



TransGrid

ENSMS – Annual Performance Report

1 October 2018 to 30 September 2019

31 October 2019

Contents

1. Annual Compliance and Bushfire Reporting	4
2. Statistical Reporting.....	5
2.1 Tier 1 - Major incidents	5
2.2 Tier 2 – Incidents	5
2.3 Tier 3 – Control failure near miss	6
2.4 Vegetation contact with conductors.....	8
2.5 Unintended contact, unauthorised access and electric shocks	9
2.6 Reliability and Quality of Supply	12
2.7 Reliability and Quality of Supply – Critical infrastructure incidents	12
2.8 Network-initiated Property damage events	13
2.9 Tier 4 implementation	13
2.10 Design, construction and commissioning.....	14
2.11 Inspection (assets).....	15
2.12 Inspections (vegetation) Aerial/Ground based	15
2.13 Public electrical safety plans and activities	17
2.14 Internal audits performed on any aspect of the ENSMS (as per AS 5577a clause 4.5.4)	18
2.15 External audits performed on any aspect of the ENSMS (as per AS 5577a clause 4.5.4)	18
3. Bushfire Reporting.....	19
3.1 Bushfire risk profile across TransGrid’s supply area.....	19
3.2 Permanent / temporary declaration of areas by RFS and TransGrid’s actions	22
3.3 TransGrid Comments	25

List of Tables

Table 1 Tier 1 – Major Incidents.....	5
Table 2 Tier 2 - Incidents	5
Table 3 Tier 3 – Control failure near miss.....	6
Table 4 Vegetation contact with conductors	8
Table 5 Unintended contact, unauthorised access and electric shocks	9
Table 6 Reliability and Quality of Supply – Critical infrastructure incidents	12
Table 7 Network-initiated Property damage events.....	13
Table 8 Tier 4 implementation.....	13
Table 9 Design, constructions and commissioning.....	14
Table 10 Inspection (assets)	15
Table 11 Inspections (vegetation) Aerial/Ground based	15
Table 12 Public electrical safety plans and activities.....	17

Table 13 Internal audits performed on any aspect of the ENSMS	18
Table 14 External audits performed of any aspect of the ENSMS	18
Table 15: Pre summer bushfire inspections	22
Table 16: Vegetation tasks.....	23
Table 17: Asset tasks	24

1. Annual Compliance and Bushfire Reporting

This report provides general information about the performance of TransGrid's Electricity Network Safety Management System (**ENSMS**) as implemented in accordance with the Electricity Supply (Safety and Network Management) (**ESSNM**) Regulation 2014 and Australian Standard AS 5577¹. This report has been produced in accordance with IPART's Electricity Networks Reporting Manual (Safety management systems reporting) August 2018 for the period 1 October 2018 to 30 September 2019.

In the reporting period, TransGrid continued to maintain its ENSMS and supporting Management Systems to meet the requirements of the ESSNM Regulation. TransGrid's ENSMS defines the interface and integration of the various corporate frameworks and management systems that implement risk controls to ensure that the objectives of the ESSNM Regulation are met. TransGrid is committed to delivering the following objectives through its ENSMS:

- > the safety of members of the public
- > the safety of person(s) working on the network
- > the protection of property (whether or not belonging to TransGrid)
- > the management of safety risks arising from the protection of the environment (for example, preventing bushfires that may be ignited by network assets)
- > the management of safety risks arising from the loss of electricity supply.

TransGrid's ENSMS is supported by the following Management Systems:

- > a Health and Safety Management System certified to AS/NZS 4801
- > an Asset Management System certified to ISO 55001
- > an Environmental Management System certified to ISO 14001.

Section 2 of this report provides an overview of the ENSMS system and performance in line with the Reporting Manual Appendix A.

Section 3 of this report covers Bushfire Preparedness as per the Reporting Manual Appendix B. It allows TransGrid to provide meaningful data to IPART and the broader community on bushfire risk mitigation programs as well as our performance in managing bushfire risk.

