Asset Management System Description



CONTROLLED DOCUMENT

Summary

Describes the main elements of our Asset Management System for its assets to enable the understanding of its structure, its supporting procedures and how it is implemented.

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1. Purpose

This document provides new employees to the organisation, and existing employees transferring to a different function, a high-level understanding of key processes, documents, accountabilities, and systems used across various asset management

activities within the scope of our Asset Management System. Direction is provided to other documentation through callouts like the example to the right. These documents enable a more detailed understanding of the Asset Management System to ensure it is effectively understood, communicated, and implemented.

Asset Management System Description: Provides an overview of our Asset Management System.

It details the scope of the Asset Management

System, its boundaries, interfaces with other management systems, and presents how key elements and criteria applied throughout the system are derived and aligned.

2. Scope

This document should be read in conjunction with the Asset Management Policy and Network Asset Strategy. This document describes the Asset Management System and its interfaces, stakeholder engagement, roles and responsibility, and continual improvement. Section 6 provides further details of inscope items.

3. Definitions

Key terms and definitions relating to the corporate-wide procedure

| Definition |
|--|
| An asset is an item, thing, or entity that has potential or actual value to an organisation. Within this document Asset refers to the in-scope assets. |
| Systematic and co-ordinated activities through which we effectively manage the assets and their associated performance, risks, and expenditures over their lifecycle for the purpose of achieving our Business Plan and objectives. |
| Our processes, procedures, and organizational structures necessary for the development, implementation, and continual improvement of the asset management policy, asset management objectives, Network Asset Strategy, and asset management plans. |
| Our Asset Management group is responsible for strategic asset management within the business. |
| Principles and direction consistent with our Business Plan for the setting of the asset management objectives and the development of the Network Asset Strategy. |
| Specific and measurable outcomes required of the assets to achieve the Business Plan and objectives; and/or Specific and measurable level of performance required of the assets; and/or |
| |



| | Specific and measurable level of the health or condition required of the assets; and/or |
|--|---|
| | Specific and measurable outcomes or achievement required of the Asset Management System. |
| Network Asset Strategy | Documents setting out the long term and short term approach to: |
| (Equivalent to the Strategic Asset | Management of the assets to achieve the required asset management objectives. |
| Management Plan referred to in ISO55001) | • Balancing the cost, risk, and performance of the assets over the complete asset lifecycle. |
| | Making better asset management decisions. |
| | Continual improvement of the Asset Management System to support the achievement of the asset management objectives. |
| | Continual improvement of asset management. |
| Asset Management Plans | Documents specifying activities, resources, responsibilities, and timescales for implementing the asset management strategy and delivering the asset management objectives. |

4. Background

Our Asset Management System is maintained and continually improved to ensure that the network assets are managed at the forefront of good practice asset management. Our NSW Transmission Operators License, issued under the Electricity Network Assets (Authorised Transactions) Act 2015, requires that our Asset Management System is consistent with ISO 55001 – Asset Management (the international standard for asset management). Our operation of network assets in the ACT and Victoria also requires the demonstration of asset management aligned with ISO 55001.

Under our licence to operate we must notify IPART of any significant changes that we propose to make to our Asset Management System. These changes are handled by specific processes and procedures, changes to the Asset Management System which could be considered significant, and will require regulator notification prior to proceeding are listed below:

- A change to the scope of the Asset Management System that is more than addition or removal of assets as part of standard business processes.
- A change to the underlying management system standard. This may involve changing to a different system that by its nature is considered consistent with ISO 55001, this may for example occur if a perceptibly superior alternative Asset Management Standard is implemented.
- Where external influences mandate an update to the system. This might occur due to ISO 55000 being superseded. General amendments to the ISO 55001 standard released by the ISO are not considered significant changes.
- Any other change that would change the fundamental way that ISO 55001 is implemented.

If a change is likely to come under one of these categories then this must be discussed with the Asset Systems and Compliance Manager who will advise if the proposed change must be notified to the tribunal.



5. Introduction to asset management

5.1. What is asset management?

Asset management in the context of our Asset Management System includes many activities outside of the functional business unit titled 'Asset Management'. Now a widely accepted term used in the world of managing physical assets, asset management is defined as the systematic and co-ordinated activities through which we effectively manage the assets and their associated performance, risks, and expenditures over their lifecycle for the purpose of achieving our Business Plan and objectives. The understanding of what good practice strategic asset management has evolved over the years and will remain to evolve in the future as new technologies change the way assets are planned for, built, operated, and maintained.

This document provides an overview of what asset management means within the business and how it is delivered through a series of processes, procedures, and organizational structures collectively known as the Asset Management System.

5.2. Key principles of asset management

Much has been published about what constitutes good asset management practice including the International Standards Organisation's 'ISO 55000 Asset management — Overview, principles and terminology', the globally recognised standard for asset management. ISO 55000 describes four key principles that our asset management system embodies:

- **Value** assets exist primarily to provide value to the organisation and its stakeholders. Therefore, processes must ensure that stakeholder 'value' is defined and asset management objectives are directly aligned with organisational objectives. This is achieved through our strategic asset management planning processes and articulated in the Network Asset Strategy.
- Alignment asset management objectives must be enabled through technical, financial and operational decision making processes that translate the definition of value into plans to achieve these objectives. This is achieved through many processes defined within our asset management system that involve risk-based and data-driven decisions.
- Leadership commitment from all levels of leadership within the organisation determine successful asset management outcomes. This is achieved through clear definition of process, roles and responsibilities and the fostering of continual improvement in the way we approach asset management activities.
- **Assurance** governance processes must be resourced and embedded across critical activities to assure assets will fulfil their intended purpose. This is achieved through various asset performance, incident, risk control, and financial reporting processes, as well as regular reviews of progress toward objectives.

5.3. Why asset management is important to Transgrid

Transgrid is an asset intensive organisation operating in a highly regulated environment. Many of our assets can have a significant impact on our ability to deliver our service in a safe, and environmentally and sociably responsible manner that meets our customer, shareholder, and other stakeholder requirements. As asset management is such a critical part of how we achieve this, it is vital that asset management activities are approached in a systematic manner to ensure the many significant risks associated with the nature of our assets are managed appropriately.



Every employee has a part to take in making Transgrid an enjoyable and successful place to work. While reading this document, you are encouraged to think about how you will contribute to good asset management by not only considering your own role in isolation, but how this affects other roles within the business achieve their part.

6. Our Asset Management System

6.1. What is an asset management system?

The Asset Management System provides the basis through which asset management is implemented within the business. Its role is to ensure that the Asset Management Objectives are consistently achieved.

It is a set of interrelated and interacting process elements that direct asset related decisions, actions, and activities in alignment with our overarching business strategy. In this way, it systemically ensures that assets are managed to effectively balance cost, risk, and performance.

It promotes effective leadership and culture throughout asset related activities. It defines roles and accountabilities, inputs, processes, and outputs to ensure strategic focus throughout the value chain.

The elements of the Asset Management System are captured through a suite of documents. These provide for methodically managing the assets to deliver upon the Asset Management Objectives and achieve optimal outcomes for Transgrid and our stakeholders.

6.2. The scope of our certified asset management system

The International Organisation for Standardisation (ISO) has developed a framework which is designed to capture the key aspects of asset management system good practice. The ISO asset management system standards comprise:

Our Asset Management System has been independently certified as being consistent with the requirements of ISO 55001.

- ISO 55000:2014 Asset management: Overview, principles, and terminology (provides an overview of the asset management family of standards and to introduce asset management and describe its underlying principles and the terminology used).
- ISO 55001:2014 Asset management: Management systems requirements (specifies the requirements for an asset management system to manage assets and asset systems over their life cycles).
- ISO 55002:2018 Asset management Guidelines on the application of ISO 55001 (provides guidelines for the application of the specified requirements in ISO 55001).

One of the requirements of ISO 55001 is to define the scope of the assets and activities covered by the system, and how they interact with other management systems within the organisation. This is especially important when the asset management system is certified to ISO 55001 set of requirements, which our asset management system has been since 2014. The scope of the Asset Management System is defined in section 6.3.



6.3. Assets within the scope of the asset management system

6.3.1. Our physical asset base

Our prescribed electricity transmission network is one of the largest in Australia. It extends from the Queensland border to the Victorian border and connects the major load supply points and the major power stations throughout NSW and the ACT. The 'prescribed' electricity transmission network assets are captured within its Regulatory Asset Base (RAB), which is valued at around \$7 billion. The network operates at voltage levels of 500kV, 330kV, 220kV, 132kV and 66kV. Our electricity transmission network incorporates:

- Over 13,000 kilometres of high-voltage overhead transmission line and underground cable operating at voltages of up to 500kV.
- Over 115 substations including switching stations which include prescribed and non-prescribed sites.
- Around 40 connection points to generators, located in the Southern NSW, Western NSW, Central Coast, Hunter Valley, and Snowy Mountains.
- Around 400 electricity distributor and direct-customer connection points.
- Five inter-connectors to Victoria and Queensland.

In developing the electricity transmission network, substations are normally located on land owned by Transgrid, while the transmission lines are generally constructed on easements acquired across private or public land.

We also manage network assets that are independent of or connected to the prescribed electricity transmission network. For example, Transgrid built, own and manage three substations and short section of line in Victoria which are part of the Victorian electricity transmission network.

We have staff strategically based at locations throughout NSW to meet day to day operation and maintenance requirements, as well as being able to provide emergency response. Our field staff are coordinated from major depots and area centres located in Western Sydney, Newcastle, Tamworth, Orange, Wagga Wagga, and Yass. We have arrangements with Distribution Network Service Providers (DNSP) to provide coverage for assets in other locations. Our head office is in Ultimo Sydney.

6.3.2. Assets within scope

Not all our physical assets are managed under the scope of the asset management system. Our core business function is as the primary Transmission Network Service Provider (TNSP) for the state of New South Wales (NSW)¹ and Australian Capital Territory (ACT). Assets that enable this function comprise the majority of the assets within the scope of the AMS (and the majority of the asset portfolio as a whole). We also provide contestable services which leverage this primary function. These are enabled by negotiated and contestable (i.e. non-prescribed) Network Assets.

The scope of this Asset Management System includes all the prescribed and non-prescribed transmission system network assets (except for non-prescribed telecommunications assets). Non-prescribed telecommunications assets and non-network assets are out of scope. Table 2 provides further clarity on which assets are deemed to be within and outside of the scope of the Asset Management System and the certified Asset Management System.

¹ Other Registered TNSPs in NSW include EnergyAustralia and Directlink.



Table 1: Assets within the scope of the AMS and the certified system

| Asset Type | AMS Scope | Outside the scope of this AMS | | | | |
|-----------------------|---|---|--|--|--|--|
| Network Assets | The following electricity transmission network assets are in scope of the certified system to ISO 55001: NSW Prescribed NSW Negotiated NSW DCA (TOT owned) ACT Non-contestable | The development and approval of non- prescribed investments up to the investment decision point. | | | | |
| | The following electricity transmission network assets are <u>not</u> in scope of the certified system to ISO 55001: NSW IUSA NSW Contestable DCA (TGS owned) VIC Contestable To meet business needs and the expectations of customers and regulators these assets are managed within the AMS (but not certified) | Non-prescribed telecommunications assets not associated with the control and operation of in-scope assets. Non-Prescribed asset activities prior to bid acceptance. | | | | |
| | The following assets are in scope of the certified system to ISO 55001: Information and supporting data required to effectively manage the provision of high voltage transmission services for assets within the scope of the certified AMS The following assets are <u>not</u> in scope of the certified system to ISO 55001: Information and supporting data required to effectively manage the provision of high voltage transmission services for assets within the scope of the certified AMS | The management and architecture of ICT- supported applications and systems that facilitate asset information management. Data and information required for corporate frameworks and other management systems that do not interface with the Asset Management System. | | | | |
| Non-Network Assets | Nil – all non-network assets are outside the scope of this AMS. | Property portfolio (Note directly related to the network, or held for future network development) Facilities (head office, three regional depots and three area centres) Fleet (motor vehicles, mobile plant) Test tools and equipment IT hardware and software (not directly related to the network such as operational technology) Non-network solution initiatives (where not directly connected to the network) Assets that provide external telecommunications services (i.e. systems not associated with the operation of the prescribed or in scope non-prescribed network infrastructure) | | | | |

Further clarity of the scope of assets within the certified asset management system can be seen in Figure 1 along with ownership, license arrangement and relationship with various regulators.



Figure 1: Certified asset management system scope



The asset classes that comprise the electricity transmission network assets are described in Table 2 along with their corresponding responsible Asset Managers. Asset Management Information, the only non-physical asset identified in this table, is considered an asset out of recognition of the importance of asset information's criticality to decisions made around the physical assets. As such, a corresponding Asset Class Strategy is developed that outlines how asset management information is managed across its lifecycle.

Table 2: Descriptions and responsibilities for in-scope assets (Network Assets)

| Asset Class | Description | Asset Manager |
|------------------------|---|--|
| Substations | Power and auxiliary transformers, switch gear, instrument transformers, ancillary plant, reactive plant, infrastructure, roads, drainage, fences, oil containment systems and buffer zones. | Substations Asset Manager |
| Transmission Lines | Steel tower, steel pole, wood pole, and concrete pole lines, together with their associated easements and access tracks. | Transmission Lines and Cables Asset Manager |
| Underground Cables | High voltage cables. | Transmission Lines and Cables Asset Manager |
| Market Metering | Revenue, check and statistical metering installations; quality of supply monitors. | Digital infrastructure Asset Manager |
| Automation Systems | Protection Protection schemes, fault, and disturbance recorders. On-line condition assets System comprising terminal servers, site servers (CMPCs), Regional servers, and web server designed to communicate with field connected devices and store OLCM data. Control systems Substation control systems, HMI, source content, SAS online configuration tools, associated substation computer systems and Ethernet ring. Low voltage AC and DC systems Batteries, chargers, distribution boards and LV cabling SCADA assets System comprising, Data Concentrator. | Digital infrastructure Asset Manager Digital infrastructure Asset Manager and Substations Asset Manager Digital infrastructure Asset Manager Digital infrastructure Asset Manager Digital infrastructure Asset Manager |
| Infrastructure Systems | | Digital infrastructure Asset Manager |



| Asset Class | Description | Asset Manager |
|--|---|--|
| Telecommunications Systems (prescribed) | Pilot cables, Low Voltage cables, Optic fibre network, Microwave and VHF radio systems, repeater sites, PLC systems, operational telephone network, communication towers, network management system, STRIDE, and buildings, roads, drainage, fences, oil containment systems and buffer zones. | Digital infrastructure Asset Manager |
| Network Property | Property Lands or yards where the substation or telecommunication sites are located (Leases and legal tenders are managed by Property and Environment). Includes sites held for future network development. Physical security assets Perimeter fencing and access, lighting, security fencing and access, electronic cards and access management systems, locks and keys, CCTV, surveillance systems, intruder detection alarm systems and signage. Buildings This includes buildings housing primary system or substation assets (e.g. GIS) and secondary system assets (e.g. control, protection panels, telecommunication, SCADA etc.). | Digital infrastructure Asset Manager Manager Property and Environment Digital infrastructure Asset Manager Respective Asset Managers (Substation Asset Manager and Digital Infrastructure Asset Manager) |
| Asset Information | This covers the asset and system information required to be captured, recorded, and maintained for the electricity transmission network, such as asset and equipment registers, condition data, protection databases, EDMS, outage and fault data, metering data, maintenance standard tasks, work schedules and resource plans. It also covers the asset data required to be captured, recorded, and maintained for TSS, including asset mapping information, easement information, topographic information, environment information, land information, aerial photo information and property owner information. | Asset Analytics and Insights manager. |

The asset classes in this table are described in more detail in their respective Renewal and Maintenance Strategies accessible on the Wire.

6.3.3. Boundary and interface assets

This Asset Management System is focused primarily on the management of physical electricity transmission network assets. The non-physical assets (e.g. financial assets, information assets, human assets) that are of interest to the Asset Manager are those where there is a significant interdependency to the optimal management of the physical assets. These assets are appropriately managed by the functional 'process owner' to deliver on and meet the needs of the Asset Manager in a cost effective and timely manner.

Table 3 outlines the responsibilities of the Asset Manager and the process owner in relation to boundary and interface assets.

| Position | Responsibility |
|---------------|---|
| Asset Manager | • Specifying the asset management data, information and reporting requirements and providing this information to the respective 'responsible manager' or 'process owner'. |
| | • Providing the functional 'responsible manager' or 'process owner' with details of any planned changes in the Asset Manager's requirements in a timely manner; in this regard the 'responsible manager' or 'system owner' will be given sufficient notice to enable changes to the relevant systems, process and/or procedures to be effected, tested and implemented in sufficient time to meet the Asset Manager's requirements. |

Table 3: Descriptions of out-of-scope assets (Non-Network Assets)



| Responsible Manager/System Owner | • Developing, managing, and implementing the processes, procedures, and systems to ensure that the Asset Manager's requirements for the identified assets are being met in a cost effective and timely manner. |
|--|---|
| | Keeping the Asset Manager informed of, and involved in, any planned enhancements or process / procedure / system changes that may impact on the Asset Manager's requirements and/or the identified asset. |

The boundary and interface assets to the Asset Management System are shown in Figure 2.

