying out the testing must understand testing procedures and be competent in the use of the tester.

Panel voltmeters should not be used as the only method of determining whether an electrical part is de-energised.

If voltage testers are used they should be tested for correct operation immediately before use and again after use to confirm that the instrument is still working. This check should be considered to be part of the 'TEST FOR 'DEAD' BEFORE YOU TOUCH' safe work principle.

If there are any exposed conductors in the immediate work area they should be separated by design or segregated and protected with insulated barricades, insulated shrouding or insulated material to prevent against inadvertent or direct contact.

Testing should be carried out using a proximity tester and followed by a multimeter for LV.

12.5.6 ACCESS PERMIT PROCESS

The general process for issuing a permit after the HV network, or parts thereof, have been isolated and locked out shall be as follows:

1. The authorised switching operator shall issue the "Access Permit for Work on High Voltage Electrical Equipment" to the authorised recipient, typically the person in charge of the work on the isolated HV equipment. The responsibilities of the person issuing the access permit are provided at Section 12.5.6.2.

   The authorised switching operator may also be the authorised recipient.

2. The authorised recipient accepts the access permit from the authorised issuer. The responsibilities of the person accepting the access permit are provided at Section 12.5.6.3.
3. Persons required to work or test under an access permit shall sign on the permit. The responsibilities of these persons are provided at Section 12.5.8.2.
4. Transfer of a permit from the original recipient is allowed as provided by Section 12.5.9.
5. The access permit can be cancelled once all work is completed. The principles and responsibilities for cancelling a permit are provided at Section 12.5.10.
6. The electricity supply can be restored once the access permit is cancelled and all requirements provided by Section 12.5.11.
7. Unfinished work must comply with the requirements of Section 12.5.12.

12.5.7 ISSUE OF A PERMIT

12.5.7.1 General

Permits shall be used for access to all HV equipment and where assessed as needed for access to LV equipment as follows:

i each permit should have a unique number.

ii a permit shall only be issued by an authorised person, typically an authorised switching operator and typically the LHIB's Senior Electrical Officer.

12.5.7.2 Responsibilities of Persons Issuing a Permit

The person issuing a permit shall ensure;

i the steps of the instruction, appropriate to the description of work or test on the permit to be issued have been carried out, are adequate for the work or test to be performed, and are recorded (as appropriate) as having been carried out; and

ii there are no altered conditions which may affect the safety of work or test under the permit; and

iii any warnings or instructions, as may be applicable, are entered on the permit and are communicated to the person receiving the permit; and

iv the person receiving the permit is authorised to receive a permit for the work or test concerned; and

v that the permit is endorsed as having been issued.

12.5.8 RECEIPT OF A PERMIT

12.5.8.1 Responsibilities of Persons in Receipt of a Permit

The person in receipt of the permit shall ensure;

i the work or test can be safely carried out (and where testing is involved the person in receipt of the permit shall be the person in control of the test); and

ii the description of apparatus and the description of work or test as shown on the permit corresponds to that requested; and

iii any warnings are clearly understood and that they are satisfied the isolation, earthing and short circuiting, if applicable, cover the work or test to be carried out; and

iv no work or test is performed until the permit has been signed; and

v the identity of the apparatus to be worked on or tested is identical to that shown on the permit; and

vi they safeguard the permit until its return; and

vii that all persons required to work or test under the permit have been instructed as to the apparatus to be worked on, its identification details and the description of work or test to be carried out; and

- are given warnings and/or demonstrations appropriate to the work or test to be carried out; and
- sign on the permit to indicate that they understand the warnings / demonstrations given and their responsibilities under the permit; and
- sign off the permit at the completion of their work or test.

12.5.8.2 Responsibilities of Persons Allocated to Work or Test Under a Permit

Persons required to work or test under a permit shall;

i sign on the permit to indicate they understand the warnings/demonstrations given and their responsibilities under the permit; and

ii follow any safety directions given by the person in receipt of the permit; and

iii if temporarily leaving the work or test site sign off the permit and upon their return and, before recommencing work or test, confirm the identity of the apparatus on which they were working or testing and sign on the permit.

12.5.9 TRANSFERRING OF A PERMIT

The transfer of the Access Permit from the original Access Permit Recipient (transferor) to another Access Permit Recipient (transferee) can occur for cases where the original recipient is unable to continue work or must leave the work area.

If the intended transferee Recipient has already signed on the Access Permit under "Issue" that person must sign under "Cancellation" before becoming the new Access Permit Recipient.

The transferee must be authorised to receive an Access Permit.

The new recipient must ensure that they are fully aware and fully understand the associated conditions of the Access Permit.

12.5.10 CANCELLATION OF A PERMIT

12.5.10.1 Principles

i When work or test as described on the permit is completed, or no longer required, the permission to work or test may be revoked. This is achieved by the cancellation of the permit.

12.5.10.2 Responsibilities of Persons Cancelling a Permit

Where a permit is to be cancelled, the authorised person shall ensure that:

i All work applicable to their access permit has been completed.

ii All persons are signed off, equipment and tools are clear of the apparatus.

iii All earths they are responsible for have been removed.

iv The equipment is serviceable.

12.5.11 RESTORING SUPPLY

All reasonable steps must be taken to ensure that restoring electricity supply following isolation does not pose risks to health and safety at the workplace including:

- appropriately terminating all conductors and ensuring all equipment is safe to restore supply;
- carrying out appropriate testing on any new, altered or repaired electrical equipment;
- removing safeguards, including temporary bonds and short-circuiting devices;
- notifying all workers working on the electrical equipment and other affected workers at the workplace that electricity is to be restored;
- cancelling any access permit;
- taking precautions as appropriate to ensure that other electrical equipment is not inadvertently energised;
- following procedures for removing any locks (or other control mechanisms), tags, notices and safety signs;
- carrying out a visual inspection to ensure that all tools, surplus material and waste has been removed from the workplace.

Any appropriate tests must be carried out once the supply has been restored to ensure safety.

12.5.12 LEAVING UNFINISHED WORK

If work is left unfinished, the workplace must be left in a safe state including:

- terminating any exposed conductors;
- physically securing any exposed conductors or surrounding metal work;
- tagging, taping off the electrical equipment and the workplace area;
- informing affected persons at the workplace the work is not complete and advising of potential hazards;
- taking any necessary precautions to ensure that electrical equipment cannot become inadvertently re-energised;
- ensuring that the status of switchboards and electrical equipment are clearly and correctly labelled;
- handing over adequate information to workers taking up the unfinished work to allow them to continue the work safely.

12.6 HIGH VOLTAGE APPARATUS

12.6.1 Access to High Voltage SWITCHGEAR

12.6.1.1 Access

i Doors giving access to high voltage switchgear shall be kept locked shut at all times when not in immediate use.

ii When a door is used to provide an established entrance to a designated working area, in association with the issue of a permit, it shall be fastened open during the currency of the permit.

iii Doors and access ways shall be kept free of obstruction to ensure ready access and exit in case of emergency.

iv A person shall not access energised high voltage conductors unless the person;

a) is authorised; or

b) has been specifically instructed by an authorised person, on the site, as to the limits of the area that may be entered, the dangers existing and the precautions that shall be observed; or

c) is accompanied by an authorised person.

12.6.2 OPERATING WORK

i The operation of high voltage apparatus (such as circuit breakers, earthing switches, disconnectors, links, fuses and similar devices) shall only be carried out by an authorised person. Such operations shall be carried out using approved procedures.

ii Operating work associated with a permit may require processes such as switching, proving de-energised, earthing, locking, tagging, or erection of barriers and/or notices.

iii Operating work may not be regarded as work on or near high voltage exposed conductors provided;

- the work can be carried out in a safe manner; and
- the electrical worker has been instructed in respect of the work to be carried out and the precautions to be observed; and
- specially designed operating rods and other equipment are used; and
- The equipment is in good condition and regularly maintained; except
- The operation of Hazemeyer switchgear which will only be operated at 'no load' and using the appropriately rated arc suit. Hazemeyer switchgear shall not be operated when fault finding.

iv Prior to any new or previously disconnected high voltage apparatus being connected to the system the operator shall ensure that;

- all security fences, gates, apparatus identification, warning signs, locks, etc., are in place; and
- all persons shall regard the apparatus as being energised; and
- as far as practicable, the apparatus has been checked and tested to ensure it is functional and safe to be energised.

12.6.3 WORK ON OR NEAR HIGH VOLTAGE EXPOSED CONDUCTORS

12.6.3.1 Requirements to Make High Voltage Exposed Conductors Safe for Work

Further to the general principles in Section 5, the following applies:

i When work or test is to be performed on or near high voltage exposed conductors, before personnel commence work or test, the conductors shall be isolated, proved de-energised, access permit earths applied and a permit issued.

ii A permit need not be issued where there is immediate risk to human life or property which requires actions regarded as work or test on or near high voltage exposed conductors, the conductors shall be isolated, proved de-energised, earthed and short circuited.

iii If the work party considers the safeguards provided by the rules or procedures to be inadequate, they may request additional precautions be taken.

iv Conductors shall be isolated from all sources of high voltage in accordance with approved procedures. The points of isolation shall be locked (where practicable) and a danger tag affixed.

In addition the points of isolation may include; low voltage sources of supply which can cause the conductors to become energised at high voltage neutral connections of generators and transformers from common portions of any neutral system

v Conductors shall be proved de-energised at the proposed point of application of an earth with an approved form of test equipment used in accordance with an approved method.

vi Access permit earths shall be connected to high voltage conductors, as follows;

- as close as practicable to the point of work or test such that their placement shall not be affected by the work or test to be done;
- between each point of isolation and the place of work or test;
- to ensure that induced voltages do not pose a threat to the work party;
- for work or test on capacitor voltage transformers, on both high voltage and low voltage conductors'
- for work or test on capacitor banks, on the high voltage conductors and the star point of the capacitors'
- where high voltage conductors can be energised from a low voltage supply, they shall be isolated, test de-energised, earthed and short-circuited.

12.6.3.2 Designated Working Areas

i Prior to the issue of a permit, the designated working area shall be defined using yellow tape barriers where appropriate. This barrier must indicate as clearly as possible the area in which work is to be performed and to indicate the dividing line between energised electrical apparatus and the electrical apparatus on which it is safe to perform work.

ii The layout of the designated working area shall be established by an authorised person.

iii All designated working areas shall;

- be established only after isolation and earthing has been completed; and
- have only one entrance which shall be opened only whilst the permit is displayed at the entrance; and
- have provision to display each permit at the entrance to the designated working area; and
- be provided with a notice placed at points which indicate there are conductors which must be regarded as energised and from which persons will need to keep clear.
- be arranged so that the electrical apparatus to be worked on is accessible without interfering with the tape or stepping over or under the tape i.e. it must clearly define the access for persons to the working area.
- No person may pass over or under a yellow tape without approval of the Access Permit recipient.
- Only the Access Permit recipient may move or re-arrange the yellow tape barrier, provided that the meaning and intent of the Access Permit is at all times maintained and consultation is carried out.

iv When a permit is to be cancelled before any danger tag associated with the apparatus is removed, the measures used to define the designated working area shall be dismantled by an authorised person.

12.6.3.3 Responsibilities of Persons Issuing A Permit for Work on or Near High Voltage Exposed Conductors

In addition of the general requirements of Section 5.6 the person, prior to issuing the permit, shall;

i assemble the working party; and

ii identify the points of isolation; and

iii identify access permit earths; and

iv explain, to the satisfaction of the working party, that any remotely earthed conductors are safe to work on or test; and

v instruct them on the correct procedure to follow should they leave the designated working area; and

vi warn them of the dangers of;

- near approach to live high-voltage conductors; and
- low voltage or mechanical apparatus; and
- any other dangers associated with the work or test.

vii clearly define the designated working area.