¹ AS 5577 – Electricity Network Safety Management Systems

2. Statistical Reporting

2.1 Tier 1 - Major incidents

No Major incidents were recorded in the reporting period.

Table 1 Tier 1 – Major Incidents

ESSNM Objective		Description of each major incident reported under the Incident Reporting requirements
Safety of members of the public		NA
Safety of persons working on network		NA
Protection of property	Third party property	NA
	Network property	NA
Safety risks arising from loss of electricity supply		NA

2.2 Tier 2 – Incidents

Two Reliability incidents were recorded in the reporting period.

Table 2 Tier 2 - Incidents

ESSNM Objective		Description of each major incident reported under the Incident Reporting requirements
Safety of members of the public		NA
Safety of persons working on network		NA
Protection of third party property		NA

Safety risks arising from loss of electricity supply	<p>Two reliability incidents were recorded in the reporting period.</p> <p>The first occurred on 15 May 2019 at Broken Hill substation and resulted in a loss of energy of 0.2197 System Minutes. It was caused by a faulty Local Back Up relay.</p> <p>The second incident occurred on 28 August 2019 at Broken Hill substation and resulted in a loss of energy of 0.1116 System Minutes. It was caused by faulty 22kV Circuit Breaker resulting in a busbar trip.</p>
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2.3 Tier 3 – Control failure near miss

TransGrid’s near miss data is presented in table 3. There are no significant trends or issues noted.

Table 3 Tier 3 – Control failure near miss

Performance measure	Population	5-year average annual functional failures	Annual functional failures (for reporting period)					
			Unassisted			Assisted		
			No fire	Fire		No fire	Fire	
				Contained	Escaped		Contained	Escaped
Towers	14,707	0.6	0	0	0	0	0	0
Poles	22,796	2.4	1	0	0	0	0	0

Performance measure	Population	5-year average annual functional failures	Annual functional failures (for reporting period)					
			Unassisted			Assisted		
			No fire	Fire		No fire	Fire	
				Contained	Escaped		Contained	Escaped
Conductor – Transmission OH	13,043 km	9.8	1	0	0	9	0	0
Conductor – Transmission UG	89 km	0	0	0	0	0	0	0
Power transformers	228	2.8	1	0	0	0	0	0
Reactive plant	173	15	10	2	0	0	0	0
Switchgear – zone / sub transmission/transmission	13,108	24.6	13	0	0	2	0	0
Protection relays or systems	3123	13.4	10	0	0	1	0	0
Zone / sub transmission/transmission substation SCADA system	2001	5.8	8	0	0	0	0	0

Performance measure	Population	5-year average annual functional failures	Annual functional failures (for reporting period)					
			Unassisted			Assisted		
			No fire	Fire		No fire	Fire	
				Contained	Escaped		Contained	Escaped
Zone / sub transmission/transmission substation Protection Batteries ¹	125	NA	NA	NA	NA	NA	NA	

2.4 Vegetation contact with conductors

Table 4 Vegetation contact with conductors

Performance measure	Event count – Current reporting period	Event count – Last reporting period	Event count – Two periods ago	Event count – Three periods ago	Event count – Four periods ago	Comments
Fire starts – grow in	0	0	0	1	1	
Fire start – fall in and blow in	0	0	0	1	0	
Interruption – grow in	0	1	3	1	0	

¹ The count of battery systems, included total count of batteries and chargers.

Interruption – fall-in and blow in	1	0	1	3	2	There was one incident involving vegetation falling onto line while the line was out of service for a planned outage.
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2.5 Unintended contact, unauthorised access and electric shocks

Table 5 Unintended contact, unauthorised access and electric shocks

Detail	Event Count Current reporting period	Event Count Last reporting period	Event Count Two periods ago	Event Count Three periods ago	Event Count Four periods ago	Comments
Electric shock and arc flash incidents originating from network assets including those received in customer premises						
Public	0	NA	NA	NA	NA	
Public worker	0	NA	NA	NA	NA	
Network employee / network contractor	0	NA	NA	NA	NA	
Livestock or domestic pet	0	NA	NA	NA	NA	
Contact with energised overhead network asset (e.g. conductor strike)						
Public road vehicle	0	NA	NA	NA	NA	
Plant and equipment	0	NA	NA	NA	NA	