Figure 2: Boundary and Interface assets to the Asset Management System



6.4. Activities within scope of the asset management system

Our Asset Management System operates within the business Operating Model, which sets accountability and core processes across the business. The Operating Model balances customer focus and responsiveness with economies of scale:

- Creating one business dedicated to prescribed and non-prescribed work, reintegrating the telecommunications sales function.
- Putting our product lines at the centre of what we do, with an increased focus on sales and advancing our non-prescribed business.
- Establishing a new way of working together as one to win business, serve our customers, and deliver profitability.
- Creating three core functions Strategy, Planning and Delivery.
- Setting strategic direction at the top and ensuring that it flows cohesively through the business.
- Developing a single, fully integrated planning function for all prescribed, non-prescribed, maintenance and telecommunications works.
- Establishing delivery mechanisms where work is work, be it prescribed, non-prescribed or telco.

Clear lines of accountability and clarity around functions allow confidence in process performance, and collaborative responsibility to deliver results illustrated in Figure 3.





Figure 3: The Asset Management System is integrated within our Operating Model

This high-level business Operating Model is broken down into more detailed activities in what is known as our Periodic Table, illustrated in Figure 4. It illustrates the operation of the Asset Management System within our Operating Model, showing the in-scope, out of scope, and interfacing processes of the Asset Management System. The Periodic Table mapping of business process flows enables clear inputs, outputs, and handovers for cross-functional activities. This mapping is documented within the following framework documents along with detailed RACIs, and can be accessed on the Wire:

- Asset Management Framework
- Business Growth Services Framework
- Design Development Framework
- Network Planning Framework
- Procurement Framework
- Project Development Framework
- Property & Environment Framework
- Works Program Framework

Detailed descriptions of the processes within the Periodic Table are provided in each of the framework documents.



Figure 4: Periodic Table to map business process flow

| Strategy and Regulation | | Network P Oper | lanning and ations | Business Delivery Growth | | | Finance | Corporate Services | | | | Legal, Governance, and Risk | | | | |
|--|--|--|--|---|---|--|---|---|---|--|---|-------------------------------------|--|--|---|------------------------------|
| 1 Strategy & regulatory policy | 2 Brand | 3 Manage prescribed revenue | 4 Plan & design | 5 Operate | 6 Manage non- prescribed revenue | 7 Build | 8 Maintain | 9 Manage resources | 10 Finance | 11 Human resources | 12 ICT | 13 Procurement and facilities | 14 Portfolio and transform'n office | 15 Legal affairs | 16 Audit, risk, and compliance | 17 Secretariat |
| 1.1 Develop regulatory strategy | 2.1 Manage brand & public relations | 3.1 Manage prescribed customers | 4.1 Develop & maintain asset strategy | 5.1 Monitor real time performance | 6.1 Develop non- prescribed strategy | 7.1 Manage project work plan delivery | 8.1 Manage maintenance work plan delivery | 9.1 Manage work performance | 10.1 Report financial performance | 11.1 Develop & maintain HR strategy | 12.1 Develop & maintain IT strategy | 13.1 Manage procurement | 14.1 Portfolio management office | 15.1 Resolve legal disputes | 16.1 Manage risk & compliance | 17.1 Manage governance |
| 1.2 Maintain revenue reset strategy | 2.2 Manage external comms & stakeholders | 3.2 Manage pricing & tariffs | 4.2 Justify & prioritise projects | 5.2 Manage network stability | 6.2 Manage non- prescribed customers | 7.2 Close out projects | 8.2 Schedule & dispatch work | 9.2 Manage vehicles & mobile plant | 10.2 Perform financial analysis & planning | 11.2 Manage organisation design | 12.2 Manage IT programs delivery | 13.2 Manage contracts | 14.2 Transformat'n management | 15.2 Manage legal documents & contracts | 16.2 Manage audit | |
| 1.3 Develop & maintain business strategy | 2.3 Manage marketing | | 4.3 Develop projects | 5.3 Report network status | 6.3 Undertake business development | | 8.3 Execute works & services | 9.3 Manage toolsets & equipment | 10.3 Manage treasury | 11.3 Manage ethics & culture | 12.3 Manage IT service. support & equipment | 13.3 Manage facilities | | 15.3 Identify legal obligations & provide legal advice | 16.3 Manage insurances | |
| | | | 4.4 Manage standards & procedures | 5.4 Manage incident response | | | 8.4 Manage emergency response | 9.4 Manage logistics | 10.4 Manage routine transactions | 11.4 Manage talent | 12.4 Manage IT/OT security & resilience | | | | | |
| | | | 4.5 Manage demand & supply | 5.5 Manage operational technology | | | 8.5 Close out work | 9.5 Manage HSE | 10.5 Manage financial governance & controls | 11.5 Manage HR admin & support | 12.5 Manage IT projects & development | | | | | |
| | | | 4.6 Perform engineering design | 5.6 Manage network asset information | | | | | 10.6 Manage tax | 11.6 Manage internal comms | | | In-scop | e of the Al | WS | |
| 5.7 Manage property & easements | | | | 10.7 Manage corporate finance | | | | Out of s | ces with A Scope of th | ms ne AMS | | | | | | |



6.5. Organisational structure supporting key in scope activities

Delivery of the operating model is driven by the Executive Leadership Team as illustrated in Figure 5. These Senior Leaders have a consistent focus on seeking and delivering the best overall outcomes for our future.



Figure 5: Executive Leadership Team

6.5.1. Network Planning and Operations

Figure 6 illustrates the functions within the Network Planning and Operations business unit which has overall responsibility for the performance of the network assets. Accountability for the Asset Management System sits with the Head of Asset Management.

Figure 6: Network Planning and Operations organisational structure





6.5.2. Delivery

Figure 7 shows the Delivery business unit. Delivery has responsibility for delivering asset activities in the field. Delivery also delivers core Asset Management System processes.



6.6. Key documentation

Figure 8 illustrates the document hierarchy for the Asset Management System and identifies key interfacing documentation that sit outside of its boundary.



Figure 8: Overview of key documents that comprise the Asset Management System





These artefacts document the asset management direction for the optimal combination of lifecycle activities to be applied across the portfolio of network assets and systems in accordance with their criticality, condition, and performance. The top-down connective thread from the Business Plan via these documents provides a clear 'line of sight' from organisational objectives to asset related activities on the ground.

These asset management system documents are described briefly in Table 4.

Table 4: Key asset management documents and systems

| Document/Category | Description | |
|---|--|--|
| Business Plan | Our Business Plan and objectives are prepared on an annual basis through the business planning cycle. | |
| Asset Management Policy | Sets out the principles for the management of assets. | |
| Network Development Strategies & Plans (Network Vision and Transgrid Annual Planning Report) | Sets out possible long term scenarios and drivers for the development of the electricity transmission network. | |
| Network Asset Strategy | Contains the asset management objectives required to achieve the Business Plan and the long term objectives for the electricity transmission network. | |
| | Identifies the overall asset management strategies, covering both the longer term and the short term, to achieve the asset management objectives. | |
| Asset Class Strategies | Identifies the strategies to achieve the required asset outcomes for the various classes of assets to deliver the overall asset management strategy and achieve the asset management outcomes. | |
| Asset Plans | Identifies the actions and resources required to achieve the relevant Lifecycle and Renewal and Maintenance strategies, including: | |
| | • 30 year forecast of investment costs. | |
| | Project Tracking Sheet for augmentations and replacements – Capital Works Program. | |
| | Outage Plan and THEOS reports. | |
| | Maintenance Plan for each asset class. | |
| | Maintenance and Defects Works Schedule (from Ellipse). | |
| | Service level agreements. | |
| Optimisation and Delivery of | A series of documentation supporting the whole of asset lifecycle activities including: | |
| Lifecycle Asset Management | Plan – Area Plans, Options Feasibility Study, Options Evaluation Report | |
| | Design – Design standards and equipment specifications | |
| | Build – Project Delivery Manual, construction standards | |
| | Operate – Operating manuals | |
| | Maintain – Maintenance plans, Managing the Maintenance Program, Maintenance Programs Delivery Manual | |
| | Renew – Network Asset Risk Assessment Methodology (RAM), AAIT, Project Delivery Manual | |
| | Dispose – Project Delivery Manual | |
| | These are supported by the Prescribed Capital Investment Process for capital and operating expenditure decision making. | |
| Principal Risk management | Formal risk assessments and risk registers | |
| Asset management information | Outlines the way asset management information is to be managed to add value to the business and its stakeholders. This includes: | |
| | Asset Information Strategy – an asset class strategy outlining initiatives to achieve objectives aligned with the Network Asset Strategy | |
| | Asset management information systems that support decision making and reporting throughout the asset lifecycle | |



| Document/Category | Description |
|---|--|
| | Asset management information standards outlining rules around highly critical asset data |
| | Data governance processes to ensure data quality |
| Asset management leadership, monitoring and review | A combination of processes covering: Leadership – Awareness and communication channels, accountability mechanisms, capability and competency frameworks, Management of Change procedure and continual improvement registers Manitaring – various performance indicators, SLT and Executive reporting. Accest |
| | Monitoring – validus performance indicators, SET and Executive reporting, Asset Management Committees, BARC, regulatory reporting |
| | Review - Asset Management System Audit Procedure, Control Assurance Reviews |
| Asset Management System Monitoring and Review | Includes the asset management committees, monitoring, and reporting of performance indicators, audit programs, and continual improvement initiatives. Management of change |
| Other Corporate Frameworks | These frameworks are managed external to the Asset Management System and include: |
| | Business Continuity Management Framework |
| | Risk Management Framework |
| | Corporate Compliance Management Framework |
| | Internal Audit Framework |
| Other Management Systems | The Asset Management System documentation is integrated into the business (quality), environment, electricity network safety, and health and safety management systems to form an effective and integrated management system. |

6.7. Accessing asset management documentation

6.7.1. Asset management documentation on the Wire

Our Asset Management System documents are stored on the Wire, Transgrid's internal intranet, with original word documentation held in TRIM.

6.7.2. Business process documentation

'Services Framework' documents detail our business processes throughout the integrated Operating Model. They are developed by each business function and relate to the processes for which they are responsible under the Periodic Table (section 6.4). Services Framework documents are available on 'The Wire'.



7. Strategic asset management planning

This section outlines the key methodologies and documentation that form our strategic asset management planning process aimed at aligning with and support the delivery of the Business Plan.

The overall flow of information across the strategic planning process is depicted in Figure 9 along with the interfaces with the management review process. It is worth noting that this is not a linear process, rather it is an iterative process.

Figure 9: Strategic Planning Processes



Ensuring that our drivers are captured, understood, and translated into effective strategy is critical to the effectiveness of our strategy and the Asset Management System. Our Network Asset Strategy presents the strategy development in context.

7.1. Our stakeholders' definition of value

We are committed to effective stakeholder engagement with respect to asset management. This includes actively identifying and engaging with stakeholders, understanding what it is they value with respect to asset management, and incorporating stakeholder feedback into the criteria applied to asset management decision making and information reporting.



We recognise that to effectively engage with our stakeholders in relation to the management of assets, it is essential to deliver best practice stakeholder engagement. This is reflected in tailored processes used across various parts of the business to manage stakeholders based on their specific needs.

Delivering upon stakeholder needs and expectations is a central function of asset management strategy and decision making. Stakeholders' values are reflected throughout the structure of the Asset Management System: Asset Management Policy, Network Asset Strategy and Decision criteria.

The Network Asset Strategy summarises our stakeholders' needs and expectations and outlines our asset management responses. Table 5 identifies some of the key stakeholder needs and expectations that are relevant to the development of the asset management objectives within the Network Asset Strategy.

| Stakeholder group | Stakeholder | Needs and expectations |
|-------------------|--|---|
| Customers | Distribution Network Service Providers (DNSP) Large energy users (e.g. mines and industry) Generator connections Infrastructure customers | Issues: Maintenance or improvement of existing reliability Clear understanding of costs for works and deliverable time frames On time and on budget delivery of major capital and emergency response works Priorities: Be provider of choice for infrastructure and connection work amongst our customers Deliver works on time and budget Demonstrate value for money and benefits from our projects Collaborative engagement and coordination for capital and maintenance works, and system events Effective communication on bushfire response, major projects, load forecasting Effective engagement for the Network Vision and Transmission Annual Planning Report |
| Governments | Federal State and Territory Local Councils | Issues: Understanding future energy system requirements and adopting necessary policy setting Understand Transgrid's network operations, requirements, and challenges Energy affordability and reliability Federal Government requirements for critical infrastructure and its protection from cyber and related attacks Impact of new investments on local communities and that Transgrid is treating people with honesty and respect Impact of investments on wider economic success of NSW Priorities: Demonstrate that our projects deliver benefits and that we strive to reduce our costs to consumers Build advocacy and understanding within government and communities for the need for an implementable Integrated System Plan. Advocate for the need for appropriate returns for network businesses on investments Build support for the implementation of major NSW based ISP projects |
| Regulators | AERIPART | Issues:Ensure compliance with all regulatory obligations |

 Table 5: Key stakeholder needs and expectations related to asset management



| Stakeholder group | Stakeholder | Needs and expectations | |
|---------------------|---|--|--|
| | • ESC/ESV | Build trust in Transgrid's operation amongst regulatory bodies in our strategies, plans and efficiency Effectively engage with stakeholders on priorities, plans and projects Priorities: Achieve appropriate regulatory approvals for forward capital program including contingent projects within the ISP | |
| Market Participants | AEMC AEMO TNSPs DNSPs Generators Retailers | Issues: Collaborative engagement for system planning and development Communication and coordination for capital/maintenance works and emergency procedures Adherence to regulatory requirements Priorities: Maintain compliance and service standards | |
| Communities | Local Councils Environment Heritage Schools RMS Developers | Issues: Environmental performance in construction and operation of our assets Priorities: Social responsibility and the importance of safety around our infrastructure To be treated with honesty and respect To understand the rationale for new assets and that impacts to communities and landholders is kept to a minimum | |
| Consumers | Residential Commercial Industrial Consumer representative groups | Issues: Energy affordability and reliability Improve industry perception as a business that is committed to driving efficiencies in the best interest of customers and consumers Priorities: Successfully deliver Powering Sydney's Future project and wider capital program | |
| Shareholders | Shareholders Parent companies Board of Directors Executive Management | The needs and expectations of our shareholders are articulated within our Business Plan | |
| People | Individual staffFamiliesUnions | Safe working conditions Clear understanding of how we manage assets and what is my role Competencies suitable to roles performed | |
| Service providers | Interfacing business functions Contractors and consultants Suppliers | Safe working conditions Clear understanding of how we manage assets and what is my role Competencies suitable to roles performed Requirements of product or service | |



7.2. Business Plan

Our Business Plan and objectives are prepared on an annual basis through the business planning cycle. The Business Plan sets the direction for the overall business, aligned with various stakeholder needs and expectations. It is the driver to the objectives contained in the Asset Management System.

Strategic themes presented in the Business Plan, together with objectives and focus areas provide a critical input to the strategic asset management planning process. The Network Asset Strategy must demonstrate alignment with parts of the Business Plan that relate to the scope of the asset management system.

Our Business Plan: Outlines our vision, mission, values, strategic themes, and objectives against which asset management objectives are to align.

7.3. Asset Management Policy

Our Asset Management Policy shapes the strategic planning process. Endorsed by the CEO, it sets out the overall policy for the sustainable management of electricity network assets. It provides guidance about the way we should approach key asset management activities and decisions in support of the achievement of our overall corporate and business objectives.

Some important aspects of the Asset Management Policy include:

- No compromise to compliance with our legislative, regulatory and licence requirements
- Taking a whole-of-lifecycle, data-driven approach to decision making
- Implementation of strategic initiatives that align with the business plan
- Investing in new activities that will add value to the business into the future.

Further details are provided in the Asset Management Policy which can be found on The Wire or posted on notice boards across various office locations.

Non-compliance with the Asset Management Policy is taken seriously at Transgrid as it can:

- Have a significant impact to the safety of our workers or the public
- Have a detrimental impact to the environment
- Cause the loss of supply to our customers
- Impact the sustainability of the business due to reduced profits or lack of business growth
- As a worst case scenario, lead to Transgrid losing our licence to operate.

Asset Management Policy: Outlines our core values with respect to managing assets that all asset management activity must align with.

Environment Policy: Outlines core values with respect to managing risk to the environment that the organisation must align with.

Health & Safety Policy: Outlines core values with respect to managing risk to the health and safety of our employees that the organisation must align with.



7.4. Prioritising investment of improvement effort and investment funding

Prioritisation of strategies aligned with the Business Plan and Asset Management Policy requires consideration of the performance, cost, and risk implications. Decisions are required to manage risks and opportunities at each stage in the development of the Network Asset Strategy, Asset Class Strategies and Asset Management Plans. We apply decision criteria to support these decisions facilitating delivery of the asset management objectives while balancing cost efficiency with asset performance at an acceptable level of risk to the organisation and its stakeholders.