12.6.3.4 Responsibilities of the Persons Receiving a Permit for Work on or Near High Voltage Exposed Conductors

In addition to the general requirements of Section 5.7 the person in receipt of a permit shall;

i ensure the permit is available at the designated working area or at a designated location; and

ii ensure the relevant general warnings are observed by all persons in the designated working area; and

iii ensure all persons entering the designated working area sign on the permit; and

iv ensure no person enters or leaves the designated working area within an electrical station or generating station except by other than the established entrance; and

v where it is necessary to alter the designated working area shall do so in accordance with an approved procedure; and

vi not leave the vicinity of the work or test during the currency of the permit, but should there be a need for the person in receipt of the permit to temporarily leave the designated working area, give instructions to all persons in the working area to cease work and vacate the designated work area until their return.

vii ensure working earths are applied, where necessary, to ensure equipotential conditions are maintained during the course of the work or test ; and

viii if there is a need to sign off the permit, ensure all persons sign off the permit, leave the designated work area and cancel the access permit; and

ix prior to cancelling the permit remove all working earths applied during the work; and

x if; during the course of the work or test, it is necessary to arrange for an additional person to commence work or test under the permit, then that person shall be given the necessary warnings and instructions by the person in receipt of the permit; and

xi when an additional person is signed on, the person in receipt of the permit shall initial, beside the signature of additional person(s) signed on the permit, to indicate that the necessary warnings and instructions have been given; and

12.6.3.5 Responsibilities of Persons Cancelling A Permit for Work on or Near High Voltage Exposed Conductors

In addition to the general requirements of Section 5.9 the person cancelling a permit for work or test on or near high voltage exposed conductors shall;

i dismantle the designated working area and associated warning signs before any action is taken to remove any danger tag associated with the apparatus; and

ii cancel the permit.

12.6.4 DISCONNECTED HIGH VOLTAGE APPARATUS

12.6.4.1 Principles

i Where work on or near high voltage exposed conductors of totally disconnected high voltage apparatus is required and there is danger from induced voltages or the possibility of coming on or near the high voltage exposed conductors of other high voltage apparatus, then a permit shall be issued.

ii Where work on or near high voltage exposed conductors of a disconnected high voltage insulated cable is required, the work can be performed without a permit provided that;

- the cable can be regarded as disconnected high voltage apparatus and the cable is identified by approved procedures.

iii Where work on a section of a disconnected high voltage overhead line is required, the work can be performed without a permit provided that;

- the section of the high voltage overhead line can be regarded as disconnected high voltage apparatus; and
- the section of the disconnected high voltage overhead line to be worked upon does not or will not, during the course of the work, come near any high voltage exposed conductors.

iv Where the work involves testing a section of disconnected high voltage line, the procedures set out in Section 6.7 of these Rules shall be observed.

12.6.5 HIGH VOLTAGE CABLES (INCLUDING UNDERGROUND CABLES)

12.6.5.1 Work or Test on High Voltage Cables

When work or test is to be performed on high voltage cables the following shall apply:

i Work or test shall only be undertaken by persons who possess the appropriate qualifications and have been authorised to carry out such work.

ii Work or test may be carried out with the cable in service in accordance with Section 6.5.2, all other work or test on cables, except disconnected high voltage cables, shall be carried out under a permit.

iii Where a cable is required to be identified an approved method shall be used.

iv An approved method to guard against induced voltages and/or transferred earth potentials in de-energised cables shall be used.

12.6.5.2 Work on Cables in Service

Work or test may be carried out on a cable or it's attachments in service without a permit under the following conditions:

i If the work or test involves making direct contact with the metallic cable sheath or armouring it shall only be carried out on those cables (or portions of cables) which are within the earth grid area of a substation or a generating station.

ii Persons moving a cable shall be trained in approved procedure and shall be closely supervised during this work.

iii Test instruments may be inserted in bonding or earthing connections provided electrical continuity of the bond or earth is maintained and approved working methods are used.

12.6.5.3 Work on Cables Out of Service

All work on cables shall be carried out under the following conditions:

i The cable shall be isolated, earthed and short circuited between all possible points of supply and the work location.

ii The cable shall be identified by an authorised person by at least two approved methods.

iii The cable shall be proved de-energised at the work site using an approved procedure

iv in order to ensure equipotential conditions exist at the work site where the work involves the cutting of high voltage cables then prior to the work commencing, bridging leads shall be applied across the proposed conductor break and a set of working earths applied to the conductor; and

v an approved method to guard against induced voltages and/or transferred earth potentials in de-energised cables shall be used.

12.6.6 ELECTRICAL TESTING REQUIRING A PERMIT FOR TESTINGS

12.6.6.1 General

A permit shall be used where electrical testing involves;

i The use of a test source which produces a voltage greater than 1000 volts alternating current or 1500 volts direct current on the electrical apparatus; and/or

ii The removal and/or replacement of access permit earths placed on high voltage conductors.

iii When a permit is issued for electrical tests on the conductors of electrical apparatus no other permit shall be current for work on the conductors.

iv The issue of a permit for electrical testing of a section of insulated metallic sheath of a high voltage cable shall not prevent the issue of further permits for;

- electrical testing of another insulated section(s) of the metallic sheath of the same high voltage cable; or
- working on another insulated section(s) of the insulated metallic sheath of the same high voltage cable; or
- working on the main conductor of another section(s) of the same high voltage cable;
- provided the Senior Electrical Officer is satisfied that an adequate and safe separation can be achieved between the section of metallic sheath being electrically tested and the other work parties.

12.6.6.2 Responsibilities of Persons Issuing a Permit for Electrical Testing

The person issuing a permit for testing shall, in addition to the requirements of Section 5.6, ensure all current permits, for work on or near the conductors required to be electrically tested, are signed off to indicate that permission to work is cancelled.

12.6.6.3 Responsibilities of Persons Receiving a Permit for Electrical Testing

In addition to Section 5.7 the responsibility of the person in receipt of a permit shall;

i control the application of the test voltage; and

ii ensure adequate communications are maintained with the person in charge of the electrical test; and

iii warn any person who would be likely to make accidental contact with the conductors under test that test voltage is to be applied and in return receive an

assurance that such person will remain clear of such conductors during the test; and

iv where necessary define any test area, external to the designated work area, which may contain test voltages greater than 1000 volts alternating current or 1500 volts direct current; and

v whilst electrical testing is in progress, close the entrance to the designated working area and erect (at this closed entrance) an approved notice warning persons of the dangers; and

vi ensure if any exposed conductors, to which test voltages are to be applied, are out of sight of the person switching the test source then, approved notices shall be placed to warn against inadvertent approach to the exposed conductors at such points and either;

- a person is posted to warn others not to approach the exposed conductors during the test; or
- fences or equivalent barriers are erected or shutters closed to prevent any person gaining inadvertent access to the exposed conductors; and

vii ensure at the conclusion of the work any apparatus under test which may have become electrically charged during the course of the test is fully discharged and left in a safe condition.

12.6.7 ELECTRICAL TESTING NOT REQUIRING A PERMIT FOR TESTING

12.6.7.1 Requirements for NOT using a Permit

Provided there is no danger from induced voltages being present on the exposed conductors of DISCONNECTED high voltage apparatus, or a possibility of coming on or near the high voltage exposed conductors of other high voltage apparatus, a permit is not required for the electrical testing.

12.6.7.2 Responsibilities of the Person in Charge of the Test

The Person in Charge of the Test Shall:

i control the application of the test voltage; and

ii ensure adequate communications are maintained with the person in charge of the electrical test; and

iii warn any person who would be likely to make accidental contact with the conductors under test that test voltage is to be applied and in return receive an assurance that such person will remain clear of such conductors during the test; and

iv where necessary define any test area, external to the designated working area, which may contain dangerous test voltages; and

v whilst electrical testing is in progress, close the entrance to the designated working area and erect (at this closed entrance) an approved notice warning persons of the dangers; and

vi ensure if any exposed conductors, to which test voltages are to be applied, are out of sight of the person switching the test source then, approved notices shall be placed to warn against inadvertent approach to the exposed conductors at such points and either;

- a person is posted to warn others not to approach the exposed conductors during the test; or
- fences or equivalent barriers are erected or shutters closed to prevent any person gaining inadvertent access to the exposed conductors; and

vii ensure at the conclusion of the test any apparatus which may have become electrically charged during the course of the test is fully discharged and left in a safe condition.

12.6.8 ELECTRICAL TESTING WITH VOLTAGES LESS THAN 1000 VOLTS ALTERNATING CURRENT OR 1500 VOLTS DIRECT CURRENT

12.6.8.1 Principles

i For the application of test voltages less than 1000 volts alternating current or 1500 volts direct current a permit for testing is not required but work shall be carried out under a permit for work.

ii Should it be necessary, for the purposes of the tests, to remove any access permit earth then the person in charge of the test shall obtain a permit for testing and shall follow the Guidelines laid down for such permits.

12.6.8.2 Responsibilities of the Person in Charge of the Test

The person in charge of the test shall;

i warn any person who would be likely to make accidental contact with the conductors, during the course of the test, that voltage is to be applied and obtain an assurance that the person will remain clear of such conductors during the test; and

on conclusion of the tests take all necessary steps to ensure that the apparatus is fully discharged and left in a safe condition.

12.7 LOW VOLTAGE APPARATUS

12.7.1 Testing and Fault Finding

When testing or fault finding, undertake a Take 5 risk assessment of the proposed task and then take the following precautions:

i receive permission for the person conducting the business or undertaking to carry out live testing.

ii before starting and during testing or fault finding:
   a checks must be made to ensure that the test instruments to be used are appropriate and are functioning correctly, before starting and during the testing or fault finding;
   b place safety barriers/notices to prevent other persons entering the work area, which may have exposed energised parts or exposed conductive parts that could become energised during the testing and fault-finding process;
   c safe working procedures relevant to each activity must be maintained and coordinated with co-workers who may have to assist in the work task, such as procedures related to switching circuits or equipment on and off during the fault finding or testing process.

iii the location of faults should first be attempted with the supply safely de-energised, and by utilising de-energised testing methods;

iv if a fault cannot be found with the supply de-energised and energised testing methods have to be used, put control measures in place that eliminate or control the risk of inadvertent contact with energised parts by protecting all persons from the hazard. Then, prior to the testing or fault finding, the following must be done:
   a identify exposed conductive parts that could become energised whilst using test instruments;
   b temporary or fixed isolation barriers should be used to isolate all electrical workers from inadvertent contact with exposed conductive parts that could become energised during testing;
   c use only approved insulated tools, test instruments and test probes and ensure workers are wearing appropriate clothing and using correct PPE;
   d use a safety observer who is competent to assist the person conducting the tests where an identified risk requires it;
   e conduct a periodic review of the work situation to ensure that no new hazards are created during the process.

v When testing or fault finding is completed, circuits and equipment must be restored to a safe condition e.g. disconnected conductors should be reconnected and left in a safe state, covers replaced and accessories and equipment properly secured in compliance with AS/NZS3000 requirements.

NOTE: This section does not cover testing or fault finding in hazardous areas as specified in AS/NZS3000.

12.7.2 Work on or Near De-Energised Low Voltage Exposed APPARATUS

12.7.2.1 General

i All low voltage exposed conductors/apparatus shall be regarded as energised until isolated (from all possible sources of electrical supply) and proved de-energised.

ii All electrical supplies to low voltage exposed apparatus shall be secured and danger tagged at all points of isolation before commencing any work on or near the exposed apparatus.

iii be proved de-energised by using an approved testing device.

iv the approved testing device must be tested before and after use to ensure that the testing device is operating correctly.

IDENTIFY THE CIRCUIT YOU ARE WORKING ON
ISOLATE TO DE-ENERGISE THE SUPPLY
SECURE YOUR LOCKING DEVICE AND DANGER TAG
TEST BEFORE YOU TOUCH

12.7.2.2 Identification

It is necessary to clearly identify the electrical equipment to be worked on and the appropriate point of supply. Identification should include labelling that is consistent and clear at the equipment to be worked on and at all points of possible isolation e.g. at the control isolate and main point of supply.

12.7.2.3 Isolation

Further to the general principles in Section 5.1, the following applies:

i The electrical equipment to be worked on must be isolated from all sources of supply; and

ii any energised apparatus are separated by design or segregated and protected with insulated barricades or insulated shrouding or insulating material to prevent against inadvertent or direct contact; and

iii Where isolation is effected at a removable or rack out circuit breaker or combined fuse switch, if practicable it must be racked out or removed, then locked open and danger tagged;

NOTE: Where power and/or control fuses or plug-in circuit breakers are installed, the fuse carriers or circuit breakers shall be removed and exposed terminals in the connection base should, where practicable, be protected against inadvertent contact and danger tags affixed.

iv The electrical worker must verify the isolation by testing;

v Locks and tags must be used wherever possible to prevent the apparatus from being energised;

vi Hasps can be used to accommodate multiple locks;

vii Other control methods must be used where locking off facilities are not provided. The control measure must be capable of withstanding any disrupting environment e.g. not becoming ineffective due to vibration. Alternate control measures include:

a An additional component, such as a clip, screw, bolt or pin that will prevent the switch from being operated and used in conjunction with additional control measures such as danger tags, or permit system;

b disconnection of the outgoing conductors and tying back;

c other means approved by the employer.