Detail	Event Count Current reporting period	Event Count Last reporting period	Event Count Two periods ago	Event Count Three periods ago	Event Count Four periods ago	Comments
Agricultural and other	1	NA	NA	NA	NA	A branch of tree came in contact with the line causing a flashover
Network vehicle	0	NA	NA	NA	NA	
Contact with energised underground network asset^e (e.g. conductor strike)						
Plant and equipment	0	NA	NA	NA	NA	
Person with hand held tool	0	NA	NA	NA	NA	
Unauthorised network access (intentional)						
Zone / BSP / Transmission substation / switching station	3	NA	NA	NA	NA	
Tower / poles	0	NA	NA	NA	NA	
Other (e.g. communication sites)	0	NA	NA	NA	NA	
Safe Approach Distance (SAD)						
Network employee / network contractor	0	0	0	0	0	

Detail	Event Count Current reporting period	Event Count Last reporting period	Event Count Two periods ago	Event Count Three periods ago	Event Count Four periods ago	Comments
Public	0	NA	NA	NA	NA	
Public Worker	0	NA	NA	NA	NA	

2.6 Reliability and Quality of Supply

The reliability and quality of supply performance measures specified in Appendix A Table A.6 of the IPART ENRM (August 2018) applies only to Distribution Network Service providers.

2.7 Reliability and Quality of Supply – Critical infrastructure incidents

Below is a listing of all reliably events during the reporting period.

Table 6 Reliability and Quality of Supply – Critical infrastructure incidents

Type of critical infrastructure (e.g. hospital, tunnel)	Minutes of supply lost ^b	Cause	Consequential safety impacts associated with supply issue
945 Wellington to Molong tee Wellington Town Transmission Line	15	External	None noted
Wallerawang Substation Bus Section	11	Plant Failure	None noted
Wagga Substation Bus Section	16	Process Issue	None noted
Broken Hill Substation Bus Section	119	External	None noted
Broken Hill Substation Bus Section	125	Plant Failure	None noted
876 Moree to Moree Solar Farm Line	147	Plant Failure	None noted
Boggabri North Relay	23	Plant Failure	None noted
Broken Hill Substation Bus Section	98	Plant Failure	None noted
96R Glen Innes to Tenterfield Transmission Line	20	External	None noted

2.8 Network-initiated Property damage events

Table 7 Network-initiated Property damage events

Detail	Event count – current reporting period	Event count – last reporting period	Event count – two periods ago	Event count – three periods ago	Event count – four periods ago	Comments
Third party property (assets including vehicles, buildings, crops, livestock)						
Damage (e.g. Fire, Physical impact or Electrical)	0	0	0	2	1	
Network property (including non-electrical assets including vehicles, buildings)						
Damage (e.g. Fire, Physical impact or Electrical)	2	2	5	2	1	

2.9 Tier 4 implementation

The following critical controls within TransGrid's Formal Safety Assessments (FSAs) have been amended or improved during the period

Table 8 Tier 4 implementation

FSA	Amendments/improvements
Worker Safety FSA and Controls	<ul style="list-style-type: none"> > Fatigue Management – Update of existing procedure > Managing the Risk of Falls – consolidation of documentation in the automated HSE system for generating work and safety packages > Organisational Behaviour – Targeted safety leadership training for Frontline leaders > Resourcing – Further refinements to the Capabilities Framework > Safety in Design - Renewed focus on Safety in Design meeting effectiveness and inclusion of all relevant stakeholders

Environment and Property FSA and Controls	<ul style="list-style-type: none"> > Development of a new procedure to document the process to assess potential harm to Aboriginal sites > Improvements in waste management of Oil and Oil- Filled Assets
Bushfire FSA and Controls	<ul style="list-style-type: none"> > Review of 2018/19 fire season initiated improvements in systems, processes, reporting and capabilities > Development of enhanced key risk metrics to senior management and the Board > Enhancements to automated Bushfire work order reporting to working and manager level review forums
Public Safety FSA and Controls	<ul style="list-style-type: none"> > Update to the Power System Emergency Response Procedure to focus on management of network incidents > Initiation of a program to install additional CCTV at selected TransGrid sites
Reliability FSA and Controls	<ul style="list-style-type: none"> > Development of enhanced key risk metrics to senior management and the Board > Improved portfolio reliability risk modelling.