Stakeholder requirements play a role in defining the parameters of decision criteria. While different stakeholders will often have competing requirements, our stakeholder management practices ensure that the relevant stakeholder needs and expectations are captured. These stakeholder requirements are then considered during options development and analysis processes as well as in the weighting and calibration applied to specific risks and achievement of performance indicators for each of the following processes:

- Network Planning and Analysis Process
- Renewal and Disposal Initiatives
- Routine Maintenance Initiatives
- Review of Renewal and Maintenance Strategies
- Renewal and Disposal Works Program and Maintenance Plan
- Compliance Requirements

Evaluations are performed to balance risk and cost in line with the leadership-approved risk appetite that details specific criteria for evaluating alternatives based on risk. The level of risk appetite is set by the Board and reflects our willingness to take on risk in relation to setting its strategic objectives. This risk appetite summarised in Table 6 is not only relevant to the strategic planning process, but also useful for employees undertaking asset management activities to help guide day-to-day decision-making.

| Table 0. Dualu Misk Appellic | Table | 6: | Board | Risk | Appetite |
|------------------------------|-------|----|-------|------|----------|
|------------------------------|-------|----|-------|------|----------|

| Risk # | Principal Risk | Appetite |
|-----------|---|----------|
| 1 | Serious failure of Health, Safety and Environment | ALARP |
| 2 | Business model disruption | High |
| 3 | Network Reliability | Medium |
| 4 | Protective and Cyber Security | Medium |
| 5 | Licence or Major Compliance Breach | Medium |
| 6 | Network Safety | ALARP |
| 7 | Workforce Capability | Medium |
| 8 | Access to Capital | Medium |
| 9 | Regulatory | Medium |
| 10 | Social Licence to Operate | Medium |
| 11 | Non Prescribed Growth | Medium |
| 12 | Major Project Delivery | High |



Further definition on our risk appetite, risk appetite levels and risk tolerance is available in the document Transgrid Risk Appetite Statement available on the Wire.

Transgrid Risk Appetite Statement: Defines the organisational risk appetite for various risk categories to guide decision making throughout the business.

7.5. Network development strategies and plans

7.5.1. Transmission Annual Planning Review

Operating under the National Electricity Rules, we are required to undertake an annual planning review to identify an optimum level of transmission investment so that services are delivered at an efficient cost. This involves assessing emerging constraints within the network and possible options to overcome them. It also summarises assets that are reaching the end of their serviceable lives and considers integrated planning options to address this other than a straight like-for-like replacement.

The review is also designed to provide information to interested parties so that they may propose options to meet those needs at lower costs where feasible. This may involve components of demand management and local generation as part of a holistic approach to renewal, growth, and the inclusion of non-network options in the decision processes.

The review process involves joint planning with each of the distribution network owners within NSW and the ACT (Ausgrid, Endeavour Energy, Essential Energy and ActewAGL) as well as with the Australian Energy Market Operator (AEMO), Powerlink in Queensland and AusNet in Victoria. The objective of joint planning is to work together to develop the overall grid in the most efficient way for the benefit of the consumers.

Transmission Annual Planning Review (TAPR): Provides an assessment of the optimal level of capital investment on the prescribed network which will enable us to deliver value for customers at an efficient cost. (latest version on the website)

A critical input to the Transmission Annual

Planning Review is a series of five detailed area plans discussed in more detail in section 7.8.1. They identify high level needs and opportunities for the future within their defined areas of the prescribed network.



7.6. Network Asset Strategy

The Network Asset Strategy is the document linking the Business Plan with what that means to the asset management system. It provides the overview of the asset management objectives to be achieved that are consistent with our stakeholders' requirements, Business Plan, Asset Management Policy, and key asset management system related risks. It defines what Transgrid intends to achieve from its asset management activities over the complete asset lifecycle and describes:

Network Asset Strategy: Describes how we intend to support the achievement of business objectives while improving the Asset Management System and its integration across the business to realise the optimum balance of cost, risk, and performance.

- Key stakeholder requirements and expectations
- The context of the organisation and the environment it is operating in
- High level historical performance against objectives
- Macro challenges or concerns with capacity, performance, asset condition, compliance against legal, and other requirements
- A high level description of the asset management framework, including optimisation, risk analysis, criticality analysis, and decision analysis processes
- Asset management objectives and a high level implementation plan to be achieved in the short, medium, and longer terms
- Strategies to mitigate the identified risks
- Targets to measure the success of the strategies

All employees undertaking asset management activities are encouraged to understand the details of the Network Asset Strategy as it clarifies how their contribution aligns with the direction of the business and adds value to the achievement of asset management objectives.

7.7. Asset class strategies

Aligned with the Network Asset Strategy, asset class strategies detail the renewal and maintenance requirements for the assets within the scope of each asset class. Figure 10 illustrates the various asset class strategy documents which are known as Renewal and Maintenance Strategies.



Figure 10: Asset class strategies



Each Renewal and Maintenance Strategy identifies emerging issues with the assets, and details the renewal and maintenance initiatives to be implemented in response to these issues. Once the entire scope of issues are captured and the associated risks have been assessed the most appropriate course of action to address the risks are implemented based on the 'appropriate courses of action'. Examples of appropriate courses of action are provided in Table 7.

Table 7: Appropriate courses of action

| Action | Description | |
|---|---|--|
| Do nothing | No further investigation required | |
| | (I.e. continue to carry out the routine maintenance plan and undertake defect maintenance as required). | |
| Asset Manager to undertake further analysis | Continue to inspect and monitor the identified issues through defect management and defect maintenance. | |
| | Undertake a formal condition assessment, including a detailed condition assessment | |
| | Work Requests (WR) - initiate non-routine urgent testing or renewal work; usually arising from the emergence of an unforeseen risk such as type faults etc. | |
| | Request broader system investigation requiring input from other business functions such as network planning, operations, or design. | |
| Routine maintenance initiative | Identification of appropriate refinements to routine maintenance tasks and schedules to address the identified issues. | |
| Renewal Initiative | Develop the need/opportunity statement and option screening assessment (NOSA) statement and initiate the Prescribed Capital Investment Process (PCIP) to evaluate options that will address the current and emerging issues. The risk to be managed according to the As Low As Reasonably Practicable (ALARP) principle. A renewal initiative arises when the preferred option is an asset renewal project and forms part of the capital works program. | |
| Network augmentation | Where augmentation solutions such as network reconfiguration exist, undertake this option to defer asset replacement and retire the asset | |
| Non-network solution | Where non-network solutions such as demand side response exist, initiate the PCIP to defer asset replacement or retire the asset | |



| Disposal | If the asset is no longer required it can be considered for decommissioning. Decommissioning's are |
|----------|--|
| | also managed through the PCIP process. |

Our Network Asset Risk Methodology (RAM) describes how asset risks are assessed to inform capital investment decisions. This methodology is applied across all assets supported by several processes and tools to ensure:

- Network asset risks are identified, assessed, and managed in a systematic and consistent manner across the asset portfolio;
- Root causes of potential failures and their consequences are understood to support justification in capital and operating expenditure;
- Investments are prioritised and times appropriately based on financial return.

The output of the strategy is the asset management program of works comprising two components:

- Renewal and disposal initiatives These are considered through the Prescribed Capital Investment Process and managed by the Head of Asset Management, which then leads to the resource-optimised capital works program.
- Maintenance initiatives These directly drive the maintenance regimes which are detailed within the relevant maintenance plans (asset management plans). The maintenance plans are then resourceoptimised through our Enterprise Resource Planning (ERP) system, Ellipse and supporting applications such as TRAC.

Renewal and Maintenance Strategies: Outlines the renewal and maintenance requirements and improvement initiatives for a specific asset class.

Asset Information Strategy: Outlines improvement initiatives relating to asset information management that support the Network Asset Strategy.

The population reviews in these Renewal and Maintenance Strategies cover prescribed assets, nonprescribed asset and assets owned by Transgrid Services. Prescribed asset class strategies cover an upcoming five year period.

7.8. Asset management plans

The primary purpose of asset management plans is to outline exactly what needs to be done, and the resources and funding required to achieve this. Asset management plans come in various formats for different activities as illustrated in Figure 11.



Figure 11: Asset Management Plans



7.8.1. Capital expenditure

Details for planned asset renewals are outlined in the various Renewal and Maintenance Strategy documents and are brought together in a single Optimised Investment List (OIL).

Area Plans are developed by the Network Planning function for distinct electrically defined areas in the prescribed network to identify the high-level needs and opportunities within each area to facilitate the development of options to meet the planning criteria for a 10-year planning horizon. **Optimised Investment List (OIL):** A listing of capital investment plans, both replacement and augmentation, for the prescribed network.

The Area Plan process aims to assess the state of the network, identify the critical external influences to determine the likely future network requirements, and identify the high-level needs and opportunities to be refined and options (external to the Area Plan process) through the Investment Governance process.

There are currently 5 area plans:

- Main System
- Central Region
- Northern Region
- Southern Region
- Inner Sydney

Network augmentation expenditure detailed within these Area Plans are also brought into the OIL to provide a consolidated view of capital expenditure for network assets.

Plans for non-network capital come in various forms depending on what type of project it relates to. Examples of non-network capex within the scope of the asset management system may include:

- Investment in capitalised spare parts
- Tools to manage or analyse asset information

7.8.2. Operating expenditure

Asset management plans covering a significant proportion of our operating expenditure are detailed within various asset maintenance plans derived from corresponding Renewal and Maintenance Strategies.



Many of the non-prescribed assets within the scope of the asset management system are covered by a single Non-prescribed Assets Maintenance Plan with other major assets containing their own Maintenance Plan.

Operating expenditure also covers managerial overhead which is often day-to-day management related but may also consist of specific initiatives undertaken by employees and contractors to improve the way assets are managed. Such initiatives are identified through either:

- Network Asset Strategy
- Asset Information Strategy
- Audit outcomes
- Changes in regulatory or other requirements
- Transformation activity
- General continuous improvement

The format and level of detail contained in these plans varies commensurate with the complexity of the initiative. **Asset Management Plans:** Detailed activities, resources, and timeframes to implement the corresponding Renewal and Maintenance Strategies.

7.9. Strategic planning accountabilities and responsibilities

The Head of Asset Management is accountable for the regular updating of the Network Asset Strategy, all asset class strategies and asset management plans. However, responsibility for their development is delegated to the relevant person(s) within the business.

The suite of strategies and plans for the Asset Classes are aligned with the asset management teams as demonstrated in Table 8. A Non-Prescribed Asset Strategy details the specific project based objectives for these assets. This strategy identifies the specific asset management plans that are applicable to the non-prescribed assets. These plans may be an existing plan or procedure that applies to the prescribed system.

| Document/Category | | Responsibility | Accountability |
|--|---|--|--------------------------|
| Network Development Strategies & Plans | | Head of Network Planning | Head of Asset Management |
| Asset Strategies and Plans | Asset Information | Asset Analytics & Insights Manager | Head of Asset Management |
| | Cables | Transmission Lines & Cables Asset Manager | Head of Asset Management |
| | Easements | Transmission Lines & Cables Asset Manager | Head of Asset Management |
| | Information & Operational Technology | Digital Infrastructure Asset Manager | Head of Asset Management |
| | Property | Digital Infrastructure Asset Manager | Head of Asset Management |
| | Secondary Systems | Digital Infrastructure Asset Manager | Head of Asset Management |
| | Substations | Substations Asset Manager | Head of Asset Management |
| Non-Prescribed Asset Strategy | Non-Prescribed projects | Head of Assessment Management or delegate | Head of Asset Management |

Table 8: Responsibility and accountability for asset strategies and plans



8. Optimisation & delivery of lifecycle asset management

Strategic asset management planning processes provide the framework for converting the Business Plan into activities to implement across the lifecycle of the assets as illustrated in Figure 12. This section outlines how these activities are optimised and delivered in a safe, timely and cost efficient manner to support the achievement of asset management objectives.

Figure 12: Optimisation & Delivery of Lifecycle Asset Management



8.1. Plan

8.1.1. Prescribed network

The Plan phase of the asset lifecycle is largely the management of network stability and security through network planning across three planning horizons which span 0 - 7 years, 7 - 15 years, and 15 - 50 years. Figure 13 illustrates the various questions asked through each of these planning horizons which combined give a long-term perspective on what the assets need to look like to achieve required network stability and security objectives.

Figure 13: Questions asked during each planning horizon







Answering these questions involve various activities outlined in Table 9 largely undertaken by Network Planning.

Table 9: Network planning horizons

| Horizon | Start/End | Key Activities |
|--------------------|---|---|
| I: 0 – 7 years | Current regulatory cycle + n = 7 years | Network planning, forecasting, and modelling Connections and customer planning System performance and stability analysis Alignment of system planning with state and national planning Non-network planning solutions Regulatory consultations |
| II: 7 – 15 years | Horizon I + 8 years = 15 years | Predictive modelling Network planning, modelling, and forecasting Specialist technical support Regulatory consultations incl. benchmarking System planning policies and procedures Power systems data management |
| III: 15 – 50 years | Horizon II + 35 years = 50 years | Network vision Predictive modelling Economic, demographic, regulatory, technical, and market research, and implications Development of future states and pathways |

Horizon 1 provides the most direct input to detailed budgeting requirements and is set at a time horizon long enough to take into account the regulatory period of 5 years, while ensuring sufficient foresight for development of projects likely to fall just outside of that regulatory period.

Area plans document high-level needs and opportunities across the network to facilitate the development of network and non-network options. Prior to inclusion in the project list, these issues and options are evaluated for:

- Technical feasibility documented in an Options Feasibility Study (OFS)
- Commercial efficiency documented in an Options Evaluation Report (OER)

The preferred options are then summarised in the Transmission Annual Planning Report (TAPR) which is used as the basis for initiating projects over a 12-month period, by which time the document is updated with new planning data and options evaluation information.

The Australian Energy Regulator requires projects to undertake a Regulatory Investment Test for Transmission (RIT-T) to identify the most credible investment option which maximises net economic benefits and, where applicable, meets the relevant jurisdictional or Electricity Rule based reliability standards. Projects valued over \$8m must be approved through the RIT-T process prior to being approved for further development.



8.1.2. Non-prescribed network

The primary role of the Business Growth function is to grow the non-prescribed asset base that we provide services for. A pipeline of potential projects is developed by Business Growth with the aim of converting requests for tender into services contracts. A technical assessment is carried out upon receipt of an enquiry for services involving construction of new assets to ensure the asset is within the capabilities of Transgrid in terms of design, operation, and maintenance delivery. The assessment is based on high-level functional requirements set out by the originator of the enquiry and informs the bid decision along with other financial and commercial assessment.

Bid activities include preliminary design and costing activity which form part of the deliverables of respective bids. The need for the asset is confirmed in the case of a successful bid for nonprescribed services. **Network Planning Framework:** Operating model document that governs the management of network stability and security through network planning across three planning horizons.

Prescribed Capital Investment Process: Outlines the end to end prescribed network capital investment process and the decision criteria and methodologies to justify and govern prescribed transmission services.

Business Growth Services Framework: Operating model document that governs the management of non-prescribed projects over their whole of life.

8.2. Design

8.2.1. Design Engineering and Equipment Engineering

A Project Initiation Document (PDI) is developed following the completion of the Optimised Investment List and the Options Evaluation Report. The PDI contains all necessary information required to move into the Design phase, with the type of information varying depending on the nature and complexity of the project.

The Project Development team consists of Design Engineers responsible for designing the network. In cases where standard equipment is used within the network, Equipment Engineering is responsible for developing specifications for this equipment so it can be procured efficiently from various approved suppliers.

A design plan is generated for complex and outsourced projects to ensure certainty of resource and timeline requirements. Generally Engineering Design teams will develop the concept design which may then be outsourced to progress through detailed design.

Safety in Design is a critical component to the engineering design process. Standard risk registers are used where relevant, with further Technical Risk Assessment and HAZOP analysis applied to complex projects or new technologies introduced to the network.



8.2.2. Approvals

Various approvals are required to prior to commencing the Build phase including:

- Regulatory approvals for prescribed assets valued greater than \$8m (RIT-T)
- A signed contract with a non-prescribed customer
- Various environmental approvals or exemptions depending on the specifications of the project, project scope change, or maintenance work
- Property and easement transactions

8.2.3. Estimation

Detailed estimates are produced for various aspects of projects including:

- Project management
- Design
- Procurement
- Stakeholder engagement
- Property and easement transactions

8.2.4. Project handover

Project handover to Delivery for execution involves the following key deliverables:

- Project Approval Document (PAD) contains the project approved cost and contingency, in-service date, and any required intermediate milestones
- Scope definition document contains the scope and staging overview
- Issue For Construction (IFC) contains all design documentation
- Safety in Design report contains risk register
- Project Assessment Conclusion Report (PACR) outcome of the RIT-T assessment
- Environmental planning approvals including Aboriginal Heritage Impact Permits (AHIPs) and consultation with other relevant parties such as road and rail authorities
- Property access rights may include property purchase, lease, or licence, easements, construction licences and notice of entry provisions

Design Development Framework: Operating model document that governs the framework within which engineering design is performed and details the activities required throughout the design process to deliver designs on time, to budget and of a high quality.

Standard Design Manuals: A series of manuals outlining mandatory requirements for asset designs to adhere to.



- Stakeholder engagement may include a stakeholder engagement plan, notifications to property owners, stakeholder and 3rd party agreements and approvals
- Procurement plan including a Bill of Materials (BoM) with long lead time items ordered
- Outage plan entered in The Outage System (TheOS)
- Project risk register contains all hazards and mitigating actions relevant to the Build phase of the project

8.3. Build

The Build phase includes project construction and commissioning of the assets. These activities are carried out by Delivery depending on the size of the project.