12.7.2.4 Tagging

Further to the general principles in Section 5.3, tagging does not perform the isolation function but acts as a means of providing information to others at the workplace that the isolating device to which it is attached has been operated for a purpose. The requirements for tagging are as follows:

i a danger tag on an isolating device is a warning that the operation of that device may endanger the electrical work who attached the tag;

ii danger tags are applied by electrical workers who will be working on electrical equipment;

iii an out of service tag is a notice that distinguishes electrical equipment out of operation for repairs or alteration, or electrical plant that is still being installed or commissioned. The electrical plant or equipment must not be operated while an out of service tag is attached;

iv appropriate tags must be placed at all points of isolation used to de-energise the equipment from all sources of supply;

v the information provided on the tags should be clearly understandable as to the purpose of the tag and include warnings for any abnormal hazards e.g. multiple points of supply;

vi tags should be dated and signed by all personnel involved in the work or, where appropriate, by the supervisor in charge of the work party;

vii tags should only be removed by the signatories or with the permission of all signatories to the tags or, if this is not possible, by the signatories immediate supervisor.

NOTE: In this circumstance, a thorough investigation of the worksite must be carried out to verify all workers are safe before any tags are removed;

viii When the work is incomplete, at a change of shift or similar circumstances, the last person removes their danger tag and replaces it with a warning (out of service or caution) tag;

ix When work is resumed, the person in charge of the work removes the warning (out of service or caution) tag and each person then applies their own danger tag;

x Each person removes their own danger tag at the completion of work.

12.7.2.5 Testing before Work

Further to the general principles in Section 5.5:

i All electrical circuits and equipment should be treated as energised (including the neutral conductor) unless proven to be de-energised;

ii Equipment must be tested to verify the supply has been removed after isolation, lock out and tagging;

iii Voltage testers must be tested for correct operation immediately before use, and again after use, to confirm that the instrument is still working – TEST BEFORE YOU TOUCH;

iv Tested with a proximity tester initially;

v Voltage tests should be conducted between all conductors and between all conductors and earth using a multimeter;

vi Consideration must be given to the possibility of circuit wiring or electrical equipment becoming energised because of the operation of automatic control devices e.g. thermostats, float switches, programme logic controllers (PLCs) and other interface devices.

12.7.2.6 Bonding of Conductors

Where isolation of electrical equipment is made at a remote location the following shall occur:

i All conductors supplying the equipment should be bonded together and connected to the general mass of earth at the worksite, if practicable;

ii Bonding to earth may be affected by connecting conductors, which should be adequate to carry the potential short circuit currents to the electrical earthing system;

iii The temporary bonding conductors must always be bonded together and attached to the general earth before any attempt is made to attach them to any de-energised component portion of the electrical installation;

iv Removal of the bonding conductors must be carried out in the reverse order;

v Suitable PPE and safety apparel should be used when attaching and removing temporary bonding conductors.

Bonding should also be carried out if there is a risk that static, induced or transferred voltages could be present the conductors shall be earthed and short circuited or live working procedures shall be applied.

12.7.2.7 Work on Cables

Where work is to be carried out on a cable, the cable should be de-energised.

Cables must be treated as energised and the procedures for working on energised electrical equipment followed until positive tests can be made that prove the cable is de-energised.

If the cable's connections are exposed the connections and attached live parts should be proved to be de-energised and identified before work starts.

Cutting cables presents particular risks. Both ends of the cable should be checked for isolation prior to cutting. Schematic diagrams or 'as built' diagrams should be checked carefully to establish secondary or metering circuits in multi-cored cables prior to cutting.

Additional precautions should be taken to ensure insulated or covered cables are deenergised, whether the cables are low voltage, high voltage or control cables. For example, the action of cutting a multi-core control cable is likely to create a risk if secondary current from a current transformer is present. This risk may not be initially apparent; that is, the cable cutters may not be damaged when the cable is cut. A high voltage may develop across the open-circuited secondary winding causing an electric shock, arcing or a fault at a later stage.

Depending on the situation, alternative precautions may include:

- using a cable spiking or stabbing device that is fit for purpose
- a combination of proving it is de-energised and physically tracing the cable.

12.7.2.8 Removing out of Service Electrical Equipment

When removal of out of service or decommissioned electrical equipment is required, the equipment must be isolated from supply and appropriate tests made to ensure the equipment is de-energised. Further tests must be made at any point that a cable is to be cut.

12.7.2.9 Return after Absence

The electrical worker, after being absent from the immediate work area, shall carry out checks and tests to ensure that the electrical equipment being worked on is still isolated on return, to safeguard against inadvertent reconnection by another person.

12.7.2.10 Restoration of Supply

The electrical equipment or parts of the installation to have the electricity supply restored must be safe to do so and shall pass the appropriate tests required by AS/NZS3000.

All relevant workers shall be notified that the supply is about to be restored and all exposed conductors shall be now considered energised.

A visual inspection shall be conducted before restoring the supply to ensure that all plant, tools, surplus material and wastes, and bonding/earthing equipment have been removed.

Appropriate testing shall be carried out before and after supply is restored to confirm that equipment is earthed, polarity is correct, actives switched and phase sequence is correct.

Precautions against the inadvertent operation of other equipment shall be carefully considered before the supply is restored.

12.7.3 WORK ON OR NEAR LIVE LOW VOLTAGE APPARATUS

12.7.3.1 Working ON Energised Circuits/Apparatus

Work on energised or 'live' LV exposed conductors or apparatus is not allowed at Lord Howe Island.

WARNING

Work on energised (live) low voltage is NOT allowed

12.7.3.2 Working near Energised Circuits/Apparatus - Preplanning

Work near live low voltage exposed apparatus shall not be carried out unless;

i the electrical worker must be competent and confident of applying the particular safe working procedures and techniques for the task at hand, and must be appropriately qualified;

ii the electrical worker must be authorised by the employer (as well as the person in control of the premise) to work on energised circuits and apparatus;

iii the work must be carried out in accordance with a safe work method statement;

iv the work area must be cleared of obstructions so that the worker can enter and leave it quickly and safely;

v appropriate test equipment is at hand;

vi insulated tools and accessories, which must be suitable for the task and must be well maintained i.e. clean, dry and no damage to the protective insulation;

vii all testing of tools and equipment must be up to date and must have been inspected to ensure they are fit for purpose, serviceable and safe to use;

viii the person who is to perform the work must be provided with and use the appropriate PPE for the task;

ix there must be a safety observer present, who must be competent and qualified to perform the particular task that is to be carried out and also competent in electrical rescue and cardio-pulmonary resuscitation (CPR);

x first aid facilities must be provided at the site and must be readily accessible. Emergency contact numbers should be made available at the site;

xi emergency lighting should be provided and should be operating correctly;

xii firefighting equipment that is suitable for electrical fires should be accessible;

xiii key people, such as the owner or the person in control and the supervisor, must be informed that the electrical worker is about to work on energised circuits and equipment;

xiv the isolation point of the relevant electricity supplies must be identified and labelled;

xv energised conductors should be insulated where necessary to prevent inadvertent contact or flashover;

xvi unauthorised persons must be prevented from entering the work area by signage and/or a barrier.

12.7.3.3 Control Measures While Working near Energised Circuits

i the electrical worker must ensure that all the necessary planning and preparation precautions outlined previously have been taken;

ii the work is done very carefully and in an unhurried, considered manner (haste can be hazardous);

iii the employer's safe work method statement and safe working procedures are rigorously followed;

iv all exposed conductors are assumed to be energised. Energised conductors should be fitted with temporary or fixed isolation barriers or insulation where necessary to prevent inadvertent contact or flashovers;

v an awareness of the voltage to earth of all exposed conductors is maintained; this may also include the neutral conductor;

vi firefighting equipment is suitable for electrical fires is at the site and is readily accessible;

vii there must be a safety observer present, who must be competent and qualified to perform the particular task that is to be carried out and also competent in electrical rescue and cardio-pulmonary resuscitation (CPR);

viii Appropriate PPE must be worn and must be in good condition.

12.8 WORK ON UNDERGROUND CABLES

12.8.1 BASIC SAFETY RULES

All underground cables and associated electrical apparatus must be regarded as energised, until isolated and proved de- energised and, in the case of high voltage cables, earthed and short circuited by approved means.

All workers shall be appropriately trained and supervised as required by the risk control process.

12.8.2 EXCAVATION IN THE VICINITY OF LIVE CABLES

12.8.2.1 Locating Services

Prior to excavation the persons involved in excavation shall identify and locate any underground cables or services including those of utilities that may be in the vicinity of the excavation. Risk control measures should include the checking of plans, looking for indicator markers, use of cable/pipe identification devices and/or ground penetrating radar.

12.8.2.2 Exposing Cables

Cables known to be close to the work area should be exposed by pot-holing using non-conductive tools or equivalent non-destructive asset location techniques to verify their location and prior to the principal excavation commencing.

Pot-holing should be undertaken along the length of the proposed excavation to identify the path of the cable and its depth.

12.8.2.3 Mechanical Excavation

Backhoes and the like are not permitted to excavate closer than 300mm cables energised at less than 1000 volts and 600mm from energised 11,000 volt cables. Close proximity is achieved by the careful use of hand tools or when the cable has been isolated, proved de-energised, shorted and earthed by approved means and there can be no confusion with the identification of the cable.

In all such cases however, a safety observer shall be positioned to warn the operator if the machine looks like coming too close or causing damage.

Pneumatic or other powered excavation tools (Kanga and jack hammers) should not generally be used in close proximity to conduits containing live cables. When using powered tools to excavate beside or around direct-laid cables in rock or hard fill, a steel plate shall be placed between the cable and the tool to protect cables.

12.8.3 IDENTIFICATION

No person may work on any underground cable (including low voltage, pilot or communication cables) unless it has been identified at the work site using an approved cable identification technique.

If an electrical method is used to identify a cable all cables in the immediate vicinity must be exposed and checked.

A cable must be stabbed using remotely operated stabbing equipment where it is not

possible to identify a cable using electrical or physical means or to prove it de – energised by testing.

Low voltage underground cables can be identified from appropriate records, rather than by one of the approved techniques where the work area is remote from the exposed terminations and provided no higher voltage cables exists in the general area of where the work is to be carried out.

At all times work shall proceed on the cable as if it is energised and all necessary precautions taken until the cable is proved de-energised at the work area.

See Section 12.6.5 for additional details.

12.8.4 TESTING TO PROVE CABLES DE-ENERGISED AT THE WORK AREA

Once identified and isolated, underground cables shall be proved de-energised by stabbing (also known as spiking) wherever possible (see also Section 6.5). Where it is not practical to stab the cable, such as:

- A communications cable;
- Sheath or serving repairs;
- An insulation repair where the cable is not to be cut.

the cable must be identified either by:

- Visual tracing from a point of isolation: or
- At least two independent approved methods of identification.

Where stabbing is to be used, then a remotely operated stabber shall be used. Stabbing shall only be performed by persons trained in the use of equipment.

12.8.5 EARTHING AND SHORT CIRCUITING HV UNDERGROUND CABLES

Earthing and short circuiting of high voltage underground cables must be carried out, using suitable equipment as provided by Section 4.8.8, between all HV isolation points and the work area, as close as possible to the work area but only after isolation and testing de-energised.

Earthing and short circuiting of a high voltage cable which is to be cut must be carried out on each side of any proposed break in the cable.

Earthing and short circuiting connections must be made to known permanent earthing facilities. These may include a cable sheath connected to a permanent earthing system. See also Section 12.6.5.

12.8.6 INDUCED VOLTAGES AND TRANSFERRED EARTH POTENTIALS

In circumstances where the work involves direct contact with the metallic high voltage cable sheath or armouring and is not within the earth grid of a substation, one of the controls in Section 12.8.7.1 or 12.8.7.2 shall be put in place.

12.8.6.1 Insulated Working Conditions

All exposed metal parts of cables or pipes or any other parts which may be earthed, and the joint-hole or confined space itself, shall be covered with insulating material, suitable for the voltage concerned, while work proceeds on one only.

12.8.6.2 Bonded Earth Mat Conditions

An equipotential area shall be created using wire mesh, all bonded together, covering the floor, walls etc. and earth. All cable cores and sheaths shall also be connected to the earth mat so that everything and everyone are at the same potential.

12.9 GENERATION

12.9.1 General

Only authorised and qualified staff and contractors shall enter generation facilities such as the powerhouse or photovoltaic farm.