2.10 Design, construction and commissioning

Table 9 Design, constructions and commissioning

Performance measure	Current reporting period	Last reporting period	Two reporting periods ago	Three reporting periods ago	Four reporting periods ago
Designs for which Safety in Design (SiD) Reports have been completed	405	NA	NA	NA	NA
Designs for which Safety in Design (SiD) Reports have been audited	0	NA	NA	NA	NA
Project closeout reports completed	45	NA	NA	NA	NA
Project closeout reports audited	0 ³	NA	NA	NA	NA

³ TransGrid does not routinely audit project close out reports, but will periodically audit the process

2.11 Inspection (assets)

Table 10 Inspection (assets)

Performance measure	Inspection tasks		Corrective action tasks			Comments
	Annual target	Achieved	Tasks identified (all categories)	Open	Outstanding	
Transmission Substations	2533	2507 ⁴	5632	2697	59	
Transmission OH	2347	2338 ⁵	4639	1069	52	
Transmission UG	354	354	148	17	1	

2.12 Inspections (vegetation) Aerial/Ground based

Table 11 Inspections (vegetation) Aerial/Ground based

Bushfire risk category	Populations(span s/poles)	Target	Achieved	Outstanding	Comments
Aerial					
Mixed	37873	37873	37040	833	TransGrid's practice is to create vegetation aerial inspection tasks against a line, not individual spans. TransGrid does not identify the bushfire risk category against a line, only at an individual span level.
Total	37873	37873	37040	833	The outstanding structures are addressed by ground based inspections as noted below as aerial inspections weren't able to be completed

⁴ Out of 26 open work orders, 4 were closed after the reporting period, 3 were not completed within the cycle and the rest are to be completed.

⁵ Out of 9 open work orders, 1 was closed after the reporting period, 8 were not completed within the cycle and are to be completed.

Bushfire risk category	Populations(span s/poles)	Target	Achieved	Outstanding	Comments
Ground-based					
Mixed	-	833	826	7	<p>The 7 outstanding structures are of a de-energised/non-operational transmission line.</p> <p>The vegetation risk at the 7 structures is assessed to be of low plus the line is currently de-energised, so a vegetation ground inspection was determined as not required.</p>
Total	-	833	826	7	

2.13 Public electrical safety plans and activities

TransGrid continued to implement its Public Electricity Safety Awareness Plan (**PESAP**) during 1 October 2018 to 30 September 2019 period. The following programs and activities were undertaken to promote the public knowledge and understanding of electrical network safety hazards, and are targeted to a broad public spectrum on the basis of the key hazardous events identified in TransGrid's ENSMS:

- > Community and stakeholder engagement
- > Communication with property owners who have TransGrid's electricity transmission network infrastructure on their land
- > Communication with emergency services
- > Communication with public authorities
- > Dial Before You Dig service
- > Safety awareness and warning signage

The brief description of these programs with reference to hazard assessments that have identified the 'at risk' groups targeted by each program is provided in TransGrid's PESAP. All these are ongoing programs.

Specific campaigns are noted in the table below.

Table 12 Public electrical safety plans and activities

Network operator public safety programs / campaigns	Details
In June 2019 a campaign was held to engage with the wider community about the hazards of dumping or storing on TransGrid easements including impacts to the environment and the community as well as outlining the 15 metre obstruction clearance zone.	This campaign was advertised through Canberra based newspapers, social media and targeted to all areas.