Delivery has implemented the Project Delivery Manual (PDM) which details the methodology for delivering construction projects from the perspective of project management and site management staff.

The PDM consists of the following components:

- Project Management Manual (PMM)
- Site Management Handbook (SMH)
- Project Delivery Documentation
- Work Instruction
- Model Specifications

The level of detail within the PDM is appropriate for complex capital projects and is the minimum acceptable standard for delivery of these projects. The methodology is also used for managing network asset replacement projects and other less complex construction projects **Property and Environment Framework:** An operating model document that governs the planning and management of the property portfolio (including easements), spatial systems, and environmental advice and approvals.

Project Delivery Manual: Details the methodology for delivering construction projects within Delivery from the perspective of project management and site management staff.

Standard Construction Manuals: A series of manuals outlining mandatory requirements for construction of asset to adhere to.

Project Risk Management Procedure: Details the process used to manage project-related risks.

Second Line of Defence Procedure: Outlines arrangements for second line of defence risk management applied to large projects.

EPPM: Enterprise Project Portfolio Management system for managing Microsoft Project schedules used for delivery of larger projects and managing project costs.

but it is recognised that the full methodology may be scaled back to a level appropriate for these projects, or the level of detail in specific project documents may be simplified to suit.

The PDM is applicable to both Non-Contestable and Contestable projects.


The PMM is a project level document intended for use by Project Managers in the delivery of Infrastructure projects. It is broken into three separate parts being Defining Project, Concept Planning, and Project Delivery to align with the Prescribed Network Capital Investment Process.

There are three main sections to the SMH being Project Establishment, Project Execution and Project Close-Out. Each part has subsections as described in

Table 10 which provides further detail on specific requirements to be undertaken in order to conduct repeatable, compliant and common practices across the entire Infrastructure Delivery portfolio of projects.

Table 10: Site Management Handbook scope

| Development of project Project plan Stakeholder management Project cost management Project cost management Project time management Project reporting Procurement management Develop specification Tender period Project induction and handover Manage contract communications Manage extension of time, variation, and latent condition claims Manage sub-contractors Manage progress claims Outage management Contractor coordination Site management Develop specification Tender evaluation | Project Establishment | Project Execution | Project Close-out | |
|---|---|--|---|--|
| Contract award Design management Nomination of principals and superintendents rep and issue possession of site Construction risk management Construction management plans approval Approval for commencement of site work (hold point) Construction site preparatory planning Project quality management Incident management Commissioning Manage training Manage authorisation and access for construction Award practical completion | Development of project Project plan Stakeholder management Project cost management Project time management Project reporting Procurement management Develop specification Tender period Tender evaluation Contract award Design management Nomination of principals and superintendents rep and issue possession of site Construction risk management Construction management plans approval Approval for commencement of site work (hold point) Construction site preparatory planning | Project induction and handover Manage contract communications Manage extension of time, variation, and latent condition claims Manage sub-contractors Manage progress claims Outage management Contractor coordination Site management Project quality management Incident management Commissioning Manage training Manage authorisation and access for construction Award practical completion | Finalise defects and omissions Asset capitalization Handover to Asset Monitoring Centre (AMC) Project close out report Project completion | |

8.4. Operations Handover

Project handover to operations involves the following key deliverables:

- Pre-Energisation checks prior to an energised connection of the electricity to the project during the build phase.
- Where applicable the approval for operation through the Alteration Clearance Process
- Acceptance of the asset by Operations and Asset Management in line with Asset Acceptance Procedure to allow financial close of the Project

The Project Delivery Manual and the Asset Acceptance Procedure for detailed processes and procedures to be followed.



8.5. Operate

Network Operations has the responsibility of operating the electricity network. Details of what this involves are shown in Table 11.

Table 11: Network Operations primary responsibilities

| Monitoring real time performance | Reporting network status | Managing incident response |
|---|--|--|
| Monitoring system security and reliability, including responding to events affecting the network and adherence to legal and regulatory requirements Monitoring, validating, and responding to operational alarms in accordance with appropriate procedures Monitoring asset condition on- and off-line data, alarms, and defect reviews in line with short and long term asset strategies, and initiating non-routine maintenance work if required Determining operating limits, systems arrangements, and operating strategies considering with short and long term asset strategies, network planning studies, and works execution Administrating, updating, and developing operating manuals and procedures for operating the network in compliance with the National Electricity Rules Managing operating protocols with external customers for the operations of non-prescribed connections Developing, maintaining, and utilising accurate system modelling capabilities to assist load forecasting and determine system limits Creating medium and short term load forecasts to predict future demand, and ensure system adequacy and readiness | Providing a source of information for Network Asset Management, Delivery, and network operators (including defects advice, impairments information, and asset condition monitoring) Performing market impact analysis and develop operating strategies considering impacts on incentive schemes and works execution Reporting network performance and status (including incidents) to our management, AEMO, distributors, customers, and regulators Managing the planning, approval, customer notification, safety compliance, load analysis, and execution of outages and switcher arrangements Recording outage data and statistics to assist real time monitoring of the high voltage network | Managing the execution of short notice, forced, and emergency outages caused by forced asset trips, security risks and network alarms Managing system restoration and assess the impacts of emergency and forced outages on system adequacy, asset condition, and external business groups Ensuring clear delegation procedures for network incidents and emergency outages outside of regular business hours Reviewing, recording, and investigating network incidents and report to our management, AEMO, distributors, customers, and regulators as required Managing emergency conditions and the CREMP system in accordance with operating procedures Developing contingency plans and emergency automatic control scheme requirements in alignment with long and short-term asset strategies and existing system capabilities |



8.6. Maintain

Delivery is responsible for the management of the workforce and resources to execute maintenance activities as well as manage asset replacement programs. The workflow is described across four stages as illustrated in Figure 14.

Ellipse: Enterprise Resource Planning (ERP) system covering accounts payable, cataloguing, purchasing, inventory & warehousing, human resources, payroll, health & safety, and maintenance.

Managing the Maintenance Program: Describes the processes for the management and reporting of the Maintenance Program, including requirements for the proper creation and management of work order though the maintenance process.

Delivery Business Practice Documents: A web page on the Wire enabling access to a variety of key documentation such as Maintenance Instructions, Standard Operating Procedure, Switching Information Manuals, Substation Emergency Response Manuals and Training Procedures.



Figure 14: Delivery target state workflow





Key activities within each stage are listed within Table 12.

Table 12: Delivery Activities

| Stage | Activities |
|--------------------------|---|
| Works Establishment | Receive handover from NP&O/Lumea |
| | Determine strategy for delivery |
| | Prepare financial information and establish delivery baseline |
| | Establish detailed maintenance plan |
| | Maintain program in Ellipse |
| | Assign works manager |
| | Establish and maintain work requirements including resources and criticality |
| | Coordinate outages & switching |
| | Preliminary works bundling |
| | Ensure 'fit for purpose' standard jobs |
| Works Horizon Management | Define Delivery resource data needs |
| | Capture Delivery resource data (fit-for-purpose) |
| | Capture Delivery resource data (scheduling data - TRAC and utilisation) |
| | Capture Delivery resource data (scheduling data - overall labour costing) |
| | Capture Delivery resource data (all other resource costing) |
| | Capture Delivery resource data (planning estimates - maintenance) |
| | Input Delivery resource data to relevant systems |
| | Assure quality, completeness, and timeliness of Delivery resource data |
| | Maintain Delivery resource data systems |
| Works Execution | Initial work order close-out management and reporting |
| | Manage work close out (incl. capitalisation, AMC & asset data documents, & close out reporting) |
| | Final work order close-out management and reporting |
| | • Update financial information (e.g. document asset deprecation, removals from asset register) |
| Feedback | Works Program Executive Committee meetings |
| | Asset Management Committee meetings |
| | Operations and Maintenance Committee meetings |



8.7. Renew

Renewal and Maintenance Strategies are updated annually to account for changes to asset management objectives, asset performance and condition. This enables further optimisation of asset portfolio risk and the delivery of renewal programs.

Renewals on the prescribed network follow the governance process outlined within the Prescribed Network Capital Investment Procedure whereas non-prescribed renewals are agreed with respective customers.

Asset renewals are grouped by Delivery into programs of work that ensure efficient delivery while minimising the impact on planned outages. Delivery is carried out by Infrastructure Delivery using processes outlined in the Project Delivery Manual and similar resources to those being used for the delivery of maintenance.

8.8. Dispose

Disposal of an asset once it's determined to no longer be required is generally managed through the same process as a construction or renewal project. Removal of a disposed asset from the asset register is undertaken as part of the close out of a project involving an asset disposal.

Disposal of property assets through identifying opportunities for maximising asset disposal value considering:

- The total and relative economic advantage compared to other options.
- The net financial disposal benefits having regard to the net book asset value of the surplus property and the current market conditions
- The strategic value of the property, in terms of realising residual or optimised value on disposal. The strategic value is based on key corporate drivers and stakeholder requirements, balanced against long term future planning needs,

Network Asset Risk Assessment Methodology: Outlines the methodology to analyse risks to support asset renewal decisions.

AAIT: Asset Analytics Investment Tool enables optimisation of the timing of asset renewal investments.

Property and Environment

Framework: An operating model document that governs the planning and management of the property portfolio (including easements), spatial systems, and environmental advice and approvals.

Waste Management Procedure: Describes the processes for the storage, transportation and disposal of goods, assets and other solid or liquid wastes (collectively referred to as wastes) in a manner compliant with environmental legislation.

Disposal of Asbestos Work Instruction: Describes the process for the disposal of friable and non-friable asbestos.

Contaminated Land Management Procedure: Describes the process for the investigation, notification and remediation of contaminated land or waters.



wider policies and objectives, or environmental outcomes (e.g. carbon or biodiversity offsets).

- Secondary service obligations which may dictate its retention
- The impact on the environment.

8.9. Technical Authority Framework (In Development)

General responsibilities and accountabilities for undertaking lifecycle activities are embedded within various procedures and framework documents, while the Authority to Work (Pegasus) system manages licenses and competencies of field workers undertaking construction and maintenance activities.

The Technical Authority Framework identifies the key activities being undertaken across the entire lifecycle of network assets that have a significant impact on safety risks associated with network assets. It also provides guidance on how we ensure Engineers undertaking these activities have sufficient competency to do so, and ensure expected outcomes are realised.

Technical Authority Framework (In Development): Provides clarity on the authorities required to undertake activities that have a significant impact on the safety of the network assets across the asset lifecycle.

Application of the Technical Authority

Framework² requires an understanding of the various competency frameworks across Project Development, Asset Management and Operations. They are intrinsically linked as some of the competencies embedded within these assessment processes are applicable to the activities outlined in this framework.

9. Principal Risk management

9.1. Risk registers

Our Asset Management System is based on the application of the principles from the corporate Risk Management Framework to identify hazardous events, analyse/assess the associated risk, and make asset management decisions to mitigate/control risk based on a good understanding of the investment options and their residual risks and benefits.

A set of risk registers are maintained under this framework as follows:

- Principal Risk Register
- Operational Risk Register
- Site/Project Risk Register

These risk registers are maintained on CAMMS (our Compliance, Audit, Risk and Safety Management System).

² Currently in development



Public Safety FSA: Defines the process and procedures for undertaking public safety risk assessment and veracity of its control for the electricity network assets.

Bushfire Risk Management FSA: Defines the process and procedures for undertaking the bushfire risk assessment and control for its electricity network assets.

Worker Safety FSA: Defines the process and procedures for undertaking the safety and safety risk assessment.

Network Reliability FSA: Defines the cross-functional process for undertaking network reliability safety risk assessment.

Environment and Property FSA: Defines the process and procedures for undertaking network level environment and property risk assessment and control.

Electricity Network Safety Management System Description: Describes the framework of the Electricity Network Safety Management System (ENSMS) to effectively manage network safety in NSW and the ACT.

Electricity Safety Management Scheme: Outlines how we will manage the Victorian electricity transmission network to reduce network safety risks As Far As Practicable and fulfil our commitment to provide our customers with a reliable and safe electricity supply

9.2. Formal Safety Assessments

In NSW the operation of each Electricity Network Operator is governed by the Electricity Supply Act 1995 and associated regulations. The Electricity Supply (Safety and Network Management) Regulation 2014 (the Regulation) is one of these regulations and requires that an Electricity Network Safety Management System (ENSMS) be put into place for each Network Operator that complies with the Regulation and AS5577 – Electricity Network Safety Management Systems.

As part of our requirements to have an ENSMS in accordance with AS5577:2013 for key safety related hazards, Formal Safety Assessments (FSA) have been developed using the Network Risk Assessment Framework. This also meets the similar requirements of the ACT Transmission licences and relevant regulations and codes relating to our assets in that jurisdiction.

Similarly, an Electricity Safety Management Scheme (ESMS) is maintained and submitted to Energy Safe Victoria in accordance with the Electricity Safety Act 1998 of Victoria for all electricity assets operated and maintained within Victoria. Safety cases are produced to support the ESMS for operational assets as a



means of assessing network risks and mitigating them with suitable controls consistent with the requirements of AS 5577 including a formal safety assessment.

9.3. Principal Risks and controls

Application of our risk management processes has resulted in the identification of six key asset management related risks. Details of these risks along with their associated causes and controls are maintained in the Principal Risk Register and Business Unit Plan, and are listed in Table 13.

| Principal Risks | AM Related Causes | Control Requirements Reference |
|--|--|---|
| Risk 1 – Serious failure of Health, Safety and Environment | Inadequate asset selection and or design; Asset failure due inadequate routine/corrective maintenance and inspection; Lack of public hazard awareness; Failure to respond appropriately to faults and emergencies; and Failure to maintain adequate asset security systems (e.g. patrols, CCTV, perimeter alarms). | Fault and emergency response Corrective maintenance Public awareness measures (Community / landowner consultation, community programs, etc.) Dial before you dig Routine maintenance, performed to plan Security monitoring (Substation CCTV, security patrols, and perimeter alarms) Condition inspections of all equipment on a regular cycle Network Security Standard Signage, marker balls, warning tape, anti- climbers, and fencing Hazardous materials procedures |
| Risk 3 – Network reliability | Inadequate understanding of the network assets and asset management system Failing to plan and delivery solutions in a timely manner Inability to operate networks appropriately Environmental disasters Failure in Transgrid maintenance | 24/7 active monitoring and control of the network via 'Virtual' control rooms Robust operating protocols and frameworks connected to the overall AEMO operation protocols Asset management plans and protocols to ISO55001 Active condition monitoring and routine condition information collection of all network assets Routine analysis of asset condition and assessment of network risk Program of works for routine and corrective maintenance Capital program to ensure replacement of assets and installation of new capacity as required Active monitoring of delivery of Maintenance and Capital works programs to plan Network Reliability FSA |
| Risk 4 – Protective and Cyber Security | Loss supply of electricity Damage to operational assets Loss of OT systems Impact on continuity of ongoing services | Security awareness training conducted for new employees and current employees with respect to cyber and physical assets Third party validation testing (extending to penetration testing of IT security infrastructure) |

Table 13: AMS Processes to control Principal Risks



| Principal Risks | AM Related Causes | Control Requirements Reference |
|-------------------------|---|---|
| | | Review of Site Security plans in relation to information assets has commenced. |
| Risk 6 – Network safety | Accidents e.g. conductors coming down Equipment failure Inappropriate practices by third parties / contractors outside of current Transgrid policies and procedures | ENSMS Bushfire Risk Management FSA Yearly audit of bushfire plan against performance. Rectification of outstanding items prior to bushfire season LIDAR Scanning of all Transmission lines Routine maintenance, performed to plan Active monitoring of bushfires in real time by control room Condition inspections of all equipment on a regular cycle Analysis of critical spans and critical areas allowing prioritisation of works Executive Management oversight |

10. Asset management information

10.1. Asset Information Strategy

We recognise the importance of accurate information in making data-driven decisions. The Asset Information Strategy is a strategic planning document that outlines strategic initiatives to improve the value derived from data across the asset lifecycle. It aligns with the Asset Management Policy and the Network Asset Strategy and outlines the framework we use to provide:

- A clear understanding of how data, information, and analysis form a life cycle in Asset Management decision processes.
- Support for continuous improvement by clearly describing the Asset Management information lifecycle.
- Clarity for the governance process based on six data governance dimensions. See section 10.4 for more information on the six dimensions.

Detailed activities and responsibilities to implement these strategic initiatives are contained in the Asset Information Strategy – Support Plan.

10.2. Asset management information systems

Transgrid utilise a broad ecosystem of information systems based on a best-of-breed strategy to ensure each application is fit-for-purpose.

Table 14 provides a list of the key information systems and a brief description of what functionality they provide.