The requirements of Sections 12.4 and 12.5 shall apply as well as Sections 12.6, 12.7, 12.8 and 12.9 depending on the situation and area of work.

12.9.2 Precautions

All sources of energy will need to be isolated for work including the diesel supply at the powerhouse. Photovoltaics will be handled with care and in accordance with industry practice but may include wrapping to prevent generation.

12.10 BATTERIES

Battery rooms with vented cells must be adequately ventilated by means of the natural or forced ventilation provided when work is to be carried out. The use of naked flames and smoking is prohibited in battery rooms.

Precautions must be in place to ensure that arcing caused by making or breaking connections, or sparking caused by power tools or conductive materials such as tools and watchbands does not occur.

Only insulated tools may be used on batteries and battery terminal covers are to be maintained as far as reasonable practicable. Wear an approved face shield as required and comply with all risk assessment/SWMS requirements.

12.11 EXTRA LOW VOLTAGE

Work on near extra low voltage (ELV) electrical installation is regarded as work near low voltage and so the requirements of Sections 12.4 and 12.5 apply.

Extra low voltage battery systems and capacitors are stored energy devices and should also be regarded as energised equipment. ELV may have high fault levels and be capable of causing harmful arcing if worked on energised and may result in electric shock, electrical or chemical burns, fire or explosion in adverse circumstances.

Always isolate battery chargers before connecting or disconnecting leads. Where one leg is earthed, always disconnect the earthed lead first, then the non-earthed lead. When connecting, connect the non-earthed lead first and then the earthed lead.

12.12 ABBREVIATIONS

Certain items in common use associated with apparatus covered by these Guidelines are often abbreviated in speech or abbreviated to save space within documents. Standard abbreviations listed below may be used when the need to abbreviate arises.

Item	Abbreviation
Access Permit(s)	AP/APs
Air Circuit Breaker	ACB
Capacitor	CAP
Changeover	CO
Circuit Breaker	CB
Control Selector Switch	CSS
Current Transformer	CT
Danger Tag	DT
Drop Out Fuse	DOF
Earth Switch	ESW
Extra Low Voltage	ELV
Feeder	FDR
Frequency Injection	FI
Gas Circuit Breaker	GCB
Generator	GEN
High Voltage	HV
Hours	HRS
Independent	INDEP
Kilo Volts	KV
Lightning Arrester	LA
Line Drop Compensation	LDC
Live Line Clamp (or Connection)	LLC
Lord Howe Island Board	LHIB
Low Voltage	LV
Low Voltage Link	LVL
Maintenance	Maint
Miniature Circuit Breaker	MCB
Non-Auto	NA
Normally Open	N/O
Normally Closed	N/C
No-Volt	NV
Number	No
Numbers	Nos
Oil Circuit Breaker	OCB

Oil Fuse Switch	OFS
On Load Tap Changer	OLTC
Open Circuit	OC
Operating Agreement	OA
Operations	OPS
Overhead	O/H
Out of Service	O/S
Parallel	//
Permanent	PERM
Permit To Work	PTW
Primary	PRIM
Programme Logic Controller	PLC
Protection	PROT
Reclosing Circuit Breaker	RCB
Ring Main Isolator	RMI
Secondary	Sec
Section	SECT
Sectionalising Circuit Breaker	AS
Sensitive Earth Fault	SEF
Short Circuit	SC
Single Pole Switch	SP SW
Stand-by	S/BY
Switch	SW
Switchboard	SWBD
Switchgear	SWGR
Tap Changer	TC
Temporary	TEMP
Transformer	TRF/TX
Underground	UG
Unserviceable	US
Volts	V
Voltage Regulator	VR
Voltage Transformer	VT

12.13 REVISION HISTORY

This document is under version control.

VERSION NO	REASON FOR UPDATE	DATE ISSUED
1	Initial document	December 2016
1.1	Amended as follows: - New Section 12.5.6: process for access permits. - Section 12.6.2: note not to operate Hazemeyer when fault finding - Section 12.7.1: clarify risk assessment process is Take 5 process. -	October 2017

ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM
Part 13
FORMAL SAFETY ASSESSMENT

Contents

Part 13 Formal Safety Assessment

13.1. Introduction and Scope

This Formal Safety Assessment (FSA) document seeks to manage all risks associated with the Lord Howe Island electrical network including:

- Public safety;
- Protection of property;
- Protection of the environment;
- Safety risks associated with the loss of the electricity supply;
- Network electrical worker safety.

This FSA has been developed under the umbrella of the Lord Howe Island Board's (LHIB) Electricity Network Safety Management System (ENSMS) Policy.
The following documents have been used or considered in the development of this document:

- AS/NZS ISO 31000-2009: Risk Management – Principles and Guidelines;
- AS 5577-2013: Electricity Network Safety Management Systems (particularly relevant is Appendix A);
- Independent Pricing and Regulatory Tribunal's (IPART) Electricity Networks Audit Guideline May 2017;
- NSW WHS Act 2011;
- WHS Regulation 2017.

13.2. Risk Assessment Framework

The risk assessment framework for the LHIB is set by the LHIB Risk Management Policy in conjunction with its ENSMS plans and this Formal Safety Assessment. Figure 1 shows this framework in regard to the electricity network with references to the various documents that detail the required information including "Sections" of this document.

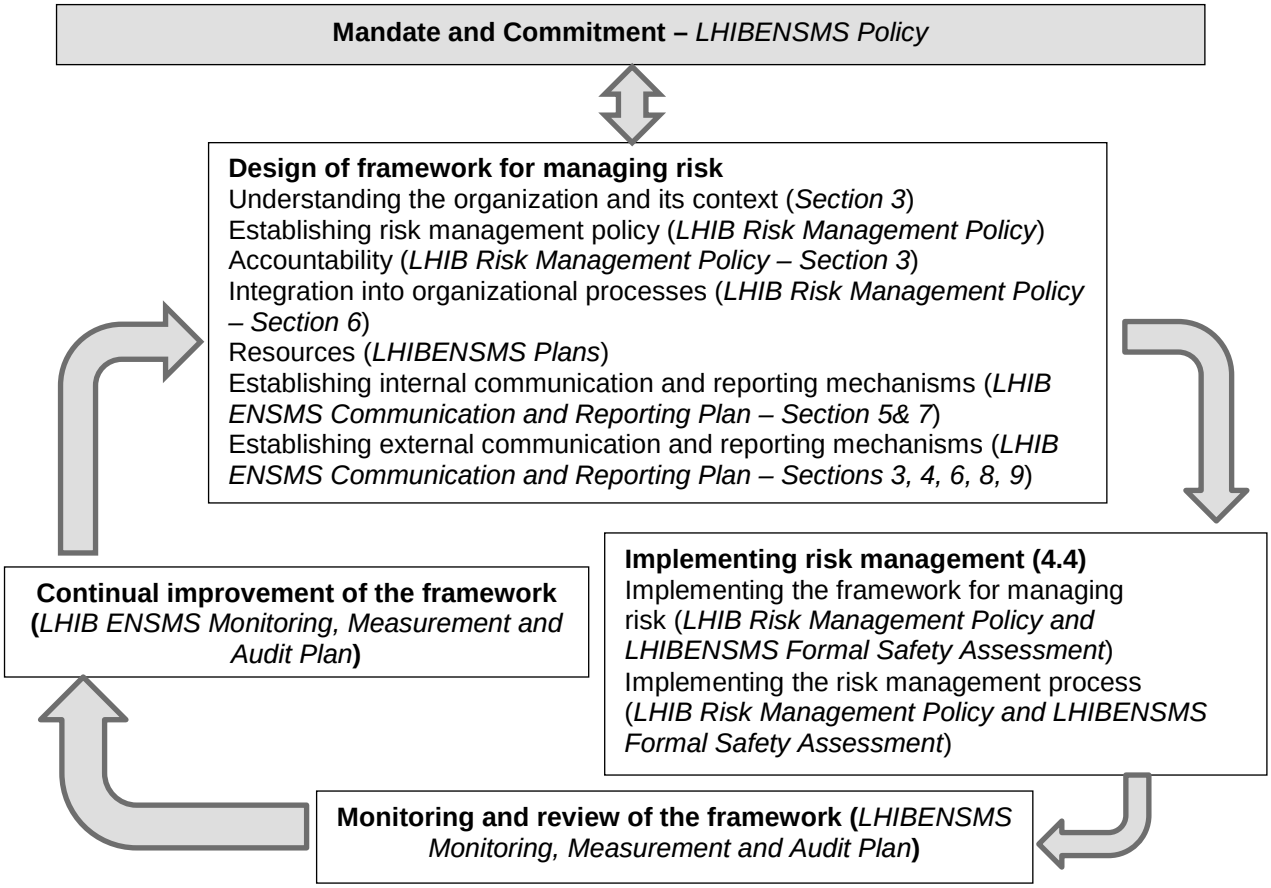


Figure 1 – LHIBENSMS Risk Assessment Framework

Numerous ENSMS Safety Management Plans have been developed from this FSA via the direction set by the ENSMS Policy (refer Figure 2). Standard work procedures, work instructions, Safe Work Method Statements (SWMS) and switching instructions have been developed under the umbrella of these plans but not included on Figure 2.

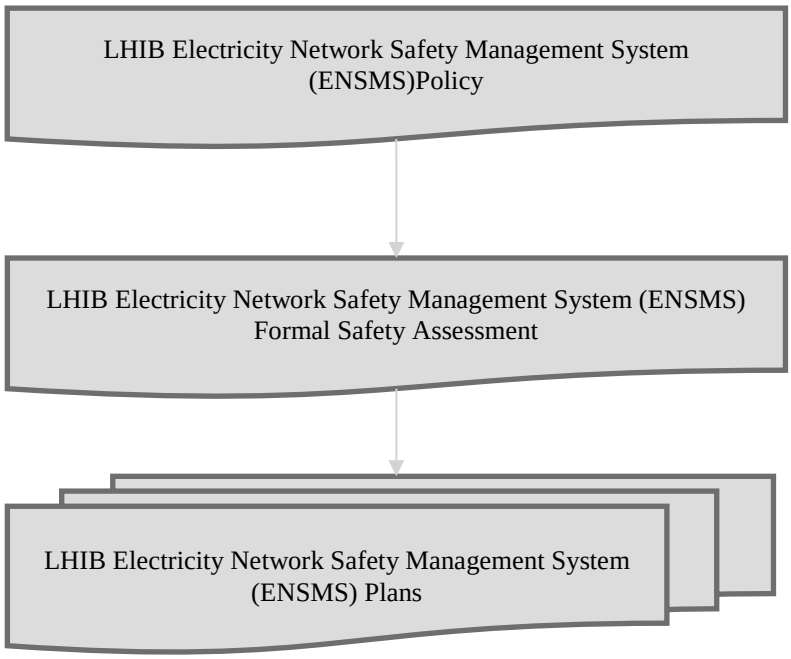


Figure 2 – LHIBENSMS Document Hierarchy

13.3. Context

13.3.1 Risk Assessment Context

The organisational approach to risk is set via the LHIB approved Risk Management Policy with more specific detail provided by LHIB's WHS Risk Management System document.
The policy requires the identification, assessment, treatment and monitoring of risks and this FSA has been developed in this context. The policy and system have been aligned with ISO3100:2009 (refer Figure 3). Safety related risks will be managed to as low as reasonably practicable (ALARP) in accordance with the LHIB Risk Management Policy.
Residual risks will only be accepted once they have been reduced to "As Low as Reasonably Practicable" (ALARP) in accordance with AS5577 where due consideration has been applied and all reasonably practicable control/treatment measures are used. These control/treatment measures must be consistent with industry standards and practice, and economic prudency and efficiency. The risk result must also be tested to see if further precautions are reasonable following the hierarchy of control. Hazards are therefore managed by eliminating risks so far as is reasonably practicable (SFAIRP).