2.14 Internal audits performed on any aspect of the ENSMS (as per AS 5577a clause 4.5.4)

Table 13 Internal audits performed on any aspect of the ENSMS

Audit scope	Identified non-compliances	Actions
TransGrid's compliance with requirements of Health, Safety and Environment Hot Work and Fire Risk Work procedure	Failure to adhere to hot work and fire risk procedures.	<ul style="list-style-type: none"> • Consider revising procedure to mandate the requirement of a FRACM (Fire Risk Assessment and Control Measures Form being completed prior to commencing all works being performed in Easements. • Review and update procedure to stipulate minimum document retention requirements • Conduct an assessment of TransGrid designated workshops welding bays compliance to the Safework Australia model code of practice for welding processes

2.15 External audits performed on any aspect of the ENSMS (as per AS 5577a clause 4.5.4)

Table 14 External audits performed of any aspect of the ENSMS

Audit scope	Identified non-compliances	Actions
The scope of this audit was to assess the extent to which the asset management system for TransGrid's network has been implemented and is effective in supporting the primary objective of TransGrid's ENSMS	No non-compliances were identified	Not applicable

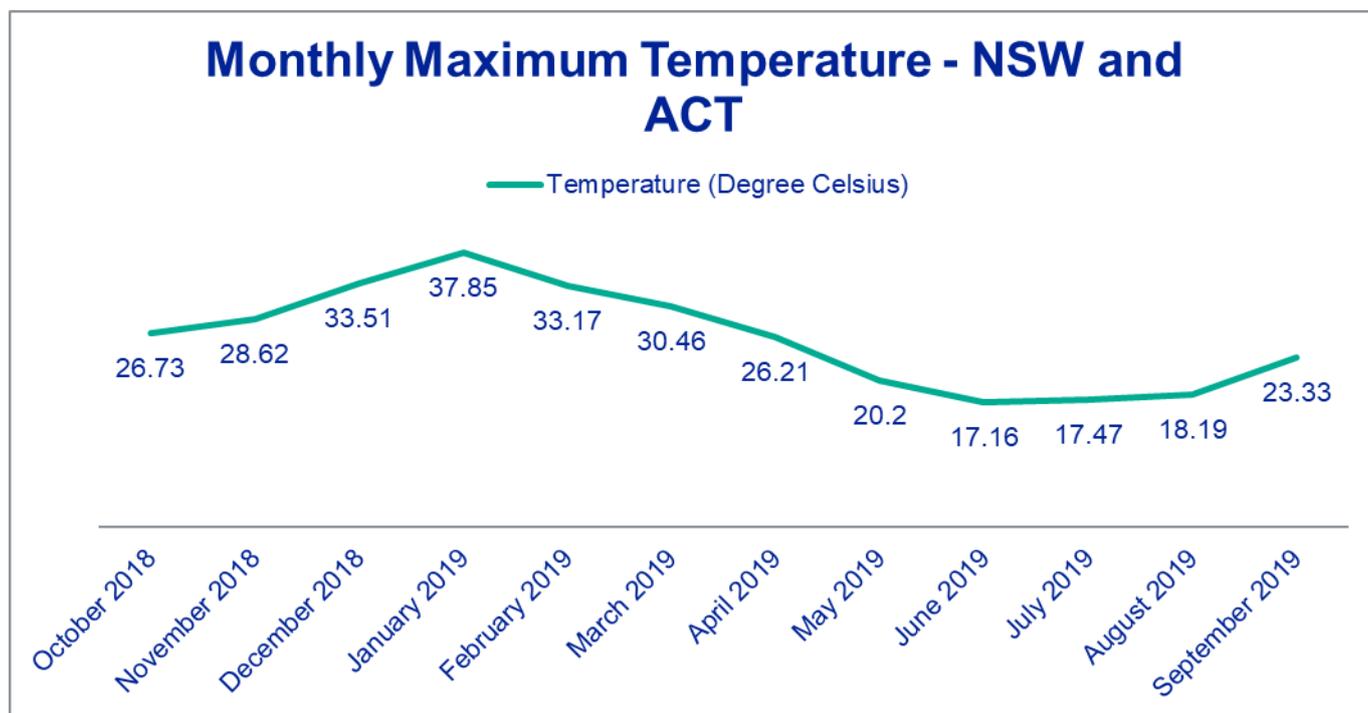
3. Bushfire Reporting

3.1 Bushfire risk profile across TransGrid’s supply area

Climate factors relating to bush fire risk include temperature, humidity, wind and the dryness of the landscape. These factors are reflected in Fire Danger Ratings and Total Fire Bans issued by the Rural Fire Service (RFS). Of these factors, historical data for maximum temperature is available from the Australian Government Bureau of Meteorology, as shown in Figure 1 and 2.

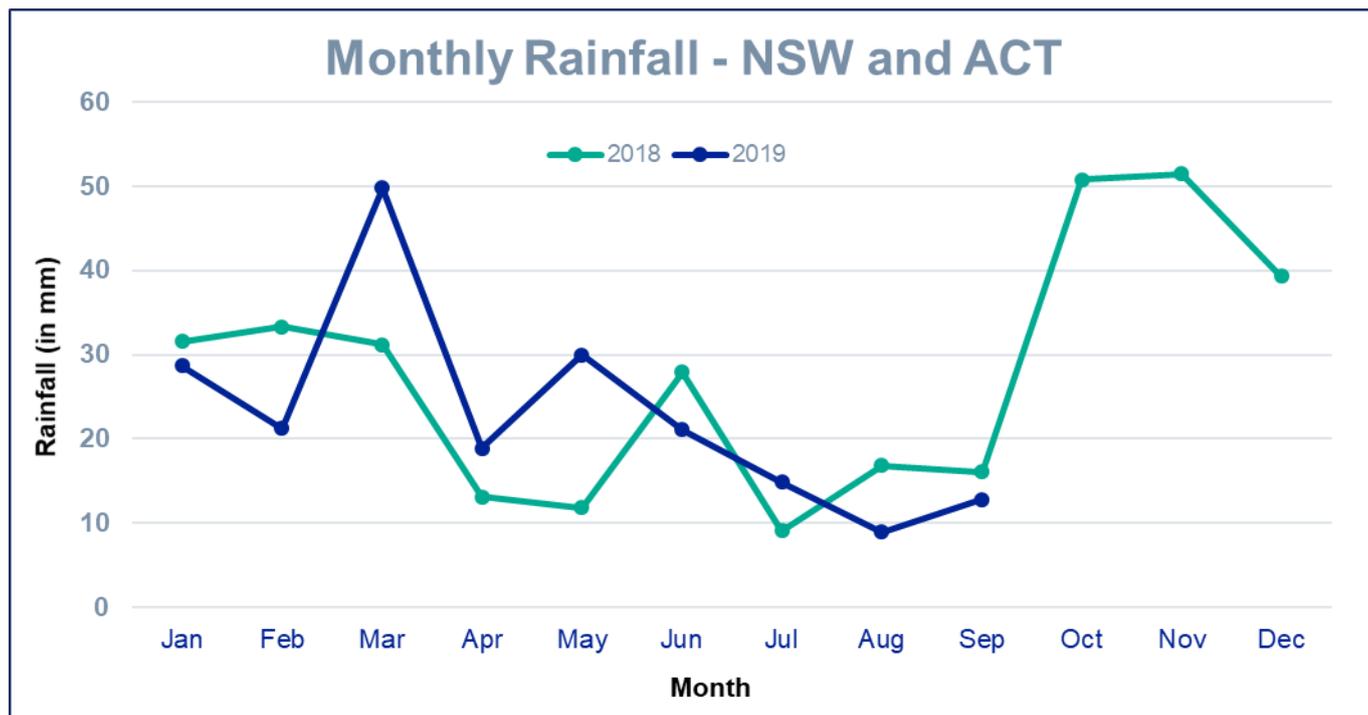
Figure 2

Figure 1 Monthly maximum temperature in the state of NSW and ACT⁶



⁶ Timeseries taken from <http://www.bom.gov.au/climate/change/#tabs=Tracker&tracker=timeseries>.