Table 14: Functions, processes, and information systems

| Information Category (Subject) | Functions and Processes | Information Type (Domain) | Information System |
|--------------------------------------|---|--|---|
| Assets | Spares management | Equipment Lifecycle | Ellipse – Equipment |
| | Asset data analytics | | Ellipse – Financial Assets |
| | Technical asset investigation | | AAIT |
| | Network performance monitoring and reporting Broportly holding, building and | | Asset Information Manager (AIM) |
| | environment management Asset valuation | Equipment Register | Ellipse – Equipment and Assets |
| | Revenue reset submission | | Pro Master Key Manager |
| | Conveyancing inquiries Set standards for new equipment and | | Insight security card management |
| | designs Maintain equipment | | system |
| | Provision and lifecycle management of | | Fleet Management (Figtree) |
| | operational technologies | Asset | Ellipse – Equipment |
| | Fleet management | Hierarchy/Iracing | Pro Master Key Manager |
| | | Equipment Manuals | SharePoint |
| | | Drawings (Designed and As Built) | Electronic Document Management System (EDMS) |
| | | Asset Value | Ellipse – Financial Assets |
| | | Spares | Spares Database (VOCAB) |
| | | | Ellipse – Inventory Management |
| | | Procurement Tracking | Ellipse - Warehouse |
| | | Non-Asset Geospatial Data (e.g. environmental factors) | Transgrid Spatial System (TSS) |
| | | Leases and Licenses (Transgrid as lessee/licensee) | Transgrid Spatial System (TSS) |
| | | Geospatial Asset Data | Transgrid Spatial System (TSS) Dial Before You Dig (DBYD) |
| | | Settings and Ratings | Supervisory Control and Data Acquisition (SCADA) |
| | | | Protection Relay Information Management (PRIM) |
| | | | Metering Management |
| | | | Lines Rating Advices (LRA) |
| | | | Dynamic Line Ratings |
| | | | Connect Master |
| Work | Asset Strategies and Plans | Maintenance Tasks | Ellipse – Works Management |
| wanagement | Asset Field Support and Quality Monitoring | Outage Requirements | The Outage Management System (THEOS) |



| Information Category (Subject) | Functions and Processes | Information Type (Domain) | Information System |
|--------------------------------------|---|------------------------------|--|
| | Resource Planning, Scheduling and Forecasting | Routine Maintenance Plan | Ellipse – Works Management THEOS |
| | SLA Management | Works Requests | Ellipse – Work Requests |
| | Business Onit Budgeting/Business Planning | Maintenance Budget | TM1 |
| | Performance Reporting | | Ellipse – Works Management |
| | Operating Arrangements | Maintenance Forecast | Single View of Work |
| | Preventative and Corrective Maintenance Services | | TM1 |
| | Revenue Reset Submission | | Excel Spreadsheets |
| | Emergency Management | Maintenance | Ellipse – Works Management |
| | Service Delivery Performance Management | Schedule | Transgrid Resource Allocation Calendar (TRAC) |
| | | | THEOS |
| | | Maintenance History | Ellipse – Works Management |
| | | | AIM |
| | | Maintenance Costs | Ellipse – Works Management |
| | | Service Instructions | The Wire |
| | | Maintenance Scripts | AIM |
| | | Authorisation to Work | Pegasus |
| Condition | Asset Real-time Condition Based | Equipment Issues | AIM |
| Assessment | Operations Planning | | Ellipse – Works Management |
| | System Incident Analysis Asset Data Analytics Technical Asset Investigation | Failure History | THEOS (including Forced and |
| | | | Emergency Outage Reports (FEORs)) Ellipse – Works Management |
| | Asset Field Support and Quality Monitoring | | THEOS PC Stats Database |
| • | Network Utilisation and Performance Monitoring | | Irregularities Management (Ops Log) |
| | Preventative and Corrective | | AIM |
| | Maintenance ServicesCondition based asset monitoring | Incident Investigation | The Wire |
| | | | THEOS |
| | | | CAMMS |
| | | Defect History | Ellipse – Works Management |
| | | | AIM |
| | | Condition Monitoring results | Ellipse – Condition Monitoring |
| | | | AIM |
| | | Inspection Results | AIM |
| | | Factory Results | Ellipse – Condition Monitoring |
| | | On-line condition monitoring | Various systems dependent on Asset Type |
| | | SF6 levels | SF6 Management System |



| Information Category (Subject) | Functions and Processes | Information Type (Domain) | Information System |
|--|---|---|--|
| | | Asset Health / Condition | SF6 Monitoring Systems Ellipse – Condition Monitoring AIM LAN Folder2 |
| Operational Information | Operating arrangements Operations planning Network utilisation and performance monitoring Regulatory and statutory reporting of financial and technical data Asset real-time condition based monitoring Network performance reporting HV network monitoring and control Emergency management | Operation Statistics Network Configuration Asset Utilisation Operational Events Operational Alarms AEMO Market Data Constraint Data Weather Data Bush Fire Data Lighting Strike Data | Ellipse – Operating Statistics SCADA Area Plans SCADA Irregularities Management (Ops Log) Irregularities Management (Ops Log) Ez2view www.indji.net/watch |
| | | Fault Records Telecommunication Faults | IQ+ Tarigma Solarwinds (Helpdesk) |
| Portfolio Management | Asset Strategies and Plans Economic Analysis Benchmarking Project and Works Feasibility Particular Estimation and Pudgation | Renewal Strategy Project Information EPPMS | The Wire AAIT Ellipse – Equipment |
| Portiono Estimating and Budge Works Program Development Regulatory and statutory reputing and technical data | Portiono Estimating and Budgeting Works Program Development Regulatory and statutory reporting of financial and technical data | Renewal History Renewals unit costs | Ellipse – Financials Success |
| | Financial Budgeting and Performance Monitoring Revenue Reset Submission Bid development | Project Work Breakdown Structures Gantt Chart Project resources | Enterprise Portfolio & Project Management System (EPPMS) |
| | | Optioneering Project Needs Milestone Documentation | Excel Spreadsheets Project Document Governance System (PDGS) |
| | | Contracts and Project Management documents | ProjectCentre iTWOcx |



| Information Category (Subject) | Functions and Processes | Information Type (Domain) | Information System |
|--|---|---|--|
| Network | System incident analysis | System Models | PowerFactory |
| Modelling | System and predictive modellingMain system planning | System Electrical Parameters | ELDBASE |
| | Network utilisation and performance | Fault Level | PowerFactory |
| | Customer connection studies | Load Forecasts | Transmission Annual Planning Report (TAPR) |
| | Load forecasting System modelling network and non- network solutions Fault Levels | | PowerFactory |
| Business | Service delivery performance | Audit results | Action and Risk Management |
| Operations | management | Compliance results | System (CAMMS) |
| | Risk assessments, monitoring and reporting | Risk Register | |
| | Fraud & corruption investigationRegulatory and statutory reporting of | Business Plans and Business Unit Plans | |
| | financial and technical data Network performance monitoring and reporting Financial budgeting and performance Non-regulated financial and performance monitoring | Management strategies | The Wire |
| | | Complaints correspondence | Complaints and Enquiry Management System (CEMS) |
| | | Historical agreements | |
| | Relationship and account management Revenue reset submission | Enquiry correspondence | |
| | Bid development | Environmental risks | TSS |
| Provision and lifecycle services and technolog | Provision and lifecycle management of IT services and technology | Asset Management Documentation | TRIM |
| | | | The Wire |
| | | Financial Budgets and Accounts | Ellipse – Financials |
| | | | TM1 |
| | | Security Card details | Insight security card management system |
| | | Customer Metering | Ellipse |
| | | | Metering Management |
| | | | TUOS |
| | | Connections and Service Agreements | LAN |
| | | Third Party Leases and Licences (Transgrid as Lessor/Licensor) | Excel Spreadsheets |

Further details including system administrator contacts can be found on the Wire <u>http://thewire/bs/Pages/default.aspx</u>.



10.3. Information access

Access to data by personnel is managed using role-based access controls. Routine audits are undertaken to ensure data access is limited to authorised personnel. This process is managed in accordance with the IT Security and Access policies and procedures.

Our information and the security measures are documented in the IT Security Strategy.

Under our licence conditions we are required to:

- Locate the operational technology and associated ICT infrastructure in Australia.
- Hold all network load data relating to or obtained in connection with the operation of the network within Australia.
- Provide a clear definition of network load data that did not exist in previous licence conditions.

The key principles of the information security policy are Confidentiality, Integrity and Availability of digital assets and information.

10.4. Asset information standards

A series of standards and rules have been developed to clarify requirements for key asset management information to ensure its quality. We use six dimensions for assessing the quality of its information systems and data storage. These quality dimensions, listed in Table 15, enable assurance to be applied to asset information aligned with ITIL V3 and ISO27001.

| Dimension | Description |
|----------------------|---|
| Relevance | Identifies how well the data captured meets the information requirements of the stakeholders. |
| Accuracy | Accuracy refers to the degree to which the data correctly describe the phenomenon they were designed to measure. Measurement of accuracy relies on the rules/criteria created for capturing that data, hence capturing data that does not comply with the respective criteria results in inaccurate data. |
| Consistency | Refers to both the internal consistency of data within a record or application and externally across multiple applications. Consistency is an important component of quality as it provides an indication of whether the dataset can be usefully compared with other sources to enable data compilation and comparison. |
| Data Completeness | Measurable error of omission observed between the information and the specification. |
| Timeliness | Timeliness refers to the delay between the reference period (to which the data pertain) and the date at which the data becomes available. These aspects are important considerations in assessing quality, as lengthy delays between the reference period and data availability can have implications for the currency or reliability of the data. |
| Accessibility | The ease of access to data by stakeholders, including the ease with which the existence of information can be ascertained, and the suitability of the form or medium through which information can be accessed. Is a key component of quality as it relates directly to the capacity of stakeholders to identify the availability of relevant information, and then to access it in a convenient and suitable manner. Adding provisions on data entry and access to data will ensure the data captured is not modified by unauthorised personnel. |

Table 15: Data quality dimensions



Table 16: Asset Management Information Standards and Rules

| Name | Document Type | Business Function | Notes/Summary |
|--|------------------------|--------------------------------------|---|
| Automation Systems Asset Data Rules | Standard | Manage Strategic Asset Management | Data rules to ensure data on automation equipment satisfies the requirements of various stakeholders as mentioned in the Asset Information Strategy and to provide a basis for measuring and managing data quality. |
| Ellipse Access and Administration | Corporate Procedure | Manage Information Technology | This procedure sets out the processes and rules to manage user access and system administration of the Ellipse Enterprise Resource Planning system (ERP). |
| Information Classification Standard | Standard | Manage Information Technology | This standard defines the minimum standards required for information classification, labelling and handling across the business. |
| Information Management Policy | Policy | Manage Information Technology | This policy provides guidance and direction to all employees and contractors working with information assets. The policy describes how these assets are to be managed across the information lifecycle. |
| Information Request Provisioning | Corporate Procedure | Manage Information Technology | This procedure describes the process for requesting information and approving the creation or modification of reports sourced from any of the corporate systems. |
| Information Security Controls General Users | Corporate Procedure | Manage Information Technology | This procedure describes the security controls applicable to, and obligations of, personnel who access information assets. |
| Information Security Policy | Policy | Manage Information Technology | The purpose of the Information Security Policy is to reduce the risk of security incidents occurring and minimise the business impact of security incidents that eventuate. |
| Maintenance Standard Job Data Rules | Work Instruction | Manage Strategic Asset Management | Data rules to ensure data in maintenance standard jobs satisfies the requirements of various stakeholders as mentioned in the Asset Information Strategy (version 1) and to provide a basis for measuring and managing data quality. |
| Maintenance Work Order Data Rules | Work Instruction | Manage Strategic Asset Management | Ensure data in maintenance work orders and work order tasks satisfies the requirements of various stakeholders as mentioned in the Asset Information Strategy (version 1) and to provide a basis for measuring and managing data quality. |
| Physical and Environmental Security Standard | Corporate Procedure | Manage Strategic Asset Management | This document sets the minimum standard for security treatments at Network sites and Regional Centres/ Depots |
| Substation Asset Data Rules | Corporate Procedure | Manage Strategic Asset Management | Ensure data on substation equipment satisfies the requirements of various stakeholders as mentioned in the Asset Information Strategy and to provide a basis for measuring and managing data quality. |



| Substation Steelwork Condition and Data Collection | Work Instruction | Manage Strategic Asset Management | This document defines the asset condition data which shall be captured during maintenance and inspection tasks for substation steelwork and the associated required actions. |
|--|------------------|--------------------------------------|--|
| Transmission Line and Easement Condition Data Collection | Work Instruction | Manage Strategic Asset Management | This document defines the asset condition data which shall be captured during maintenance and inspection tasks for transmission lines and their easements. |
| Transmission Line Asset Data Rules | Work Instruction | Manage Strategic Asset Management | Data rules to ensure data on transmission line component satisfies the requirements of various stakeholders as mentioned in the Asset Information Strategy (version 1) and to provide a basis for measuring and managing data quality. |



10.5. Data change management

Businesses as usual (BAU) Data changes are managed by the system administrator and approved by the Maintenance Delivery Manager. If there are significant changes within the system, these will follow the 'IT Change Management Procedure'.

Other changes related to asset management which fall outside of the scope of the IT procedure will be covered under the 'Asset Management Change Procedure'.

10.6. Data retention periods

Data retention is carried out in accordance with the requirements of the corporate Document Records and Management Procedure, associated business unit document procedure, or as required by the requirements specified in the Electricity Network Safety Management System descriptions.

11. Asset management leadership, monitoring & review

11.1. Leadership

11.1.1. Asset management awareness and communication

Awareness of the importance of asset management to the organisation is carried through various mechanisms including:

- Induction material for new employees and contractors
- Competency based training processes (see 11.1.3)
- Various committee meetings (see 11.2.2)
- Business unit pages on the Wire
- 'Latest news' section on the Wire
- General email communications

All new starters are required to work through various induction modules tailored to the needs of their specific role. Table 17 provides a list of modules relevant to various roles undertaking asset management activities.

Table 17: Employee induction modules

| | Nature of induction | Induction module |
|-----------|-----------------------------|--|
| Transgrid | Company Overview | Transgrid Induction eLearning Module |
| Ð | Behavioural Expectations | Respectful Workplace eLearning Code of Ethics and Conduct |
| KEN | Safety & Environment | WHSE Transgrid Safety and Environmental Induction Your Guide to Staying Alive |
| ß | Security | Cyber Security Awareness |



| Legal Expectations | Competition I - Dealing with Competitors Competition II - Avoiding Anti-Competitive Conduct |
|--------------------|--|
| Asset Management | Introduction to asset management at Transgrid Beginners guide to our asset management processes |

Internal communications occur both formally through structured meetings and documented processes, and informally through discussions between colleagues. Key structured meetings include various committee meetings outlined in section 11.2.3 as well as regular inter-departmental meetings designed to coordinate activities and resolve issues.

Communication with external stakeholders is carried out by various parts of the business. Key communications undertaken in relation to the asset management system are summarised in Table 18

Asset Management Committees Strategy and Plan: Describes the function and membership of the asset management committees.

Asset Management Change Procedure: Describes how change is controlled and managed.

Maintenance Programs Stakeholder Plan: Identifies key stakeholders in the delivery of maintenance programs.

Stakeholder Engagement Charter: Provides details of each significant external stakeholder to assist with ongoing communications.

Easement Guideline (available on the website): Provides guidelines for the public to safely live with electricity transmission lines.

Prohibited Encroachments Procedure: Describes the process for management of prohibited encroachments on easements.

Customer Plans: Provides detailed engagement plans for key external stakeholders.

Regulatory Incident Reporting Procedure: Describes the obligations to report electrical incidents to the relevant regulatory agencies.



Table 18: Communications with key stakeholders related to asset management

| Business Function | Stakeholder | Description of Communications |
|---|--|--|
| Customer & Connections | Customers | Manage contracts Manage relationships with customers by understanding needs, managing expectations, and resolving issues Release new documentation such as the Annual Review and TAPR Exchange load forecasting information Optimise outage planning Seek details of complaints through the website Communicate and coordinate in the event of a critical incident |
| Government & Stakeholder Engagement | State government departments | Manage stakeholder consultations and media releasesRespond to queries |
| | Local MPs | Discuss new projectsRespond to landowner concerns |
| | AEMO | Control room protocolsIncident reporting |
| | ENA | Representation on various committees and working groups |
| Inductor 9 | DNSPs Energy Consumers | Communicate and coordinate in the event of a critical incident Joint Planning Provide submissions on relevant issues |
| Stakeholder | Australia | Response as required |
| Engagement | Energy Users Association of Australia | Provide submissions on relevant issuesResponse as required |
| Property | Councils | Manage relationships with councils by understanding needs, managing expectations, and resolving issues Manage applications for easements Inform councils of easement guidelines Manage network encroachments |
| | Developers | Inform developers of easement guidelines Manage interactions and development proposals through the easement inquiries process |
| Regulation | AER | Manage relationship with the AER by understanding needs, managing expectations, and resolving issues Leading revenue reset activities within Transgrid and communicating with the AER |
| Public Policy | COAG Energy Council | Respond to submissionsProposed policy changes |
| Compliance | IPART ACT Utilities Technical Regulator Energy Safe Victoria | Periodic and incident reportingAudit processes and outcomes |



11.1.2. Accountabilities and responsibilities

General responsibilities and accountabilities for undertaking asset management activities are embedded within the various procedures that make up the asset management system. These are supported by various framework documents that provide a high level view of business processes and the interfaces between various functions.

The Head of Asset Management has overall responsibility for the Asset Management System. The Head of Asset Management performs this role under the Executive Manager – Network Planning and Operations, who is ultimately accountable for this Asset Management System.