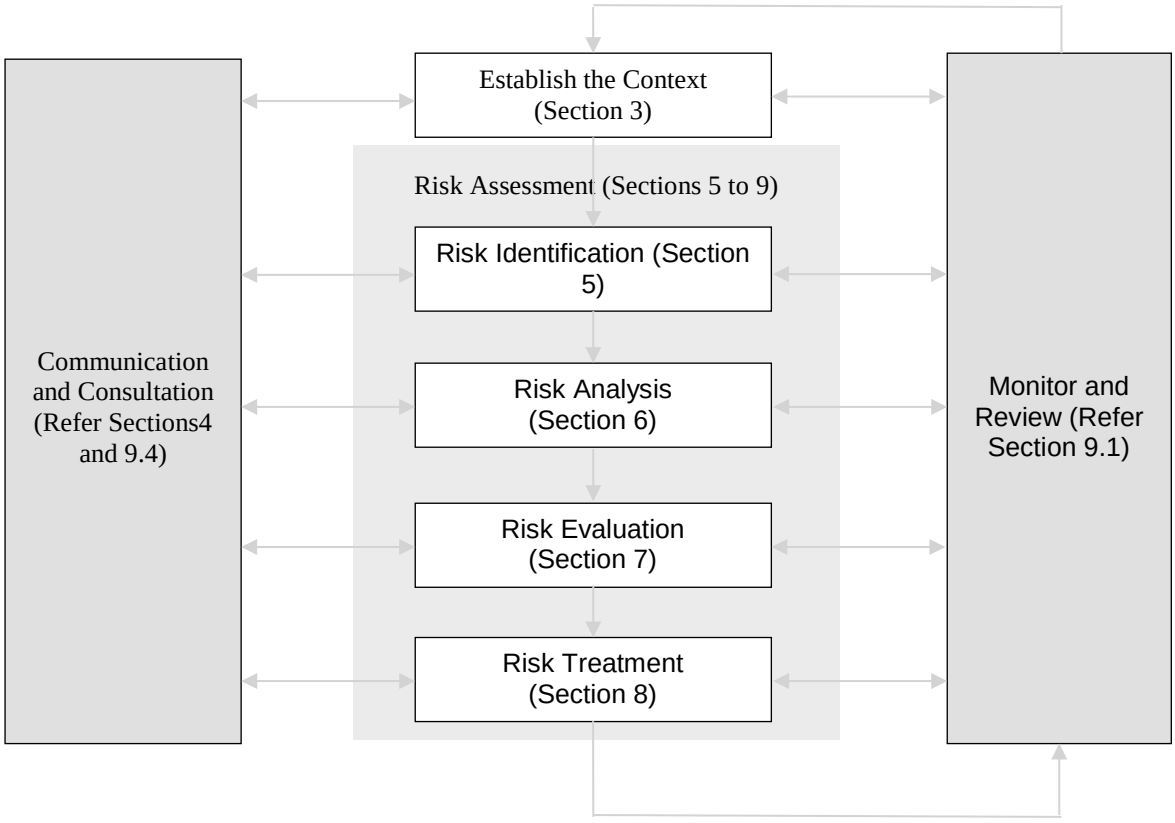


Figure 3 Risk Management Process

13.3.2 External Context

Community, regulatory, and industry contexts are explored in this section as it is important to understand these since they can greatly influence the risk management framework and risk management options. These discussions also capture the network characteristics as they are relevant to the risk being assessed.

13.3.2.1 Community and Environmental Context

Lord Howe Island is located 700 kilometres north-east of Sydney and has been included on the World Heritage List, additionally in 2007 it was one of fifteen World Heritage places to be included in the National Heritage List.

The island is 11 km long and between 2.0 km and 0.5 km wide. It has an area of 14.55 km^2, of which only 398 hectares is in the lowland settled area. The northern and southern mountainous ends of the Island and a central section, form part of the Permanent Park Preserve (similar to a National Park).

Most of the island is virtually untouched forest with many of the plants and animals found nowhere else in the world. Other natural attractions include the diversity of its landscapes, the variety of upper mantle and oceanic basalts, the world's southernmost barrier coral reef, nesting seabirds, and its rich historical and cultural heritage.

The Island's population comprises approximately 360 permanent residents and a maximum 400 tourists at any one time with tourism being the main revenue source for the island population.

There are approximately 280 electricity customers on Lord Howe Island only.

The airport and wharf provide key transport links with the mainland. The Airport provides passenger and limited freight services on a daily basis. Lord Howe Island Airport is a Licenced Security Controlled Airport in accordance with Civil Aviation Regulations and the Civil Aviation Safety Authority (CASA). As a result, a high degree of safety requirements and regulatory controls are in place.

Operationally the runway is 846m in length with a bitumen sealed surface. Solar powered runway, taxiway and terrain lighting is available and activated on request for emergencies only. The Airport also provides

an Automatic Weather Information Service and Aerodrome Frequency Response Unit 'Beep Back' (frequency identifying Lord Howe Island Airport).
Qantaslink Airlines provide daily services to/from Sydney and twice weekly service to/from Brisbane and Port Macquarie. Common aircraft in use include light single engine, helicopters and large twin engine. Fuelling facilities are available for aviation gas and aviation turbine fuel.
The Gower Wilson Memorial Hospital caters for the residents and tourists on Lord Howe Island. This is the only medical/nursing facility on the Island with three inpatient beds currently used for acute medical/surgical admissions. Complex cases are transferred to the mainland.

13.3.3.2 Regulatory Context

Lord Howe Island is part of NSW and so operates its electricity network within a regulated environment, where:

- IPART regulates the technical and safety issues associated with the electricity network (which includes a requirement for an ENSMS that incorporates this FSA);
- SafeWork NSW – LHIB is a “person conducting a business or undertaking” and so must meet its WHS obligations to ensure the health and safety of workers and other people including those that visit LHIB premises. (IPART and Safework NSW have an arrangement for the management of safety issues associated with the electricity network).

To this end, LHIB has developed its Electricity Network Safety Management System (ENSMS) which includes:

- Electricity Network Safety Management System Policy;
- This Formal Safety Assessment
- Customer Electrical Installation Safety Plan;
- Planning, Design, Construction & Commissioning Plan;
- Electrical Network Maintenance Plan;
- Operations Plan;
- Bushfire Management Plan;
- Emergency Management Plan;
- Decommissioning Plan;
- Communications and Reporting Plan;
- Monitoring, Measurement and Audit Plan;
- Public Electrical Safety Awareness Plan;
- Electrical Safety Rules; and
- Other documents such as procedures, work instructions, Safe Work Method Statements (SWMS) and switching instructions.

13.3.3.3 IPART

The LHIB will report notifiable events including SEWA to the Independent Pricing and Regulatory Tribunal (IPART) in accordance with IPART’s *Electricity Networks Reporting Manual - Incident Reporting* and with Part 9 of the *LHIB ENSMS – Communication and Reporting Plan.*
A notifiable event occurs whenever:

- Electricity works are involved i.e. any electricity powerlines or associated equipment, or electricity structures that form part of a transmission or distribution system (known in the industry as electrical mains and apparatus;
- injuries or near misses involving network operator employees or contractors relating to bushfire risk management work within private electrical installations;

- Significant loss of property;
- Widespread interruptions to the electricity supply.

LHIB also provides an annual Network Performance Report to IPART which summaries incidents and events associated with the network.

13.3.3.4 SafeWork NSW

The LHIB will report notifiable events including SEWA to Safework NSW in accordance with IPART's *Electricity Networks Reporting Manual – Incident Reporting* and with Part 9 of LHIB's ENSMS – Communication and Reporting Plan.
SafeWork NSW, via the Work Health and Safety Actrequires notification (notifiable incidents) for:

- the death of a person, or
- a serious injury or illness of a person, or
- a dangerous incident.

13.3.3.5 Lord Howe Island Board

Lord Howe Island Local Environmental Plan 2010 has been made under the Environmental Planning and Assessment Act 1979 and came into effect in 2010. The plan controls planning and development on the Island and is the key instrument in protecting the unique values of the Island. The LHIB is the consent authority for the purposes of this plan.

13.3.3.6 Marine Parks Authority and Marine Parks Advisory Council

The Island is surrounded by NSW waters out to 3 nautical miles and Commonwealth waters from 3 to 12 nautical miles.
The NSW Lord Howe Island Marine Park was created in 1999 to protect the marine environment and comprises all ocean waters and the ocean bed contained between mean high-water mark to 3 nautical miles from the territorial sea baseline of Lord Howe Island, the Admiralty Islets, Ball's Pyramid and South –East Rock, covering an area of some 48,000 hectares. There is a zoning plan for the park and activities within the park are regulated under the Marine Parks (Zoning Plans) Regulation 1999 via the Marine Parks Authority and Marine Parks Advisory Council.

13.3.3.7 Australian Government Department of the Environment

The Lord Howe Island Group is one of 6 world heritage listings in NSW. The Group comprises Lord Howe Island, Admiralty Islands, Mutton Bird Island, Ball's Pyramid, and associated coral reefs and marine environments.
The Commonwealth Environment Protection and Biodiversity Conservation Act 1999, provides protection of matters of national environmental significance including world heritage areas. Under the Act, any action that is likely to have a significant impact on the Island requires the approval of the Federal Environment Minister.
The Lord Howe Island Marine Park (Commonwealth Waters) was created in 2000 to protect the marine environment of the Commonwealth waters and is estimated to be over 300,000 hectares in area.
There is a management plan for the park and activities within this park are also regulated under the Environment Protection and Biodiversity Conservation Act 1999. The Australian Government Department of the Environment administers the EPBC Act.

13.3.3.8 Industry Context

The LHIB will take measures to ensure that all reasonably practicable safety measures are implemented relevant to industry practice including:

- Representation on relevant industry committees e.g. Industry Safe Steering Committee (ISSC);
- The use of external consultants, where necessary, that work across multiple network business;
- Developing staff professionally by subscriptions to trade magazines and emails, industry training courses, etc;
- Reviewing issues by internet searches and by contact without network providers.;

- Networking with other network provider staff and conferences and training.

External contractors are generally used for additions or alterations to the network. Operation and maintenance is typically carried out by the board electrical team.
New network equipment is generally sourced from the mainland and typical industry equipment is used.

13.3.3.9 Emergency Services Context

The Local Emergency Management Committee (LEMC) comprises representatives from the LHIB and all local emergency and support agencies. The committee is supported by the LHIB through the provision of administrative services. It is responsible for the planning, preparation, response and recovery of all matters relating to emergencies that may affect the local community. This committee include representatives from the State Emergency Service (SES) and Rural Fire Service (RFS).
The NSW SES is the emergency agency responsible to assist the public during periods of storms, floods and tsunami. The Lord Howe Island Local Unit is managed and manned by volunteers. It is also the first response rescue unit for road, industrial, domestic and other rescue incidents on the Island. The LHIB has a responsibility to provide administrative support and assist in the provision of plant, labour and equipment when requested during emergencies.
The NSW RFS is the emergency agency responsible to prevent and extinguish fires in all areas of the Island. RFS Management is through an elected committee structure and assisted by mainland RFS professional employees. The LHIB financially supports the operation of the Brigade through the local government contribution scheme and directly assists in the provision of plant, labour and equipment when requested during emergencies.

13.3.4 Internal Context

13.3.4.1 Organisation context

The electricity network team is small with only two workers. LHIB seeks to manage risk as low as reasonably practicable through risk management and continuous improvements in all areas identified by the scope of this FSA.
The electrical network team is supported by other functional groups internally.

13.3.4.2 Network context

The Lord Howe Island Board's generates and distributes electricity via an underground electrical reticulation system servicing approximately 280 customers on Lord Howe Island only.
The electricity generation system is housed in a centrally located powerhouse and consists of 3 x 300kW Detroit Series 60 diesel generating units. In addition to this there is 1 x 450 kW Cummins C55D5 diesel generating unit that provides backup power in the event of major failure of the Series 60 generators.
The underground electrical reticulation system is designed for a HV distribution voltage of 11kV but is currently utilized at a transmission voltage of 6.6 kV. There is approximately 13 kilometres of underground HV cable. There are no aerial conductors on the island distribution system.
Two 500 kVA padmount substations supply the HV reticulation system from the powerhouse and one 500 kVA padmount substation supplies the HV reticulation system from the standby generating unit. These three 500 kVA padmount substations utilize ABB Safelink ring main units for HV control. There are basically two 6.6kV feeders from the substations with an intertie between the two via the ABB ring main units.
The existing HV network protection systems at the Power House and standby generator are 25 amp, 6.6 kV transformer fuses.
Ten smaller padmount substations ranging in size from 50 kVA to 150 kVA convert this HV distribution voltage to a nominal 400/230 volt 3 phase low voltage supply which is then distributed locally to all customers via underground mains.
Existing powerhouse generator protection is provided by Woodward EGCP-2 engine control units. Distillate fuel is stored in 1 x 34,000 litre and 2 x 17000 litre underground fuel tanks at the powerhouse and is delivered fortnightly by a contracted Lord Howe Island Sea Freight shipping agent.

The existing standby generator protection is provided by Cummins Power Command 2.2 engine control units with onboard diesel storage.
Protection of property and environment are a high priority for those on the island and it is realised that the electricity network can impact on these.
The electricity supply on the island is very reliable but it is realised that the community have high expectations in this regard and that the LHIB cannot be complacent in the operation and maintenance of its network.