The Head of Asset Management has the following key responsibilities:

- Ensures that Asset Management Objectives are developed to achieve the Business Objectives. Where the Asset Management Objectives:
 - Are developed collaboratively with Executive Management Team responsible for developing the Business Objectives; and
 - Must reflect and balance the needs and requirements of all stakeholders.
- Ensures that the Asset Management System is designed to achieve the Asset Management Objectives;
- Ensures that the Asset Management System is resourced, implemented, monitored, and continually improved; and
- Ensures that all activities in relation to the assets are consistent with achieving the above.

The central aspects of the above are documented within the Asset Management Policy and Network Asset Strategy document.

11.1.3. Asset management capability

Capability within asset management roles is managed at the highest level through our Capability Framework. This framework outlines both technical and non-technical capabilities required across the business including:

- Personal attributes
- Relationships
- Results
- Leadership
- Commercial acumen
- Role specific capabilities

The Asset Management Capability Guideline provides guidance to employees who undertake asset management roles to:

- Identify capabilities required for critical asset management roles
- Undertake a gap analysis of against these capabilities
- Integrate these asset management capabilities into individual Performance Development Plans on an annual basis
- Identify appropriate recognised asset management training courses, such as those provided by the Asset Management Council of Australia
- Identify other workplace based development opportunities such as involvement with special projects, temporary secondments and acting in higher graded roles



This process is further supported by role-specific competency frameworks and assessment processes for highly technical activities.

Capability Framework: Describes high level capabilities required across the business to support the achievement of our objectives.

Asset Management System Capability Guideline: Provides guidance for the use of 'Role Specific Capabilities' defined in the Capability Framework to manage capability development.

HRIS – Human Resource Information System: The information system used to document development plans because of the application of the Asset Management System Capability Guideline.

System Operator Competency Standard: A list of the competencies that a person requires before being deemed competent to operate the network.

Field Resources – Technical Capability Guideline: A guideline for managing the competency of people carrying out work on the electricity network.

These framework and assessment processes are referenced by the Technical Authority Framework that outlines the structure for ensuring that the core tasks are performed by Engineers having the authority to do so or are adequately supervised by authorised personnel. The Technical Authorities Framework requires an appropriate combination of education, experience, and ability to provide advice, guidance and decision making in their technical discipline.

Figure 15 illustrates the capability management documentation hierarchy.



Figure 15: Asset management capability management

| Capability Framework | Describes high level capabilities required to support the achievement of TransGrid's Asset Management objectives. | |
|--|--|--|
| Asset Management System Capability Guideline | Provides guidance for the use of 'Role Specific Capabilities' across various asset management related roles. | Capability Framework |
| Contraction of the local division of the loc | | |
| Competency Frameworks | Describes the process for ensuring employees operating in highly technical roles are competent. | Competency areas within scope: • Existing: • System Operators • Field Resources |

11.1.4. Decision criteria

Clarity of criteria used to make key decisions throughout the lifecycle of the assets is important to ensure decisions are:

- Aligned with asset management objectives
- Add value to the business and stakeholders
- Aligned with organisational risk appetite
- Compliant with regulatory and licence requirements
- Commercially prudent

Appendix A provides an overview of decision criteria for various lifecycle activities. However, much of this criteria is qualified and quantified at an individual process level and governed through various approval and committee processes.

11.1.5. Resourcing

Delivery aim to forecast a 24 month view of resource requirements for both maintenance, augmentation and renewal activities. Data and processes around Single View of Work, Ellipse and EPPMS enable a refined sourcing strategy for both parts and labour to delivery Asset Renewal and Maintenance Strategies.

Resources not related to the direct delivery of maintenance or project work are determined through internal business planning processes. Strategic outsourcing is used to supplement internal resources, either to provide specialist skills, or to augment teams during peak periods of workload.

Outsourcing of any asset management activity is driven on business needs arising from factors such as:

- Requirement for skill sets not available internally (e.g. risk experts, aerial/aviation services)
- Shortage of resources (e.g. project construction)



• Requirements for external review (e.g. auditing and certification)

The process for selecting an outsourced provider is based on business needs. The process is managed by Strategic Procurement who work with the requestor of services to select the preferred outsource provider based on:

- Cost benefit
- Expertise required
- Past performance
- Benefit realisation

11.1.6. Management of change

Our change management procedure describes the process undertaken by the Asset Manager for the management of planned changes to the Asset Management System which is documented in the Asset Management Change Procedure. This procedure is intended to ensure that risk assessments are performed for any planned changes prior to the change being implemented. This does not necessitate the establishment of **Resource Planning Guidelines:** Describes how resources are planned and scheduled across the works program.

Asset Management Change Procedure: Describes how change is controlled and managed within the Asset Management System.

additional risk management processes but ensures that risk assessments are carried out in accordance with the corporate Risk Management Framework.

Table 19 provides an overview of asset management system changes covered by the Asset Management Change Procedure.

Table 19: Asset management system changes covered by the change procedure

| Changes | Descriptions |
|-----------------------------------|---|
| Physical Asset Changes (Asset) | Physical Asset changes are made to the physical assets, which might have been influenced by design changes, part changes, or other factors. |
| Asset Management | Changes to processes and procedures for managing assets. |
| Asset Management System | Changes to the asset management system framework or scope. |



11.1.7. Continual improvement

We have a continuous improvement culture to the way we do things to maximise value derived from the assets in an ever changing environment. This is primarily evidenced by the nature and number of improvement strategies identified within the Network Asset Strategy.

The need for continual improvement is identified through various mechanisms including:

- The strategic planning process
- Ongoing analysis and review carried out in various working groups and committees of asset performance, maintenance and project delivery performance, defect history, outages, incidents, and Principal Risk control measures
- Research into new methods, tools and technologies carried out across the business
- Participating in international benchmarking studies such as ITOMS
- Participating in international and national electricity industry groups, such as CIGRE, Grid Australia, and Energy Networks Australia (ENA)
- Participating in professional bodies, such as the Institute of Asset Management, Asset Management Council and ENA.
- Management reviews of the asset management system
- Results of audits of the asset management system
- Results of Control Assurance Reviews
- Results of other audits, such as quality, safety, and environmental

These mechanisms are summarised in the workflow illustrated by Figure 16.

Figure 16: Continuous improvement workflow





Figure 16 workflow illustrates how the actions required to implement continuous improvement are directed to the responsible management level based on risk. It involves monitoring both the assets and the elements of the Asset Management System and provides prioritisation and governance to the issues that are most critical to the business.

The primary processes for managing continuous improvement activities include:

- CAMMS Holds the findings and any corrective actions for all formal audits undertaken as well as any
 corrective actions required from incidents and risk reviews that identify risks to the business. Optionally
 this can include actions related to opportunities for improvement.
- Continuous improvement registers that contain opportunities for improvement of a less critical nature. These registers are reviewed at the relevant committees and working groups, and as required may have an associated project developed for implementation. Note that there are several registers, lists, etc. that exist within the various business units with some using CAMMS as a general register.
- Business as usual activities where updates to systems occur in line within the boundaries of existing processes and procedures. E.g. Change to a maintenance procedure due to recurrent failures identified during defect review meetings, items handled through the Personal Development Processes.

As part of our continuous improvement culture, employees are encouraged to:

- · Accept personal responsibility for identifying and supporting improvement opportunities
- Understand their customers' needs whether they are internal or external to Transgrid
- Not be afraid of failure and take it as an opportunity to improve in the future
- Ensure that improvements are aligned with the Asset Management Policy and the objectives within the Network Asset Strategy
- Aim to identify and fix the root cause of problems rather than apply band aids
- Embed improvements in the asset management system to ensure they are systematic

11.2. Monitoring

11.2.1. Asset management performance indicators and reporting

Performance Indicators (PI) are used to monitor the effectiveness of the asset management strategies in managing the performance of the assets and achieving the asset management objectives. PIs are monitored, reviewed, and reported at the appropriate internal and external forums, and utilised to inform future revisions of the asset management strategies and objectives.

Table 20 below details the PIs the Asset Management System relies upon, and the various reporting forums these are monitored and reviewed through. Trend analysis for each of the PIs is provided in the artefacts presented to the forums.

 Table 20: Asset management performance indicators

| Performance Indicators | Reporting forum |
|-----------------------------|---|
| Network related LTIs | Company DashboardBoard Health, Safety and Environment CommitteeIncidents and Accidents reporting to the IPART |
| Network related fire starts | Board Health, Safety and Environment Committee |



| Performance Indicators | Reporting forum |
|---|---|
| | Asset Management CommitteeWorks Program Executive Committee |
| | Network Performance Review |
| | Bushfire reporting to IPART |
| Network related environmental incidents | Asset Management Committee |
| | Works Program Executive Committee Network Performance Review |
| Key Hazardous Events: | Asset Management Committee |
| Conductor drop | Works Program Executive Committee |
| Catastrophic failure | Network Performance Review |
| Structure fall over | Outage/Unavailability causes details for STPIS reporting to the AER (via RIN reporting) |
| Uncontrolled discharge/contact with electricity | IPART incident reporting |
| Unauthorised entry | |
| Contaminant or pollutant release | |
| Unplanned outage | |
| Operational Cyber Security Incidents | |
| Electricity Network Safety Management System non compliances | |
| Loss of supply events | Asset Management Committee |
| | Works Program Executive Committee |
| | Network Performance Review |
| | STPIS target setting by the AER |
| Maintain system reliability | Asset Management Committee Network Asset Strategy |
| Operating outside network transient limits as | Network Asset Strategy System Planning Working Crown |
| notified by AEMO | Network Performance Review |
| Average age of asset class to a sustainable | Asset Class Renewal and Maintenance Strategies |
| level | |
| MITC | Works Program Executive Committee |
| | Network Performance Review |
| | Executive Network Performance Report |
| Porformance of the STRIS massures: | Merko Program Executive Committee |
| Fault and forced outage rates for | VVOIKS Program Executive Committee Network Performance Review |
| Transmission lines | Executive Network Performance Report |
| Transformers | |
| Reactive plant | |
| Incorrect operational isolation of primary or secondary equipment | |
| Failure of protection system | |



| Performance Indicators | Reporting forum |
|--|---|
| Average outage duration | |
| Asset Management Program of Work budget | Works Program Executive Committee |
| Standard maintenance job costs | Works Program Executive Committee |
| Capital project performance | Delivery Review Committee |
| Network CAPEX cash flow adherence | Investment Review Committee |
| Network CAPEX budget | Investment Review Committee |
| ISO 55001 re certification | Asset Management Committee |
| Maturity level in the risk, strategy, and asset information Asset Management System elements | Asset Management Committee |
| Internal audits carried out as per audit program | Asset Management Committee |
| ENSSM 2014 Regulation and AS 5577 non- compliances | Asset Management Committee |
| Reliability standard non-compliances | Area Plans |
| NER non-compliances | System Planning and Performance Working GroupWorks Program Executive Committee |



11.2.2. Asset management system audit

A risk based triennial audit plan is maintained and documented in the AMS/ENSMS Audit Procedure. It sets out the three-yearly schedule for the planned audits of the Asset Management System for the purpose of auditing our Asset Management (AMS), Electricity Network Safety Management Systems (ENSMS) and Electricity Safety Management System (ESMS).

Application of this procedure enables these systems to be strategically and continually improved in support of the achievement of the Regulatory and License requirements and covers all ISO 55001 requirements.

11.2.3. Asset management committees

Several formal committees and working groups meet on a regular basis with specific charters and agendas to ensure the assets and asset management system are continuing to support achievement of asset management objectives. The focus and membership of each committee is different with information flowing through them as illustrated in Figure 17 enabling decisions to be made to support desired outcomes. AMS/ENSMS Audit Procedure: Provides guidance on the auditing requirements of the AMS, ENSMS and ESMS.

Second Line of Defence Procedure: Outlines arrangements for internal auditing of risk management applied to large projects.

Health, Safety and Environmental Audit Process: Describes the process for the planning, conduct and reporting of health safety, and environmental audits

Internal Strategy and Audit Plan: Outlines the schedule of audits conducted by the Internal Audit function.





Figure 17: Committee framework diagram

These committees and working groups provide coverage across the complete asset lifecycle stages (plan, design, build, operate, maintain, renew and dispose), and ensure the Asset Management System is fit-for-purpose. Formal minutes are taken and distributed to members to ensure decisions are actioned accordingly. Further details can be found in Asset Management Committees - Strategy and Plan.

Asset Management Committees – Strategy and Plan: Describes the function and membership of the asset management committees and their integration into the Asset Management System.

11.3. Review

Review of the performance of the assets and asset management system is carried out through various asset management committees as illustrated in Figure 17. The Asset Management Committee is responsible for the highest level of asset management review which is supported by more operationally focused committees. The focus of this review includes:

- Review and endorsement of the Asset Management Policy, asset management strategies, asset management plans and governance frameworks
- Review the effectiveness and efficiency of the Asset Management Policy, asset management strategies and asset management plans to deliver the required corporate objectives, asset outcomes (e.g., cost, performance, risk) and the safe operation of the network over the complete asset lifecycle



- Review of the performance of the asset management system and the electricity network safety management system considering factors such as:
 - Audit results
 - Trends in KPIs
 - Trends in incidents and corrective actions
 - Changes in the profile of risks to the network
 - Internal and external changes that will have a significant impact on the asset management system
 - Changes in stakeholder requirements

The Head of Asset Management is accountable for the regular update of the Network Asset Strategy as part of the corporate planning processes based on analysis of the:

- Effectiveness of the asset management strategies in achieving the asset management objectives and the corporate objectives
- Impacts of significant changes in the health, condition, performance, and risks of the assets
- Impacts of significant changes
 - To the business objectives
 - To available funding because of the outcomes from the Australian Energy Regulators (AER) Revenue Determination
 - In stakeholder needs and expectations
 - In Legislative, Regulatory and Licence requirements
- Effectiveness of asset management and the Asset Management System.

12. Accountability

| Title | Responsibilities and Accountabilities |
|--|--|
| Executive Manager Network Planning and Operations | Overall accountability for the management of our network assets |
| Head of Asset Management | Accountable for the Asset Management System |
| | Accountable for the Asset Management System Description document |
| | Responsible for ensuring that the Asset Management System is continually improved and maintained |
| Asset Systems and Compliance Manager | Develop and refine the Asset Management System Description document |

13. Implementation

The Head of Asset Management is accountable for the implementation of the asset management system and this Asset Management System Description document.

14. Monitoring and review

This procedure shall be reviewed at a minimum of three years or when a material change is made to included processes and procedures.



15. Change from previous version

| Revision no. | Approved by | Amendment |
|--------------|-----------------------------|--|
| 7 | Head of Asset Management | October 2021 – Reviewed to align with current processes and organisation structure. |
| 6 | Head of Asset Management | March 2020 – Major structural revision including changes to the framework. Refocused wording on an audience new to the organisation or function. |
| 5 | Head of Asset Management | November 2019 – Revised to include non-prescribed Infrastructure network assets as in-scope and other general updates. |
| 4 | Head of Asset Management | September 2017 – Revised in line with 2017 AMS refresh. |
| 3 | Head of Asset Management | November 2016 – Review and implementation for continuous improvement |
| 2 | Head of Asset Management | August 2015 – Update to reflect organisation restructure. |
| 1 | Head of Asset Management | August 2014 – Update to reflect ISO 55001 requirements. |

16. References

- Asset Management Policy.
- Network Asset Strategy.



Appendix A – Decision Criteria

At each stage in the development of the asset management strategy, lifecycle strategies and asset Renewal and Maintenance Strategies asset management decisions are required. In making these asset management decisions, we apply decision criteria which focus on delivering on the asset management objectives at efficient costs, and while maintaining acceptable risks at the asset level.

The following decision criteria are considered in all asset management decisions, whether it be an informal assessment or within a more formal structure such as the Prescribed Network Capital Investment Procedure. In the application of the decision criteria, we undertake a range of analyses to ensure that the decisions are made based upon the best understanding of actual business outcomes. Such analyses consider the application of risk management against the performance indicators.

Stakeholder requirements play a role in defining the parameters of decision criteria. While different stakeholders will often have competing requirements, our stakeholder management practices ensure that the relevant stakeholder needs and expectations are captured, as detailed in Section 6.1. These stakeholder requirements are then considered during options development and analysis processes as well as in the weighting and calibration applied to specific risks and achievement of PIs.

A.1 Network planning and analysis process

The network planning and analysis process applies to the plan lifecycle stage. We plan the network to minimise the risk of the network not being able to meet forecast demand, connection of Distribution Network (DNSP) and other directly connected industrial customers to its network, and interconnection with transmission networks in other states, in accordance with the NSW government regulated Design and Reliability Standards and the National Electricity Rules (NER). This reflects stakeholder needs and expectations identified in Section 5.1.

We also have obligations to meet community expectations in the supply of electricity, including ensuring that developments are undertaken in a socially and environmentally responsible manner. We plan the network to achieve supply at least community cost, without being constrained by State borders or ownership considerations.

Our approach to network planning includes consideration of non-network options such as demand side response, and demand management and/or embedded generation, as an integral part of the planning process. Joint planning with DNSPs, directly connected industrial customers, generators, and interstate TNSPs is also carried out to ensure that the most economic options, whether network or non-network options, consistent with customer and community requirements are identified and implemented.

The network planning and analysis process is described in the Transmission Annual Planning Report (TAPR). A copy of the TAPR is available on The Wire.



A.2 Renewal and disposal initiatives

Renewal and disposal initiatives are developed through the Prescribed Network Capital Investment Procedure (PCIP)³. Within the procedure a need/opportunity statement and option screening assessment (NOSA) are first developed to capture the current and emerging issues and assess the risks associated with an asset, and/or the benefits that give rise to the opportunity. Following the identification of the need/opportunity, options are identified, investigated, and evaluated, and the optimal solution is selected.

The investment process considers the economic benefits of investment to electricity consumers, as well as the organisation's obligation to manage network safety risks to As Low As Reasonably Practicable / So Far As Is Reasonably Practicable (as defined in the Australian Standard 5577 - Electricity Network Safety Management Systems). The options evaluation process is further detailed in the PCIP that is available on The Wire, and implemented within the investment governance documents (OER). This process reflects the needs and expectations of the various stakeholder groups identified in Section 5.1, including Government, Regulators, Consumer Groups, and residential consumers.

Proposed renewal and disposal works are optimised through Project Development in consideration of other network investments such as those addressing network planning needs. A renewal initiative arises when an approved asset renewal project results from this process.

A Project Approval Document (PAD) is required to action any proposed renewal investments.

A copy of the Prescribed Network Capital Investment Procedure is available on The Wire.

A.3 Routine maintenance initiatives

Routine maintenance regimes are typically first established based on manufacturer recommendations, and then refined as our experience and familiarity with the asset type grows, as the asset ages, and as issues begin to emerge. In general terms, the primary maintenance approach will fall into one of two categories:

- High-value assets and assets with mechanical components: these assets typically require routine preventative maintenance, and reactive (defect) maintenance as required
- Low-value assets and assets with static components: these assets typically require routine inspection only (i.e. no routine maintenance) and reactive maintenance as required.

Maintenance regimes for assets have been refined over several years, and with each re-evaluation further opportunities to refine the processes are considered. They are based on consideration of the specific asset failure modes and seek to strike an optimised balance between preventative and reactive maintenance.

Asset maintenance regimes are analysed in consideration of:

- Performance compliance, condition, defects age and obsolescence etc.
- Risks safety, environment, reliability, compliance, cost and reputational
- Costs operational costs and capital costs associated with implementing each solution.
- Asset health and criticality.
- The outcomes of last years' maintenance programs
- Any current or emerging issues that could potentially be addressed by an adjustment to the maintenance programs.

³ Details of the relevant project planning documents for these renewal initiatives can be obtained at <u>http://thewire/dc/planning/ProjectPlanningDocuments/Pages/default.aspx</u>



The Asset Working Groups are chaired by the Asset Manager and attended by relevant stakeholders from Delivery. The Asset Working Groups discuss routine maintenance requirements going forward in consideration of:

- Actual work performed against the previous maintenance plan
- Defect trends in relation to defects
- Any other emerging issues
- Review of maintenance tasks and frequencies
- Possible changes required from the previous maintenance plan
- Maintenance requirements for new assets, including training and competencies of staff and tools and equipment requirements.

These routine maintenance initiatives reflect the needs and expectations of stakeholder groups identified in Section 5.1, including consumer, industry, and business groups.

A.4 Review of renewal and maintenance strategies

The Renewal and Maintenance Strategies set are regularly reviewed to:

- Confirm that the actual interventions undertaken are delivering the required asset outcomes
- Ensure consistency with the Business Plan. This review is undertaken as part of the annual corporate planning cycle.

Part of the review involves a reassessment and alignment due to changes in:

- Actual condition and performance of the assets
- The asset base
- Corporate objectives
- Asset outcomes to be achieved over the upcoming regulatory period
- Stakeholder needs and expectations
- Regulatory requirements for the upcoming regulatory period
- Strategic and business context of the organisation, such as changes to the risk tolerance for the assets
- Financial constraints on the organisation.

Renewal and disposal work program and maintenance plan

After the Renewal and Maintenance Strategy has been reviewed and approved, the Asset Managers prepare:

- In conjunction with the Finance Business Unit, the Capital Works Program for Renewal and Disposal projects
- The Maintenance Plan.

These plans set out the scope of the actual interventions to be undertaken by the Delivery business unit.

The Capital Works Program is maintained by the Delivery business unit and the Maintenance Plan is available on the Wire.

In the Operation and Maintenance Committee the Delivery and Asset Managers review the actual performance of the Capital Works Program and the Maintenance Plan. Significant variances between planned performance and actual performance are analysed and discussed in the Operation and Maintenance Committee. The outcomes of these discussions may result in the:



- Delivery to undertaking additional work to address any backlogs to get back on track with the plan
- Asset Manager modifying the plans.

Compliance requirements

A core asset management principle is to capture our regulatory, jurisdictional and licence compliance requirements. These compliance requirements are set by government/regulators on behalf of consumers to reflect their expectations regarding performance requirements that cannot be compromised, such as legislation, NER, design and reliability standards, as well as safety and environmental obligations.

These are often critical areas where the consequences of non-compliance present significant risk to the organisation. The risks are such that their appropriate mitigation is deemed mandatory and are thus typically not assessed on a case by case basis. Compliance should be considered independently to ensure that their requirements won't be 'optimised out' if the costs of achieving them outweigh the risks associated with their occurrence.

The compliance requirements include:

- Regulatory and legal, such as the NER
- Operating licence requirements
- Safety
- Environmental;
- Electricity network safety management
- Jurisdictional planning requirements
- Jurisdictional requirements, such as design and reliability standards
- Customer and consumer obligations.

Compliance requirements reflect the needs and expectations of the Government and Regulators stakeholder group identified in 11.1.1.
Appendix B – Alignment to ISO 55001- Processes and Procedures

| ISO 55001 Requirements | Description | Responsibility | Process Owner | Process / Procedure / System / Report |
|--|--|------------------------------------|---|--|
| 4.1 Understanding the organisational context The Business Plan includes Transgrid's vision, mission, corporate strategies and objectives, and outlines what Transgrid needs to do to succeed in the coming years. The Business Unit Action Plans are driven by the Business and are aligned to the Strategies and Objectives. The network strategies and plans set out the framework for the development and the safe, secure, reliable, and sustainable operation of the network to provide transmission services over the long term to achieve Transgrid's business objectives and to meet stakeholder and customer requirements in a cost effective and value adding manner. The Lumea business identifies and pursues opportunities to increase Transgrid's non-prescribed revenue streams. | The Business Plan includes Transgrid's vision, mission, corporate strategies and objectives, and outlines what | Network Planning and Operations | Head of Network Planning | Integrated System Plan – Transgrid Submission (to AEMO) |
| | Transgrid needs to do to succeed in the coming years. | | | Transgrid Annual Planning Report |
| | Lumea | Head of Infrastructure | Business Growth Services Framework | |
| | All Business Units | All Business Unit Executives | Business Unit Action Plans (Multiple Documents) | |
| | Chief Executive Officer | Chief Executive Officer | Business Plan | |
| | | | | |
| 4.2 Understanding | In accordance with its Regulatory requirements, Transgrid has put in place a range of processes to engage with its key stakeholders and consumers of electricity, including conducting several stakeholder forums and round table discussions to gain their views on Transgrid's objectives and plans and to better | Network Planning and Operations | Head of Asset Management | Network Asset Strategy |
| expectations of stakeholders | | | | Prescribed Network Capital Investment Process |
| | | | | Electricity Network Safety Management System (ENSMS) |
| transmission services. The Network Asset Strategy docur | transmission services. The Network Asset Strategy document sets out the decision criteria used for asset management decision | | Head of Land, Community and Environment | Stakeholder Engagement Charter |
| | making. It identifies that stakeholder requirements are a key input to the asset management decision making The Lumea business ensures that the needs and expectations of stakeholders are reflected and balanced, and explicitly stated in contractual arrangements. | Lumea | Head of Infrastructure | Business Growth Services Framework |
| | | Legal, Governance and Risk | Head of Brand, Media, and Communications | 'Transgrid.com.au' website |
| 4.3 Determining the scope of the Asset Management System | The scope of the Asset Management System is described in the Asset Management System Description document. | Network Planning and Operations | Head of Asset Management | Asset Management System Description |

73 | Asset Management System Description | CONTROLLED DOCUMENT_



| ISO 55001 Requirements | Description | Responsibility | Process Owner | Process / Procedure / System / Report |
|--|---|----------------------|-----------------------------|--|
| 4.4 Asset | The Head of Asset Management, as Transgrid's Asset | Network Planning and | Head of Asset Management | AMS / ENSMS Audit Procedure |
| Management System The Organisation shall establish, | and continually improve Transgrid's Asset Management System. | Operations | | Asset Management Committees - Strategy and Plan |
| implement, maintain, | The Head of Asset Management has put in place a | | | Asset Management System Description |
| improve an asset management system The organisation shall | range of processes, procedures, and review mechanisms to review the Asset Management System so that it remains 'fit for purpose' to achieve the asset management objectives. | | | Network Asset Strategy |
| develop a Strategic Asset Management Plan (SAMP) The Network Asset Strategy defines what Trans intends to achieve from its asset management over the complete asset lifecycle and sets out t | The Network Asset Strategy defines what Transgrid intends to achieve from its asset management activities over the complete asset lifecycle and sets out the: | | | |
| | Asset management objectives to be achieved in the short, medium, and longer terms. | | | |
| | Asset management framework, including optimisation, risk analysis, criticality analysis, and decision analysis processes | | | |
| | Asset condition and health. | | | |
| | Strategies to mitigate the identified risks. | | | |
| | • Targets to measure the success of the strategies. | | | |
| | Sets out the overview of the Network Asset Strategy to be achieved that are consistent with Transgrid's stakeholders' requirements, Business Plan, and key asset management system related risks. | | | |
| | Stakeholder identification, needs/expectations reflected in decision making criteria and reporting | | | |
| 5.1 Leadership and | The EM Network Planning and Operations (EM/NPO), | Network Planning and | Head of Asset | AMS / ENSMS Audit Procedure |
| Commitment | as Transgrid's Asset Manager, has the accountability to provide leadership to support Transgrid's Asset Management System. | Operations | Management | Asset Management Committees - Strategy and Plan |
| | The Head of Asset Management has put in place a range of processes, procedures, and review mechanisms to ensure that the asset management system remains 'fit for purpose' to achieve the asset management objectives. | | | Asset Management System Description |



| ISO 55001 Requirements | Description | Responsibility | Process Owner | Process / Procedure / System / Report |
|---|--|---|---|---|
| 5.2 Policy | The Asset Management Policy sets out the overall policy for the sustainable management of Transgrid's electricity network assets It identifies the core principles and requirements that underpin the policy's delivery and implementation to achieve Transgrid's overall corporate and business objectives. | Network Planning and Operations | Head of Asset Management | Asset Management Policy |
| 5.3 Organisational roles, responsibilities, and authorities | The EM Network Planning and Operations (EM/NPO) business unit has a dedicated Asset Manager who is responsible for the establishment, maintenance, | Corporate Services | Head of Supply Chain and Transformation | Transgrid's operating model organisation chart and process map 'The Wire' |
| | including review to ensure that it remains fit for purpose to achieve the asset management objectives. | Network Planning and Operations | Head of Asset Management | Asset Management System Capability Guideline |
| | The Asset Manager within the group is responsible to ensure that the responsibilities and authorities for the various roles relating to the Asset Management System are assigned and communicated to the relevant managers. | Chief Financial Officer | Chief Financial Officer | Financial Authorities |
| 6.1 Actions to address risks and | Transgrid has established strong risk management practices and processes based on ISO 31000 for corporate, financial, stakeholder, and regulatory related risks. Transgrid maintains an in-house legal function and has established appropriate processes to ensure compliance with regulatory requirements. Transgrid: | Corporate Services | Chief Information Security Officer | Physical Security Management Framework |
| opportunities for the Asset Management | | Delivery Head of Infrastructure Development Head of Project Governance and Assurance | Head of Infrastructure Development | Project Delivery Manual |
| System | | | | Project Risk Registers (Project Specific) |
| | | | Head of Project | Construction Work Risk Framework |
| | | | Project Risk Management Procedure | |
| | assets; these strategies are prepared by each asset | Network Planning and Operations | Head of Asset | Asset Management Change Procedure |
| | class. Sets out those strategies to enhance the enablers | | Management | Asset Management Committees - Strategy and Plan |
| | System. | | | Asset Management System Description |
| | • Sets out those strategies to enhance the asset | | | Continuous Improvement Register |
| | Asset Management System. | | | Electricity Network Safety Management System (ENSMS) Description |
| | • Sets out those strategies that are required to plan, develop, and augment the network in accordance | | | Electricity Safety Management Scheme (ESMS) |



| ISO 55001 Requirements | Description | Responsibility | Process Owner | Process / Procedure / System / Report |
|---------------------------|---|------------------------------------|---|--|
| | with the network strategies and to meet forecast | | | Formal Safety Assessments (Multiple) |
| | The Lumea business identifies and pursues opportunities to grown non-prescribed revenue | | | Network Asset Risk Assessment Methodology |
| | streams, and works closely with the Asset Management group to ensure that the risks associated with doing so are managed within Transgrid's Risk Management | | | Renewal and Maintenance Strategies (by asset class) |
| | Framework and Risk Appetite | | | Safety in Design |
| | | | Head of Health, Safety and | Environmental Management System Framework |
| | | | Environment | Health and Safety Management System Framework |
| | | | Health and Safety Risk Assessment | |
| | | | Health Safety and Environmental Audit Process | |
| | | | Site Risk Assessment for Office Personnel | |
| | | | Head of Network Planning | Transmission Annual Planning Report |
| | | Lumea | Head of Infrastructure | Business Growth Services Framework |
| | | Legal, Governance | Chief Risk Officer | Board Audit and Risk Committee Charter |
| | | and Risk | | Internal Audit Framework |
| | | | | Principal and Operational Risk Registers (CAMMS) |
| | | | | Risk Management Framework |
| | | Head of Compliance | Corporate Compliance Management Framework | |
| | | | | NEM Law and compliance (Legislation and Regulations) |
| | Transgrid sets out the asset management targets that the asset management strategies are to achieve and | Network Planning and Operations | Head of Asset Management | Network Asset Strategy |



| ISO 55001 Requirements | Description | Responsibility | Process Owner | Process / Procedure / System / Report |
|-------------------------------------|--|----------------------|-------------------------------|---|
| 6.2.1 Asset Management | are consistent with Transgrid's business objectives, Business Plan and stakeholder expectations. | | Head of Health, Safety and | Environmental Management System Framework |
| Objectives | | | Environment | Health and Safety Management System Framework |
| 6.2.2 Planning to achieve the asset | The asset management plans focus on ensuring that adequate resources and systems are in place to deliver | Corporate Services | Chief Information Officer | IT Disaster Recovery Invocation Procedure |
| objectives | on the asset management strategies and to ensure that the assets are appropriately managed to deliver safe, | | | IT Disaster Recovery Procedure |
| | secure, and reliable transmission services; the asset management plans are for: | Delivery | Head of Infrastructure | EPPMS – project resource management and scheduling |
| | Sets out the procedures for responding to incidents and maintaining the continuity of critical network assets and asset management activities, including | | Development | Project Document Governance System (PDGS) |
| the testing of these plans. | the testing of these plans. | | | Project Delivery Manual (PDM) |
| | | | Head of Maintenance | Authorisation to Work |
| | | | | Ellipse - Work Schedule for maintenance and related works |
| | | | | Emergency Response Manual - Each substation site has an individually designed Emergency Response Manual to deal with environmental emergencies or incidents at that site These manuals are maintained to ensure their currency and are subject to regular independent audits (e.g. Newcastle substation) |
| | | | | Resource Planning Guidelines |
| | | Network Planning and | Head of Asset | Network Asset Strategy |
| | | Operations | Management | Renewal and Maintenance Strategies (All Asset classes) |
| | | | | Bushfire Risk Management Plan (NSW/ACT) |
| | | | | Bushfire Mitigation Plan (Victoria) |
| | | | | Continuous Improvement Register |
| | | | | Corrective Maintenance Process |



| ISO 55001 Requirements | Description | Responsibility | Process Owner | Process / Procedure / System / Report |
|---------------------------|-------------|----------------|--|--|
| | | | | Digital Infrastructure Spares Plan |
| | | | | In-Service and Spare Power Transformers and Reactors |
| | | | Maintenance plans (All asset classes) | |
| | | | Network Performance Review Procedure | |
| | | | Prescribed Network Capital Investment Process | |
| | | | | Spares Policy All Asset Streams |
| | | | | Substation Spares Plan |
| | | | | Transmission Line Emergency Structures |
| | | | | Underground Cable Assets Spares Plan |
| | | | | Victorian Assets Bushfire Mitigation Plan |
| | | | | Managing the Maintenance Program |
| | | | | Transgrid Electric Line Clearance Management Plan |
| | | | Head of Health, Safety and Environment | Fire Protection |
| | | | | Power System Safety Rules |
| | | | Head of Land, Community and | Easement Guidelines for Third Party Developments |
| | | | Environment | Prohibited Encroachments Procedure |
| | | | | Property Acquisition Compensation Principles for NSW major projects |
| | | | | Property Acquisition Policy |
| | | | | Property Acquisition Procedure |
| | | | | Property Portfolio Procedure Third Party Access Rights |
| | | | | Continuity of Transmission Supply Plan |