13.4 Historic incident performance

Very few incidents occur within the scope of this document over time on the Island. This is mainly due to the small size of the electricity network, the limited number of network staff and the network being constructed underground.
Electrical contractors are mentored by the LHIB's Senior Electrical Officer to help provide high quality new electrical installations and additions and alterations to existing electrical installations.
The LHIBENSMS Annual Performance Report for 2016/17 noted no incidents for the following:

- Non-conformances relating to the safety of electrical installations for customers;
- Network asset failures;
- Unauthorised access to the network;
- Major safety defects for Notifications of Electrical Installation Work;
- Number of disconnections of customers premises arising from safety concerns;
- Number of customer shocks from installations;
- Number of customer shocks from installations caused by the ENO's electricity network.

Additionally, no network related fires were reported for the same period in ENSMS Bushfire Risk Management Report for 1 October 2015 TO 30 September 2016.

Also, no "widespread supply interruptions" were reported for the following:

- Where a state of emergency has been declared under the State Emergency and Rescue Management Act 1989 (NSW) due to the impact of an outage, or the cause of the state of emergency places the network at risk of loss of supply/failure;
- LHIB has classified a supply interruption as a significant outage (as part of the LHIB's ENSMS or incident management system) due to adverse impact or disruption to the community;
- Where an outage caused the loss of network supply, for greater than 2 hours, to significant community infrastructure such as:
    - Peer group A1, A2, A3 and B hospitals;
    - Road tunnels on motorways that have emergency evacuation systems;
    - Air transport systems where travel is affected;
    - Other community infrastructure determined by the LHIB to be of Regional significance;
- Distribution - The whole island grid out for greater than 4 hours.

13.5 Stakeholder engagement

13.5.1 External stakeholders

External stakeholder participation in stages of the FSA

Table 1identifies the external stakeholders, and outlines means for engagement, their involvement, and consultation procedures.

Table 1: External stakeholder engagement

Stakeholder	Engagement Methods	FSA Involvement	Consultation, Communication and Reporting Methods - FSA Development, Implementation and Review
Hospital/doctor	Meetings, phone contact and emails.	Context, Identifying, Assessing Treatment and Evaluation	Discussion with PowerLogic and check of this FSA
LHI Emergency Services	Meetings, phone contact and emails.	Context, Identifying, Assessing Treatment and Evaluation	Regular meetings but phone contact and emailed FSA for comment.
Qantaslink	Meetings, phone contact and emails.	Context, Identifying, Assessing Treatment and Evaluation	Check of this FSA
General public	Advertisement in paper, discussion or radio, website and facebook	Context, Identifying, Assessing Treatment and Evaluation	Check of this FSA
Electrical contractors			
IPART	Meetings, phone contact and emails.	Context, Identifying, Assessing, Treatment and Evaluation	IPART representative inspected the network and started the process for the development of the ENSMS. They have been given the opportunity to comment through the development of the ENSMS.
SafeWork NSW	Email	Context, Identifying, Assessing, Treatment and Evaluation	Email FSA for comment. Mandatory notifiable incident reporting
PowerLogic	Meetings, phone contact and emails.	Context, Identifying, Assessing Treatment and Evaluation	PowerLogic developed the LHIB ENSMS and FSA with assistance from internal staff.
Cutler Merz	Meetings, phone contact and emails.	Context, Identifying, Assessing Treatment and Evaluation	Cutler Merz engaged to audit ENSMS including FSA documentation

Stakeholder	Engagement Methods	FSA Involvement	Consultation, Communication and Reporting Methods - FSA Development, Implementation and Review
Other DNSP's	Email	Treatment	Specific DNSPS's were contacted for treatment options for some risks

13.5.2 Internal stakeholders

Internal stakeholder participation in stages of the FSA

Table 2 identifies the internal stakeholders, and outlines means for engagement, their involvement, and consultation procedures.

Table 2: Internal stakeholder engagement

Stakeholder	Engagement Methods	FSA Involvement	Consultation, Communication and Reporting Methods - FSA Development, Implementation and Review
Board Members	Meeting, emails, board meeting	Context, identify, assess, treat, evaluate	Approval
Chief Executive Officer	Meeting, emails	Context, identify, assess, treat, evaluate	Finalised and approve for Board involvement
Manager Business and Corporate Services	Meeting, emails	Context, identify, assess, treat, evaluate	Guidance and allocation of budgetary issues
Manager Environmental and Community Services	Meeting, emails	Context, identify, assess, treat, evaluate	Guidance for environmental issues
Manager Environment/World Heritage	Meeting, emails	Context, identify, assess, treat, evaluate	Guidance for environmental and world heritage issues
Manager of Infrastructure and Engineering Services	Meetings and emails	Context, identify, assess, treat, evaluate	Direct involvement as responsible officer for the ENSMS.
Electrical workers	Meetings and emails	Context, identify, assess, treat, evaluate	Direct involvement in the development of the FSA

13.6 Hazard Identification

Extensive consultation and analysis has been carried out to ensure all hazards, threats, and hazardous events have been identified that could affect the items detailed in the scope of this document.

13.6.1 Hazard Identification Techniques

Hazard identification techniques have been used to identify all hazards including internal and external stakeholder engagement.
A mix of expertise and hazards not evident to one group may be identified through the engagement of all key stakeholders.
The following sections provide an overview of the techniques used to compile the list of hazards.

13.6.2 Incident Data Analysis

Incident data was used to identify hazards that are known to have contributed incidents in the past and treatments updated.
This analysis is updated annually and used in the review of this FSA.

13.6.3 Industry forums and events

Attendance at industry forums and events and networking at meal breaks and after hours also provides a mechanism that helps to identify hazards and treatment.

13.6.4 Electrical Staff Interviews and Discussions

Electrical staff interviews and discussions also help to identify hazards and control measures being utilised.

13.7 Identification of hazards

All foreseeable hazards have been identified for the scope of this FSA using the hazard identification techniques. These have been included in Sections 13.9 9 to 13.12.

13.8 Risk Analysis

13.8.1 Risk Analysis Techniques

Hazards and risks have been analysed using a qualitative approach using the risk analysis matrix in Section 13.6.2.

13.8.2 Risk Analysis Matrix

Risks will be assessed using the LHIB risk matrix (from the LHIB WHS Risk Management System document) as shown in Figure 4 by consideration of the likelihood of an incident occurring and the resulting consequence. This table can be used to determine a risk rating for each of the risks listed, for both before and after (the residual risk) the proposed risk treatment strategies are applied.

LHIB Health & Safety Risk Matrix					
CONSEQUENCE	**Insignificant**	**Minor**	**Moderate**	**Major**	**Catastrophic**
PROBABILITY	May have little or no impact on health and safety	May have some impact on health and safety, but will be able to recover from or repair the damage within a relatively short term	A moderate permanent disability or long term impairment	A single fatality or severe permanent disability	Multiple fatalities or significant irreversible effects on the health of a large number of people
Likely There is a very good chance this event will occur in the near future	L	M	H	E	E
Probable This event has occurred several times or more in corporate experience	L	M	H	E	E
Possible This event might occur once or twice in corporate experience	L	L	M	H	E
Unlikely This event does occur somewhere from time to time, but very seldom	L	L	M	M	H
Rare It is theoretically possible for this event to occur, but extremely unlikely that it will	L	L	M	M	M
Key: *L = Low manage by routine procedures*		*M = Medium; management responsibility must be specified*		*H = High; senior management attention needed*	*E = Extreme; immediate action required*

Figure 4: LHIB Risk Matrix

13.9 Risk Evaluation

The level of risk found during the analysis process has been evaluated using the risk criteria,established when the context was considered, and the need for treatment considered. Risk treatment measures are then considered and included as part of the analysis.

13.10 Risk Treatment

Risk control measures/treatments detailed in Sections 10 to 13 to the identified hazards are done so in accordance with the standard hierarchy of controls and the LHIBWHS Risk Management System document. The risk treatments will seek to reduce the risk to as low as reasonable practical. Any treatments not initially in place have been included and implemented through consultation, additions to procedures, etc.

13.11 Measurement and Evaluation

13.11.1 Monitoring and Review

LHIB will continue to monitor and evaluate hazards, risks and treatments to ensure risks are maintained to as low as reasonably practicable (ALARP). This monitoring and review shall include the management of new or emerging risks. Reviews may include:

a) Consultation of key stakeholders where necessary including the use of subject matter experts that might include external consultants (if considered necessary);

b) Whether additional or stronger treatments are needed;

c) Consideration of suitability and effectivenessof treatments including using the hierarchy of controls e.g. to check if elimination of hazards and the risk they pose is possible;

d) Consistency for good industry practice;
e) Residual risk considering things such as incidents both internally and externally.

13.11.2 Recording Incidents and Incident Investigation

All types of incidents, including near misses, will be recorded and used in the review process. Incidents are to be reported using *LHIB's Safety Incident Reporting Form* and investigated using the guidance of *LHIB's Safety Incident Management, Reporting and Investigation* procedure. Additional guidance for reporting incidents involving the electrical network is provided by Part 9 of the *LHIB ENSMS Communication and Reporting Plan*.
For injuries resulting in any lost time or medical treatment, the Notification of Injury form must be completed within 48 hours.
Details of safety and other types of incidents and subsequent investigation is recorded via the *Accident, Incident and Near Miss Investigation Report.*

13.11.3 Audit and Review

This FSA will be periodically reviewed internally in accordance with Part 10 of the *LHIB ENSMS Monitoring, Measurement and Audit Plan* and externally audited as required by IPART.

13.11.4 Communication and Reporting

Internal and external communication and reporting is managed using the guidance of Part 9 of the *LHIB ENSMS Communication and Reporting Plan*.
This FSA will be included on the LHIB's internal policy library following audit review and made available to key external stakeholders, identified at Section 4.1, upon request once the initial consultation process is completed.

13.12 Risk Analysis - Public Safety

No.	Risk Descriptor	Hazard	Risk Category	Consequence Description	Consequence Rating	Likelihood Rating	Inherent Risk	Hierarchy of Controls	Controls	Residual Risk	ALARP
1	Digging up underground mains	Electricity	Operational Design	Possible electric shock or electrocution from excavation works Damage to network equipment	Major	Probable	Extreme	Administrative	• Dial before you dig • Protection of HV cables at Power House and Backup Generator • LV circuits protected from distribution substations • ENSMS Public Electrical Safety Plan • Electrical safety awareness programs	Medium	Yes
2	Street light bollard, LV pillar or substation hit/damaged by vehicle	Electricity	Design Operational Maintenance	Possible electric shock or electrocution from live wires	Major	Probable	Extreme	Administrative Engineering	• Siting bollards, pillars or substations where they are unlikely to be run over • HV protection at Power House or Standby Generator • LV circuit breakers at substations protect all outgoing circuits • Safety switches to be used to protect street lights in the future.	Medium	Yes

No.	Risk Descriptor	Hazard	Risk Category	Consequence Description	Consequence Rating	Likelihood Rating	Inherent Risk	Hierarchy of Controls	Controls	Residual Risk	ALARP
									• Visual check for trees likely fall as part of 6 monthly checks • ENSMS Public Electrical Safety & Maintenance Plans		
3	Restoration of supply after blackout where a vehicle has hit/damaged a pillar or transformer	Electricity	Operational	Possible electric shock or electrocution when electricity is restored	Catastrophic	Possible	Extreme	Administrative	• Patrol of assets to occur for all unplanned outages before restoration • ENSMS Operational Plan	Medium	Yes
4	Transformer or HV distribution pillar fault causing an explosion	Flying objects	Design Maintenance	Possible blunt injury or death flying debris	Major	Possible	High	Administrative	• Protection provided at Power House and Backup Generator • Transformers fully contained • No exposed porcelain insulators	Medium	Yes
5	Shocks from taps in showers & the like in homes caused by the network	Electricity	Design Maintenance	Possible electric shock or electrocution from live tap caused by a faulty or poor neutral connection on the network	Major	Likely	Extreme	Administrative	• Yearly substation and pillar maintenance checks for corrosion or burning of neutral connections. • The MEN system helps minimise the risk.	High	Yes