| ISO 55001 Requirements | Description | Responsibility | Process Owner | Process / Procedure / System / Report |
|---|---|--|---|---|
| | | | Head of Network Operations | Exercises to test PSERP and contingency plans |
| | | | | Outage Management System (THEOS), including outage plan example |
| | | | | Power System Emergency Response Plan (PSERP) |
| | | | Grid operating manual – contingency planning OM 68.1 | |
| | | Head of Network Planning | Transmission Annual Planning Report | |
| | Lumea | Head of Infrastructure | Business Growth Services Framework | |
| | Strategy, Innovation, and Technology | Stakeholder Communications Manager | Transgrid Stakeholder Engagement Charter | |
| | | Legal, Governance and Risk | Chief Risk Officer | Business Continuity Management Framework |
| | | | | Risk Management Framework |
| 7.1 Resources Transgrid determines its resource requirements at several levels: | Delivery | Head of Infrastructure | EPPMS – project resource management and scheduling | |
| | • At the business unit level as part of the annual | Development | Development | Project Delivery Manual |
| | of this process is setting the overall resourcing levels to achieve the Business Plan and business | | | Project Document Governance System (PDGS) |
| | objectives that are agreed by the Managing Director with each Executive Manager. | | Head of Maintenance | Ellipse - Work Schedule for maintenance and related works |
| | At the Group level within each business unit as part of the development of the business unit plans to | | | Pegasus System |
| | support the achievement of the Business Plan and | | | Resource Planning Guidelines |
| | unit undertakes appropriate resource analysis to | Network Planning and | Head of Asset | PADs for capital projects |
| prioritise the work to be undertaken to reflect the | Operations | Management | Optimised Investment List | |



| ISO 55001 Requirements | Description | Responsibility | Process Owner | Process / Procedure / System / Report |
|---|--|---|-----------------------------|---|
| | available resourcing and the timing that resources can be assigned. | Chief Executive Officer | Chief Executive Officer | Business Plan |
| At the team level based on the required a management activities to be undertaken | At the team level based on the required asset management activities to be undertaken for: | | | |
| | Maintenance activities and related work based on the Ellipse Work Schedule. | | | |
| | Appropriate resourcing analysis to prioritise the work to be undertaken to reflect the available resourcing and the timing that resources can be assigned. | | | |
| Capital project work based on the Project Approval Document (PAD) to achieve the required capital works set out in the Capital Works Program Appropriate resourcing analysis to prioritise the project work to be undertaken to reflect the forecast demand analysis, available resourcing and the timing that resources and service providers are available | | | | |
| | Appropriate resourcing analysis to prioritise the project work to be undertaken to reflect the forecast demand analysis, available resourcing, and the timing that resources and service providers are available | | | |
| 7.2 Competence | The required competency of personnel undertaking asset management related activities is determined as part of the formal evaluation of each position Requirements for each position are established through formal position descriptions which set out required competencies, experience, and tertiary qualifications | Corporate Services | Head of People and Culture | Performance Development System (HRIS) |
| | | Delivery | Head of Maintenance | Pegasus System |
| | | Network Planning and OperationsHead of Asset ManagementHead of Health, Safety and Environment | Head of Asset Management | Asset Management System Capability Guideline |
| | | | Head of Health, | Power System Safety Rules |
| | | | Safety and Environment | Power System Safety Rules Authorisation and Training documentation/manuals (i.e., competency based training) |
| | | | | Safety Rules Performance Reviews |
| 7.3 Awareness | EM Network Planning and Operations (EM/NPO) has | Network Planning and | Head of Asset | AMS Communication Strategy |
| | established a range of measures to keep staff, contractors, internal or external service providers, and | Operations | wanagement | Asset Management Committees - Strategy and Plan |



| ISO 55001 Requirements | Description | Responsibility | Process Owner | Process / Procedure / System / Report |
|---|---|---|---|--|
| | suppliers aware of Transgrid's Asset Management System and activities These mechanisms include: | | | Asset Management System induction module |
| | Asset Management Committees and Working Groups. | | | Network Asset Strategy |
| | Discussion of asset management in Transgrid's newsletters, briefings, introduction. | | | |
| | Inclusion of asset management articles on Transgrid's intranet, the Wire. | | | |
| | Briefings to the Executive. | | | |
| | Placing of Transgrid's Asset Management Policy on notice boards throughout the organisation | | | |
| 7.4 Communication | Communication requirements for stakeholders is | Network Planning and | Head of Asset | AMS Communication Strategy |
| | distributed across Transgrid depending upon the nature of the work and the type of stakeholder. | Operations | Management | Asset Management Change Procedure |
| | EM Network Planning and Operations (EM/NPO) provides regular communication to the Executive, managers and employees regarding asset management information and its importance to Transgrid. The Project Delivery Manual specifies stakeholder engagement requirements across the project lifecycle. | | | Asset Management Committees - Strategy and Plan |
| | | | | Network Asset Strategy |
| | | | Relevant Meeting Owner | Asset Management Committees - Strategy and Plan - Minutes of Meetings |
| | | Delivery | Head of Infrastructure Delivery | Project Delivery Manual |
| | The Stakeholder Engagement – Corporate Affairs lists | Lumea | Head of Infrastructure | Business Growth Services Framework |
| contact details and objects for key Government bodies, Regulators, consumer groups and business groups. Asset class Working Groups are cross-BU forums to discuss and address asset management related matters. | Legal Governance and Risk | Head of Government & Stakeholder Relations | Stakeholder Engagement - Corporate Affairs | |
| 7.5 Information Requirements | Describes the Asset Management System information that is required to be captured, recorded, and maintained. | Delivery | Head of Maintenance | Ellipse - Work Schedule for maintenance and related works |
| | | | | 2020-21 Bushfire Performance Report |



| ISO 55001 Requirements | Description | Responsibility | Process Owner | Process / Procedure / System / Report |
|---|--|---|--|---|
| | | Network Planning and | Head of Asset | Asset Information Strategy |
| | | Operations | Management | Bushfire Preparedness Report |
| | | | | ENSMS Performance Reporting Procedure |
| | | Head of Land, Community and Environment | Transgrid Spatial System (TSS) | |
| | | | Head of Network Operations | Asset Event Investigation and Reporting |
| | | Legal, Governance and Risk | Head of Compliance | Regulatory Incident Reporting Procedure |
| | | Chief Financial Officer | Chief Financial Officer | Asset Recording and Control Procedure |
| 7.6 Documented Information | Procedures to enable management of document and ensure is appropriately understood, communicated, and operated. The procedures set out the requirements for those records to be maintained to support the Asset Management System | Corporate Services | Chief Information Officer | Document and Records Management |
| | | Delivery | Head of Project Governance and Assurance | Delivery Document Management - Work Instruction QLY-FSM-WIN-001 |
| | | Network Planning and Operations | Head of Asset Management | Asset Information Strategy |
| | | | | Asset Management System Description |
| | | | | Network Planning and Operation (NPO) Document Management Procedure |
| | | | Head of Network Operations | Network Operations Document Management Procedure |
| 8.1 Operational Planning and Control | Procedures established for the implementation of the asset management plans across all stages of the asset | Delivery | Head of Infrastructure | EPPMS – project resource management and scheduling |
| | litecycle. Activities for the maintenance and calibration of tools | | Development | Project Delivery Manual |
| | equipment, meters and protection and control devices and systems. | | | Project Document Governance System (PDGS) |
| | The EM Network Planning and Operations (EM/NPO), as Transgrid's Asset Manager, has the responsibility to | | | Safe Working Instructions (including tooling) |

82 | Asset Management System Description | CONTROLLED DOCUMENT_____



| ISO 55001 Requirements | Description | Responsibility | Process Owner | Process / Procedure / System / Report |
|---------------------------|--|---|--|---|
| | establish, maintain, and continually improve Transgrid's Asset Management System. | | | Testing of High Voltage Equipment Prior to Energisation |
| | The EM Network Planning and Operations (EM/NPO) has put in place a range of processes, procedures, and review mechanisms to: | | Head of Maintenance | Ellipse - Work Schedule for maintenance and related works |
| | Support the effective delivery of the activities contained in the asset management plans. Review the Asset Management System so that it remains 'fit for purpose' to achieve the asset management objectives. | | | Maintenance reporting dashboards in Power BI (Various) |
| | | | Head of Health, | Waste Management of Timber Poles |
| | | | Safety and Environment | Work Instruction - Disposal of Asbestos |
| | | Network Planning and | Head of Asset | AMS / ENSMS Audit Procedure |
| | | Operations | Management | Asset Acceptance Procedure |
| | | | Asset Management Capability Guideline | |
| | | | Asset Management Committees - Strategy and Plan | |
| | | | Corrective Maintenance Process | |
| | | | | Maintenance plans (All asset classes) |
| | | | Prescribed Network Capital Investment Process | |
| | | | | Safety in Design |
| | | | | Standard Design and Construction Manuals |
| | | | | Managing the Maintenance Program |
| | He Co En | Head of Land, Community and Environment | Property Disposal Procedure 2020 - Final | |
| | | Head of Network | High Voltage Network Outage Planning | |
| | | | Operations | Network Operations Manuals (All) |
| | | | Head of Network Planning | Transmission Annual Planning Report |



| ISO 55001 Requirements | Description | Responsibility | Process Owner | Process / Procedure / System / Report |
|------------------------------|--|------------------------------------|---|---|
| | | Legal, Governance, and Risk | Chief Risk Officer | Risk Management Framework |
| | | Chief Financial | Chief Financial | Asset Recording and Control Procedure |
| | | Officer | Officer | Property Disposal Procedure |
| 8.2 Management of Change | Process for the identification, risk assessment, and management of those changes that have a significant impact on the effective operation of the network assets | Delivery | Head of Infrastructure Development | Design Change Request |
| | and/or the Asset Management System | Network Planning and | Head of Asset | Asset Management Change Procedure |
| | | Operations | Management | Maintenance Program - Variation Process |
| | | | | Prescribed Network Capital Investment Process |
| | | | | Safety in Design |
| 8.3 Outsourcing | Asset management activities are undertaken by Asset Management business unit and are not outsourced. Activities for maintenance services and construction services are undertaken by the Delivery business units. These business units prepare and issue tenders, evaluate tender responses, and establish contracts to engage outsource service providers as appropriate. | Corporate Services | Chief Information Security Officer | ISMS Supplier Management Standard |
| | | | Head of Supply Chain and Transformation | Procurement Framework |
| | | | | Procurement Procedure |
| | | Delivery | Head of Infrastructure Development | Project Delivery Manual |
| | | Network Planning and Operations | Head of Asset Management | Asset Management System Description |
| | | | Head of Health, Safety and Environment | Contractor Health Safety and Environment Management |
| | | | Head of Network Operations | SO OF D2 010 R6 - SCADA Requirements for Contractors |
| 9.1 Monitoring, measurement, | Transgrid undertakes and maintains a proactive condition assessment and condition monitoring process | Network Planning and Operations | Head of Asset Management | Asset Management Committees - Strategy and Plan |
| analysis, and evaluation | for its assets. | | | Cable Assets Condition Monitoring Manual |

84 | Asset Management System Description | CONTROLLED DOCUMENT_____



| ISO 55001 Requirements | Description | Responsibility | Process Owner | Process / Procedure / System / Report |
|---------------------------|---|------------------------------------|--|---|
| | Condition of assets is reviewed through the Working Groups, by maintenance activities undertaken by Delivery personnel, and by the Asset Managers. | | | Condition Monitoring Manual |
| | | | | Corrective Maintenance Process |
| | Transgrid undertakes and maintains a proactive process for the investigation and resolution of faults and failures. Processes are reviewed through the Working Groups, by maintenance activities undertaken by Delivery personnel, and by the Asset Managers. CAR processes assess compliance with standards, applicable legislative requirements as set out in the standards, procedures, and identifies non- conformances. Issues, non-conformances, etc. are recorded and tracked via the CAMMS system. | | | Internal Work Request Procedure |
| | | | | Minutes of Network Performance Review Committee meetings |
| | | | | Substation Steelwork Condition and Data Collection |
| | | | | Monthly Network Performance Reports (Various) |
| | | | Head of Health, Safety and Environment | HSE External Notification of Incidents |
| | | | | HSE Hazard and Incident Management |
| | | Head of Network Operations | Pollution Incident Response Management Plan - Sydney West 330kV Substation | |
| | | | | Pollution Incident Response Management Plan - Transportation of Waste |
| | | | Head of Network | OM 554 - Outage statistics and reporting |
| | | | Operations | Operating Manuals (All) |
| | | | | Resolving Outage Conflicts |
| | | Legal, Governance and Risk | Chief Risk Officer | Compliance and Incident reporting system (CAMMS) |
| 9.2 Internal Audit | Transgrid's internal audit framework consists of the following elements: 'Asset Owner' internal audits - these internal audits to be undertaken under direction of the Chief Risk officer. These internal audits have an 'assurance focus' and check that the Asset Manager has established an asset management system that is 'fit for purpose' for use with the scale and complexity of Transgrid's assets. | Network Planning and Operations | Head of Asset Management | AMS / ENSMS Audit Procedure |
| | | | Head of Health, Safety and Environment | Health Safety and Environmental Audit Process |
| | | Legal, Governance and Risk | Chief Risk Officer | Board Audit and Risk Committee Charter |
| | | | | Compliance and Incident reporting system (CAMMS) |



| ISO 55001 Requirements | Description | Responsibility | Process Owner | Process / Procedure / System / Report |
|---|---|------------------------------------|-------------------------------|---|
| | Checking the effectiveness and efficiency of the | | | Internal Audit Framework |
| | Asset Management System to deliver the Asset Management Strategy and Asset Management Objectives. | | Head of Compliance | Corporate Compliance Management Framework |
| | 'Asset Manager' Internal Audits – Control Assurance Reviews and Target Area Reviews are undertaken under the direction of the Head of Asset Management. These internal audits have a 'compliance focus' and include: | | | |
| | Checking the implementation of the Asset Management Plans is occurring in an efficient, timely, and cost effective manner. | | | |
| | Identifying and assessing asset management system and asset management activities related risks. | | | |
| 9.3 Management Review | The Asset Management Committee undertakes regular review of the Asset Management System to ensure its continuing suitability, adequacy, and effectiveness, including need for change to the asset management system, asset management strategy and asset management objectives. | Network Planning and Operations | Head of Asset Management | Asset Management Committees - Strategy and Plan |
| | | | Relevant Meeting Owner | Minutes of the Asset Management Committee meetings (All committees) |
| 10.1 Non-conformity and corrective actions | Issues, non-conformances, etc. are recorded and tracked via the CAMMS System, including the results of asset management system audits, internal audits, CARs, and TARs. Identify, evaluate, and determine appropriate corrective action to be taken for issues in respect of the assets, asset management, and/or the Asset Management System. | Network Planning and Operations | Head of Asset Management | AMS / ENSMS Audit Procedure |
| | | | | Asset Management System Description |
| | | | | Corrective Maintenance Process |
| | | | | Minutes of the Asset Management committee meetings (Network Performance Review) |
| | | | Head of Network Operations | OpsLog |
| | | Legal, Governance and Risk | Chief Risk Officer | Compliance and Incident reporting system (CAMMS) |
| | | | Head of Compliance | Compliance Incident Management Procedure |
| | | | | Corporate Compliance Management Framework |



| ISO 55001 Requirements | Description | Responsibility | Process Owner | Process / Procedure / System / Report |
|-------------------------------|---|------------------------------------|-----------------------------|---|
| 10.2 Preventive Action | Transgrid's has adopted a Preventative Maintenance approach for the development of its Maintenance Strategy and Maintenance Plans. Transgrid undertakes a range of preventative measures to gather appropriate data to enable the early identification of potential failures or incidents These measures include inspections, condition assessments, and real time condition monitoring of assets. Monitor and identify potential failures in asset performance and to evaluate the need for preventative actions | Network Planning and Operations | Head of Asset Management | Cable Assets Condition Monitoring Manual |
| | | | | Condition Monitoring Manual |
| | | | | Corrective Maintenance Process |
| | | | | Internal Work Request Procedure |
| | | | | Network Asset Strategy |
| | | | | Network Performance Reports (Various) |
| | | | | Substation Steelwork Condition and Data Collection |
| 10.3 Continual Improvement | All participants to the Asset Management System are responsible for continuous improvement initiatives to enhance the assets and to improve the Asset Management System. | Network Planning and Operations | Head of Asset Management | Asset Management Committees - Strategy and Plan |
| | | | | Asset Management System Description |
| | Asset Class Working Groups are one of the key forums for continual improvement together with the Asset Managers. | | | Continuous Improvement Register |
| | | Legal, Governance and Risk | Chief Risk Officer | Compliance and Incident reporting system (CAMMS) |
| | The EM Network Planning and Operations (EM/NPO) is accountable for the continual improvement of asset management in Transgrid, including the Asset Management System. | | | |
| | All parties responsible for sections of the Asset Management System have an implied responsibility to continually improve its systems and processes. | | | |