No.	Risk Descriptor	Hazard	Risk Category	Consequence Description	Consequence Rating	Likelihood Rating	Inherent Risk	Hierarchy of Controls	Controls	Residual Risk	ALARP
									• ENSMS Electrical safety awareness plan options.		
6	Unauthorised persons accessing and/or operating network equipment.	Electricity	Design Maintenance Operational	Unauthorised persons may receive burns from arcs or receive an electric shock or be electrocuted	Major	Probable	High	Administrative Engineering	• Equipment generally inaccessible due to locks • No exposed equipment in compounds such as zone substations or poles	Medium	Yes
7	Vandalism of network equipment	Electricity Explosion Arc flash	Design	Potential electric shock, electrocution, burns or blunt force trauma to members of public	Major	Possible	High	Administrative	• ENSMS Electrical safety awareness programs. • ENSMS Emergency plans • Network protection equipment particularly for street lights • Danger signs	Medium	Yes
8	Copper theft	Electricity Arc flash	Design	Copper is used for HV and LV cabling and for earthing. Other networks have experienced copper theft.	Major	Possible	High	Administrative	• ENSMS Electrical safety awareness programs. • ENSMS Emergency plans • Network protection equipment particularly for street lights • Aluminium used for some cables • Danger signs	Medium	Yes

No.	Risk Descriptor	Hazard	Risk Category	Consequence Description	Consequence Rating	Likelihood Rating	Inherent Risk	Hierarchy of Controls	Controls	Residual Risk	ALARP
									• Small island and difficulties in obtaining without witness and difficulties with the sale of copper		
9	Emergency service personnel working near or touching "live" apparatus while putting out fire	Electricity	Design Operational Maintenance	Emergency service personnel may receive a shock or be electrocuted	Major	Unlikely	Medium	Administrative	• Discussion/training session with emergency personnel • Emergency personnel trained to follow guidance of ENA DOC 008 as stipulated in ENSMS Public Electrical Safety and Emergency Plan	Medium	Yes
10	Faulty wiring or equipment within an electrical installation whether by an electrician or home owner	Electricity Fire	Public safety	Potential electric shock or electrocution to member of public or loss of property	Catastrophic	Possible	High	Administrative	• ENSMS Customer Electrical Installation Safety Plan • Switchboard upgrade, product safety recalls, DIY and General Electrical Safety advice in Public Electrical Safety Plan • ENSMS Electrical Safety Awareness Plan and program of activities	Medium	Yes
11	Lightning entry into	Electricity Arc flash	Design	Potential damage to network and	Major	Possible	High	Engineering Administrative	• An underground network and	Medium	Yes

No.	Risk Descriptor	Hazard	Risk Category	Consequence Description	Consequence Rating	Likelihood Rating	Inherent Risk	Hierarchy of Controls	Controls	Residual Risk	ALARP
	homes via network			customer equipment as well as electric shock to member of public					Multiple Earth Neutral (MEN) system limits risk • Lightning advice in ENSMS Public Electrical Safety Plan		
12	High seas, storm water, lightning, tsunamis, fire	Electricity	Operational	Potential damage to property, loss of supply and electric shock or electrocution of staff/contractor or member of public	Catastrophic	Unlikely	High	Engineering Administrative	• ENSMS Emergency plan • Underground network • Electrical safety rules	Medium	Yes
13	Erosion at base of substation	Electricity Arc flash	Public safety	Erosion could cause damage to the substation causing arc flash or electric shock	Catastrophic	Unlikely	High	Engineering Administrative	• Regular checks as part of maintenance and monthly checks • Corrective actions if erosion was to occur • Site assessment for new substations and appropriate design	Medium	Yes

13.13 Risk Analysis –Safety Issues Associated with Protection of Property and the Environment

No.	Risk Descriptor	Hazard	Risk Category	Consequence Description	Consequence Rating	Likelihood Rating	Inherent Risk	Hierarchy of Controls	Controls	Residual Risk	ALARP
14	Deliberately violating or	Hazardous	Operational	Hazardous substance	Major	Possible	High	Administrative	• Handling procedures and practices	Moderate	Yes

No.	Risk Descriptor	Hazard	Risk Category	Consequence Description	Consequence Rating	Likelihood Rating	Inherent Risk	Hierarchy of Controls	Controls	Residual Risk	ALARP
	error in handling, storing, transporting, disposing of hazardous substance	substance escapes into bush, soil and ocean		causing damage to property or the environment					• Spill kits available		
15	Oil spill from transformer or generator motor	Oil escapes into bush, soil and ocean	Operational	Transformer oil causing damage to the environment	Moderate	Probable	High	Administrative Engineering	• Few cars on the island, speed limits apply, and road conditions don't allow for speeding • Regular maintenance • Trees checked as part of 6 monthly maintenance • Handling procedures and practices • Spill kits available • New transformers have bunding • Generator room – bunding and pit	Medium	Yes
16	Diesel delivery and handling	Diesel escapes into bush, soil and ocean	Operational	Diesel causing damage to the environment	Moderate	Probable	High	Administrative Engineering	• Supply contractor handling and spill response procedures and practices • Filling backup generator by LHIB staff - handling and spill response procedures and practices • Spill kits available	Medium	Yes
17	Diesel spill from generators	Diesel escapes into bush, soil and ocean	Operational	Diesel causing damage to the environment	Moderate	Probable	High	Administrative Engineering	• Spill response procedures and practices • Spill kits available • Generator room – bunding and pit • Main storage tanks are self-bunded • Backup generator has adequate bunding	Medium	Yes
18	Fire started by network	Fire causing damage to property or environment	Operational	Fire causing damage to property or the environment	Unlikely	Catastrophic	High	Administrative	• Rainforest type environment with little flammable growth • Underground network • Protection equipment • Network maintenance	Medium	

13.14 Risk Analysis - Safety Risks Arising from the Loss of Supply

No.	Risk Descriptor	Hazard	Risk Category	Consequence Description	Consequence Rating	Likelihood Rating	Inherent Risk	Hierarchy of Controls	Controls	Residual Risk	ALARP
19	Loss of supply to residential and commercial customers	Personal health	Operational	Food quality of refrigerated food Water supply pumps not working Trip hazards without adequate lighting Septic systems overflowing	Minor	Likely	Medium	Administrative	• Standby generator in different location to primary generators with separate feeder • Switching sheets/plans for loss of certain items of network equipment • Adequate network spares • Contractors available if needed for repairs e.g. cable jointer • Network maintenance in accordance with ENSMS	Low	Yes

No.	Risk Descriptor	Hazard	Risk Category	Consequence Description	Consequence Rating	Likelihood Rating	Inherent Risk	Hierarchy of Controls	Controls	Residual Risk	ALARP
									Electrical Network Maintenance Plan • Adequate generator fuel reserves and refuelling strategy		
20	Loss of supply to the hospital	Unable to adequately care for patients	Operational	Loss of lights and medical equipment	Major	Likely	Extreme	Administrative	• Controls from item above. • UPS on vaccine/ medicine fridge and X-ray • Exit lights • Emergency light • Backup generator available from SES • Torches • Relevant medical equipment with backup battery	Medium	

No.	Risk Descriptor	Hazard	Risk Category	Consequence Description	Consequence Rating	Likelihood Rating	Inherent Risk	Hierarchy of Controls	Controls	Residual Risk	ALARP
									• Backup and UPS batteries checked annually		
21	Loss of supply to airport	Loss of comms to planes	Operational	Unable to contact incoming plane	Catastrophic	Likely	Extreme	Administrative	• Controls from first item in this section • Comms not mandatory for landing for small planes • Meteorological Bureau has air band radio • LHIB handheld air band radio • Backup generator can be proved by LHIB	Low	Yes
22	Loss of supply to “life support” customers	Failure of medical equipment	Operational	Medical equipment could not operate without supply	Major	Likely	Extreme	Administrative	• Not applicable as no life support customers on the island • Controls from first	Low	Yes

No.	Risk Descriptor	Hazard	Risk Category	Consequence Description	Consequence Rating	Likelihood Rating	Inherent Risk	Hierarchy of Controls	Controls	Residual Risk	ALARP
									item in this section • Life support customers encouraged to have backup systems • Backup generator available from SES		

13.15 Risk Analysis – Electrical Worker Safety

No.	Risk Descriptor	Hazard	Risk Category	Consequence Description	Consequence Rating	Likelihood Rating	Inherent Risk	Hierarchy of Controls	Controls	Residual Risk	ALARP
Personal Issues											
23	Drugs and/or alcohol consumption	Electricity Traffic Trips and falls etc	Construction Commissioning Operational Maintenance Decommissioning	Drugs and/or alcohol can impair workers ability to perform all work functions and exposes them to all hazards at a work site	Catastrophic	Possible	Extreme	Administrative	• Adequate supervision • Counselling for offenders • Workers understanding their WHS obligations through toolbox talks	High	Yes
24	Medical condition			A medical condition may impair workers ability to perform all work functions and exposes them to all	Catastrophic	Possible	Extreme	Administrative	• Adequate supervision • Workers understanding their WHS obligations through toolbox talks • Staff counselling service available	High	Yes

No.	Risk Descriptor	Hazard	Risk Category	Consequence Description	Consequence Rating	Likelihood Rating	Inherent Risk	Hierarchy of Controls	Controls	Residual Risk	ALARP
				hazards at a work site							
25	Mental stress			Mental stress may impair workers ability to perform all work functions and exposes them to all hazards at a work site	Catastrophic	Possible	Extreme	Administrative	• Adequate supervision • Workers understanding their WHS obligations through toolbox talks • Staff counselling service available	High	Yes
Behavioural											
26	Poor safety culture	Electricity Traffic Trips and falls etc	Construction Commissioning Operational Maintenance Decommissioning	A poor safety culture has a massive impact on workers and can unnecessarily expose them to incidents	Catastrophic	Possible	Extreme	Administrative	• The LHIB to set the culture for the organisation • Managers to “walk the talk” • Adequate supervision • Workers understanding their WHS obligations through toolbox talks • Staff counselling service available	High	Yes
27	Breach of work practice or procedure	Electricity Arc flash Traffic Trips and falls etc	Construction Commissioning Operational Maintenance Decommissioning	A breach of a work practice or procedure can have a minor to catastrophic result.	Catastrophic	Possible	Extreme	Administrative	• The LHIB to set the culture for the organisation • Managers to “walk the talk” • Adequate supervision • Workers understanding their WHS obligations through toolbox talks • Staff counselling service available	High	Yes
28	Incorrect switching operation	Arc flash Electricity	Operational	An incorrect switching operation can result in arc flash and/or workers exposed to electric shock when supposedly working de-energised	Catastrophic	Possible	Extreme	Administrative	• Qualified workers • Training and refresher training • Authorisation • Operational plan • Switching sheets	High	Yes

No.	Risk Descriptor	Hazard	Risk Category	Consequence Description	Consequence Rating	Likelihood Rating	Inherent Risk	Hierarchy of Controls	Controls	Residual Risk	ALARP
29	Failure to maintain safe approach distance or contact with energised electrical apparatus	Arc flash Electricity	Operational	Failing to maintain a safe approach distance can result in arc flash and/or workers exposed to electric shock	Catastrophic	Possible	Extreme	Administrative Engineering	• Qualified workers • Training • Authorisation • Training and refresher training • Operational plan • Switching sheets • Enclosed and insulated switchgear wherever possible including in Planning, Design, Construction and Commissioning Plan	High	Yes
30	Worker complacency (repetitive tasks)	Electricity Arc flash Traffic Trips and falls etc	Design Planning Construction Commissioning Operational Maintenance Decommissioning	Worker complacency can have a minor to catastrophic result.	Catastrophic	Possible	Extreme	Administrative	• Supervisors to be aware of the dangers with repetitive tasks • Vary work to help minimise boredom and complacency • Workers understanding their WHS obligations through toolbox talks	High	Yes
Training											
31	Worker not competent including in emergency response (poor skills or lack of experience)	Electricity Arc flash Traffic Trips and falls etc	Design Planning Construction Commissioning Operational Maintenance Decommissioning	Worker complacency can have a minor to catastrophic result.	Catastrophic	Possible	Extreme	Administrative	• Supervisors to manage staff competencies • Annual performance assessments to identify skills gaps • Training and refresher training • Workers understanding their WHS obligations through toolbox talks • Simulations	High	Yes
Planning											
32	Inadequately planned switching	Electricity Arc flash	Operational Maintenance	Inadequately planned switching can result	Catastrophic	Possible	Extreme	Administrative	• Staff be given time to plan work	High	Yes

No.	Risk Descriptor	Hazard	Risk Category	Consequence Description	Consequence Rating	Likelihood Rating	Inherent Risk	Hierarchy of Controls	Controls	Residual Risk	ALARP
				catastrophic result.					• Switching sheets to be developed and checked for accuracy • Supervisors to manage staff competencies • Training and refresher training		
33	Poor job planning	Electricity Arc flash Traffic Trips and falls etc	Planning Construction Commissioning Operational Maintenance Decommissioning	Poor job planning can have a minor to catastrophic result.	Catastrophic	Possible	Extreme	Administrative	• Staff be given time to plan work • Switching sheets to be developed and checked for accuracy • Adequate resources allocated to the job	High	Yes
34	Worker fatigue	Electricity Arc flash Traffic Trips and falls etc	Construction Commissioning Operational Maintenance Decommissioning	Worker fatigue must be managed to prevent incidents	Catastrophic	Possible	Extreme	Administrative	• Adequate resources allocated to the job • Workers encouraged to observe standard work breaks including morning tea and lunch • Workers encouraged to observe minimum amount of time off between the end of one shift and the start of another • Supervisors encouraged to develop rosters with worker fatigue in mind	High	Yes
Asset Equipment											
35	Asset failure near work location	Electricity Arc flash Traffic Trips and falls etc	Construction Commissioning Operational Maintenance Decommissioning	Asset failure could include a mechanical breakage or electrical failure	Catastrophic	Possible	Extreme	Administrative Engineering	• Planning, Design, Construction and Commissioning Plan • PPE	High	Yes
Plant (including motor vehicles) and Equipment/Tools											

No.	Risk Descriptor	Hazard	Risk Category	Consequence Description	Consequence Rating	Likelihood Rating	Inherent Risk	Hierarchy of Controls	Controls	Residual Risk	ALARP
36	Inappropriate equipment	Electricity Arc flash Traffic Trips and falls etc	Construction Commissioning Operational Maintenance Decommissioning	Using the wrong tool can result in a catastrophic outcome	Catastrophic	Possible	Extreme	Administrative Engineering	• Tools and equipment provided that is suitable for the job • Electrical safety rules • Planning, Design, Construction and Commissioning Plan • Operational Plan • Training •	High	Yes
37	Failure of plant or equipment	Electricity Arc flash Traffic Trips and falls etc	Construction Commissioning Operational Maintenance Decommissioning	Failure of plant or equipment can result in a catastrophic outcome	Catastrophic	Possible	Extreme	Administrative Engineering	• Plant and equipment maintained as required by procedures or the manufacturer – whichever provides the best safety outcomes • Maintenance Plan	High	Yes
Chemicals/Hazardous Substance											
38	Chemical/hazardous substance absorption into body	Chemical absorption	Construction Commissioning Operational Maintenance Decommissioning	Chemicals can be absorbed into the body if in appropriately handled or used	Catastrophic	Possible	Extreme	Administrative	• Training • MSDS's	High	Yes
Personal Protective Equipment											
39	Inappropriate PPE	Electricity Arc flash Traffic Trips and falls etc	Construction Commissioning Operational Maintenance Decommissioning	In appropriate PPE can result in a catastrophic outcome	Catastrophic	Possible	Extreme	Administrative Engineering	• Appropriate PPE provided to staff • Training	High	Yes
40	Lack of care and	Electricity Arc flash	Construction	Failure of plant or equipment	Catastrophic	Possible	Extreme	Administrative	• Plant and equipment maintained as required by procedures or the	High	Yes

No.	Risk Descriptor	Hazard	Risk Category	Consequence Description	Consequence Rating	Likelihood Rating	Inherent Risk	Hierarchy of Controls	Controls	Residual Risk	ALARP
	maintenance of PPE	Traffic Trips and falls etc	Commissioning Operational Maintenance Decommissioning	can result in a catastrophic outcome				Engineering	manufacturer – whichever provides the best safety outcomes • Maintenance Plan		
Work Locations/Environmental											
41	Extreme weather conditions (wind, lightning, tsunami, etc)	Electricity Arc flash Traffic Trips and falls etc	Construction Commissioning Operational Maintenance Decommissioning	Extreme weather conditions can exacerbate hazards/risks and their control	Catastrophic	Possible	Extreme	Administrative	• Plant and equipment maintained as required by procedures or the manufacturer – whichever provides the best safety outcomes • Maintenance Plan • Disaster plans and training • Linkages with emergency services	High	Yes
42	Trips, slips and falls	Trips, slips and falls	Construction Commissioning Operational Maintenance Decommissioning	Trips, slips and fall type hazards abound	Catastrophic	Possible	Extreme	Administrative	• Housekeeping • Job site audits	High	Yes
43	Unintended collapse of excavation work	Collapse of excavation works	Construction Commissioning Operational Maintenance	Trenches can collapse and trap, injure or kill workers	Catastrophic	Possible	Extreme	Administrative	• Observing standard requirements for shoring up trenches • Keeping trenches as shallow as possible • Engage engineers if in doubt as to the stability of trenches	High	Yes
44	Working near roads	Traffic/vehicles	Construction Commissioning Operational	Working near roads on the island on the island is not as dangerous as on the mainland but	Catastrophic	Possible	Extreme	Administrative	• Island speed limits • Numbers of vehicles on the roads • Procedures and Practices	High	Yes

No.	Risk Descriptor	Hazard	Risk Category	Consequence Description	Consequence Rating	Likelihood Rating	Inherent Risk	Hierarchy of Controls	Controls	Residual Risk	ALARP
			Maintenance	the hazard and consequences remain							

Appendix A - Acronyms

ACRONYM	TERM
ALARP	As Low As Reasonably Practicable
ENSMS	Electricity Network Safety Management System
IPART	Independent Pricing and Regulatory Tribunal
ISO	International Organisation for Standardisation
HV	High Voltage
km	kilometre
kV	Kilovolt
kW	Kilowatt
LHIB	Lord Howe Island Board
LV	Low Voltage
m	metre
MSDS	Material Safety Data Sheet
SEWA	Significant Electricity Works Accident
SFAIRP	So Far As Is Reasonable Practicable
SWMS	Safe Work Method Statement
WHS	Work Health Safety

ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM

PART 14

COMPLIANCE REGISTER

Part 14 Compliance Register

ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM COMPLIANCE REGISTER

14.1. INTRODUCTION

This Register is part of the Lord Howe Island Board's (LHIB) Electricity Network Safety Management System (ENSMS) and is for internal use only.

The LHIB is committed to ensuring a safe and reliable electricity supply to all our customers by operating and maintaining our electrical network to as high as standard as reasonably practicable. This Register and the management of the issues associated with the listed external references is part of the strategy to achieve this aim.

The implications of changes to the items in the register shall be consider at each register review and/or as they occur.

14.2. REGISTER

Item	Last Revision
Acts	
Electricity (Consumer Safety) Act 2004	14 January 2018
Electricity Supply Act 1995	8 January 2018
Work Health and Safety Act 2011	21 March 2018
Regulations	
Electricity (Consumer Safety) Regulation 2015	14 January 2018
Electricity Supply (Safety and Network Management) Regulation 2014 (NSW)	1 July 2016
Work Health and Safety Regulation 2017	1 September 2017
Standards	
AS/NZS4836 Safe working on or near low voltage electrical installations and equipment	2011 (incl Amdt 1)
AS5577: Electricity Network Safety Management Systems	2013
Codes of Practice	
Managing Electrical Risks in the Workplace (NSW)	September 2016
IPART Documents	
Electricity networks audit guideline - Audit fundamentals, process and findings	October 2017
Electricity networks audit guideline – Safety management systems audits	October 2017
Electricity networks reporting manual – Incident reporting	April 2018
Electricity networks reporting manual Safety management systems reporting	April 2018
Electricity networks reporting manual Bushfire risk management reporting	April 2018
Electricity networks reporting manual Annual compliance reporting	April 2018
Electricity networks reporting manual NSW Code of Practice for Authorised Network Operators	April 2018

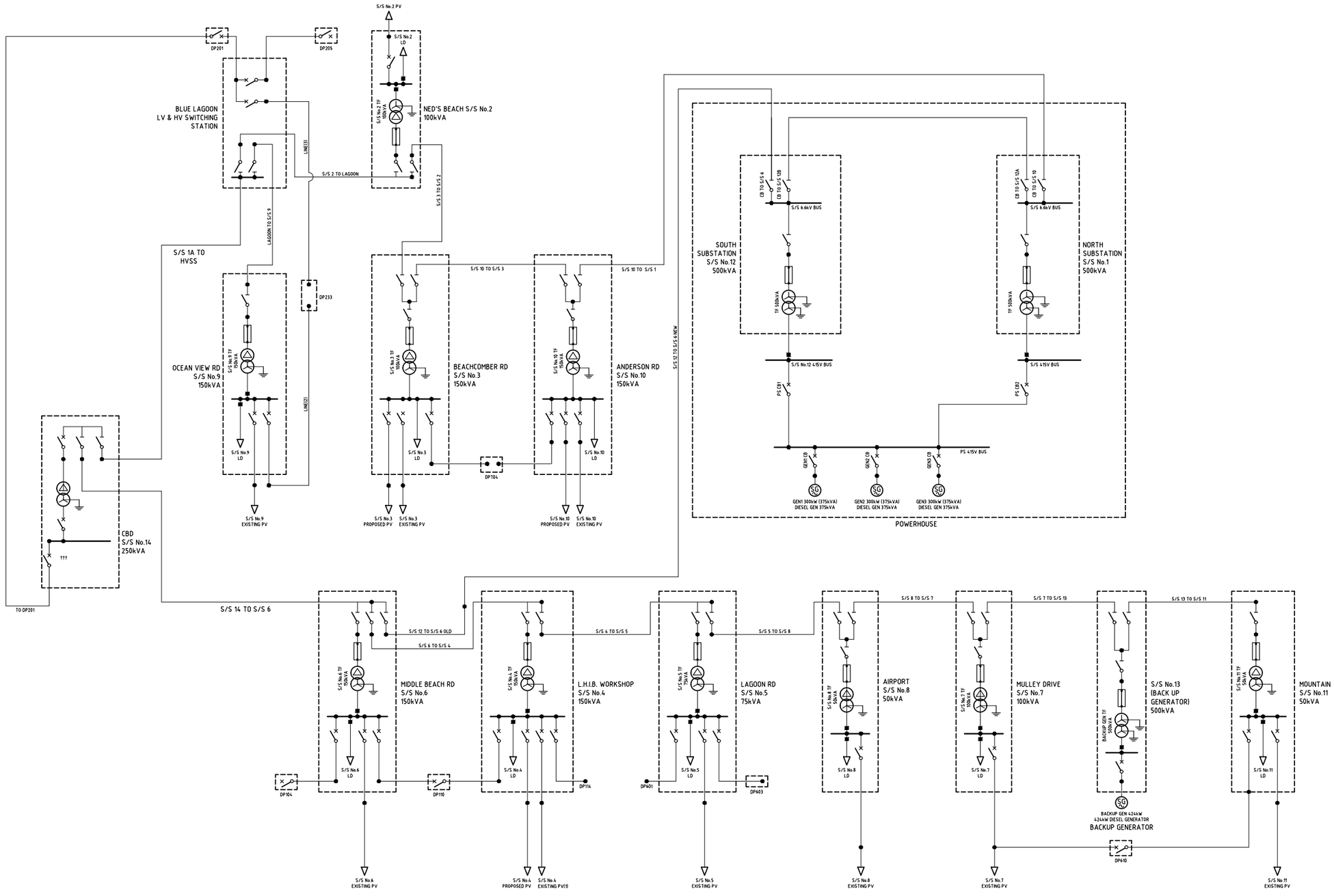
14.3. REGISTER REVIEW

This register will be reviewed and amended as required, to meet the LHIB ENSMS Monitoring, Measurement and Audit Plan.

ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM

PART 15

SINGLE LINE DIAGRAM



REV	DATE	DRAWN	REV'D	APP'D	REVISION
A	16.01.17				PRELIMINARY ISSUE

CLIENT
LORD HOWE ISLAND BOARD

PROJECT

DRAWN	DRAWING CHECK	REVIEWED	APPROVED
DESIGNED	DESIGN REVIEW	DATE	DATE

TITLE
EXISTING SLD
DISTRIBUTION AND GENERATION

SCALE	DRAWING No	REV
NTS	RT019500-LHI-SLD-WALL-CHART	A

A2

ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM

APPENDIX A

AS5577- 2013

ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM

APPENDIX B

ELECTRICITY SUPPLY ACT 1995

ELECTRICITY NETWORK SAFETY MANAGEMENT SYSTEM

APPENDIX C

ELECTRICITY SUPPLY (SAFETY AND NETWORK MANAGEMENT) REG 2014