Figure 2 Monthly rainfall in the state of NSW and ACT



The bushfire risk profile across NSW and ACT related to transmission line spans, substations and communication sites is represented in the Figure 3 Figure 4 and Figure 5.

Figure 3 Transmission Line Span Bushfire Risk Profile

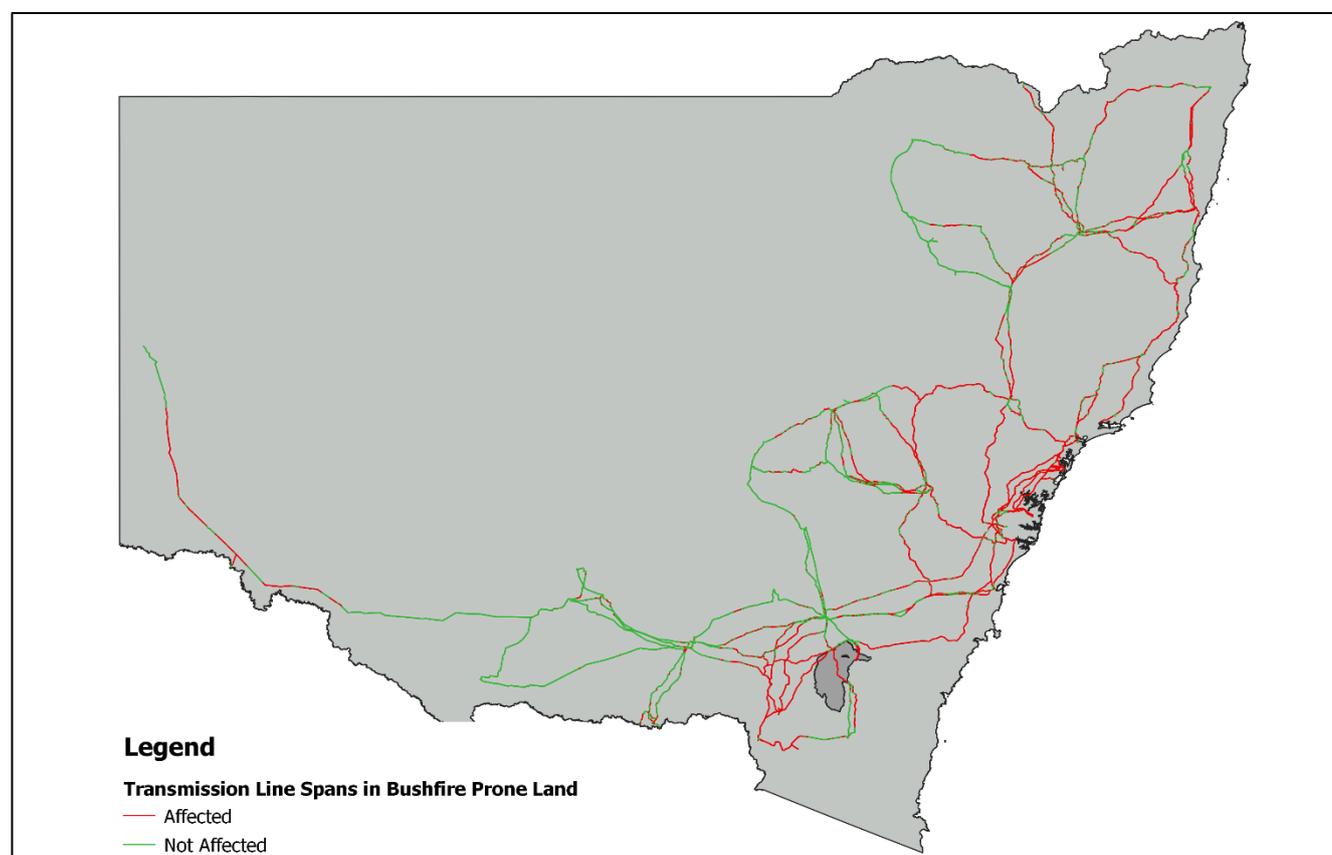


Figure 4 Substation Bushfire Risk Profile

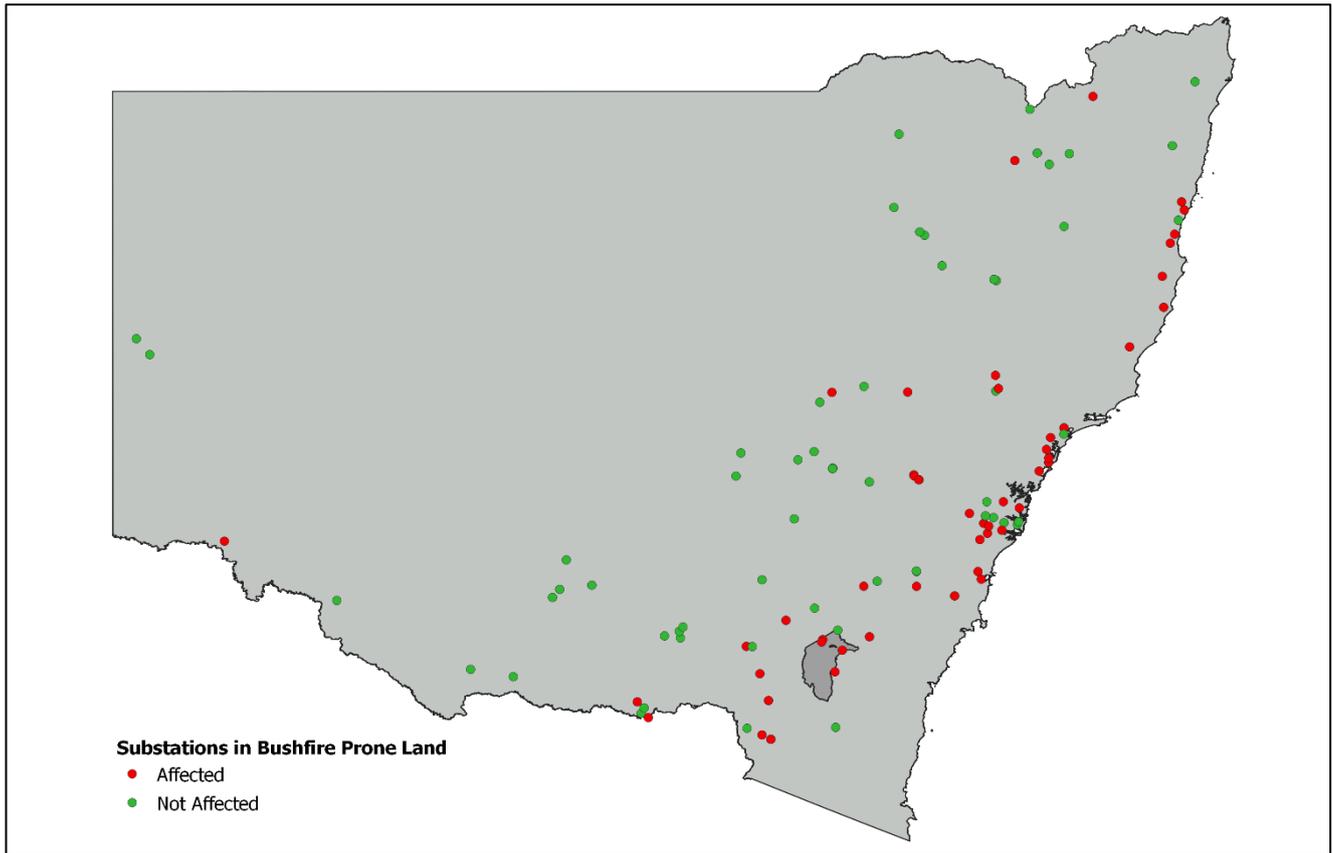
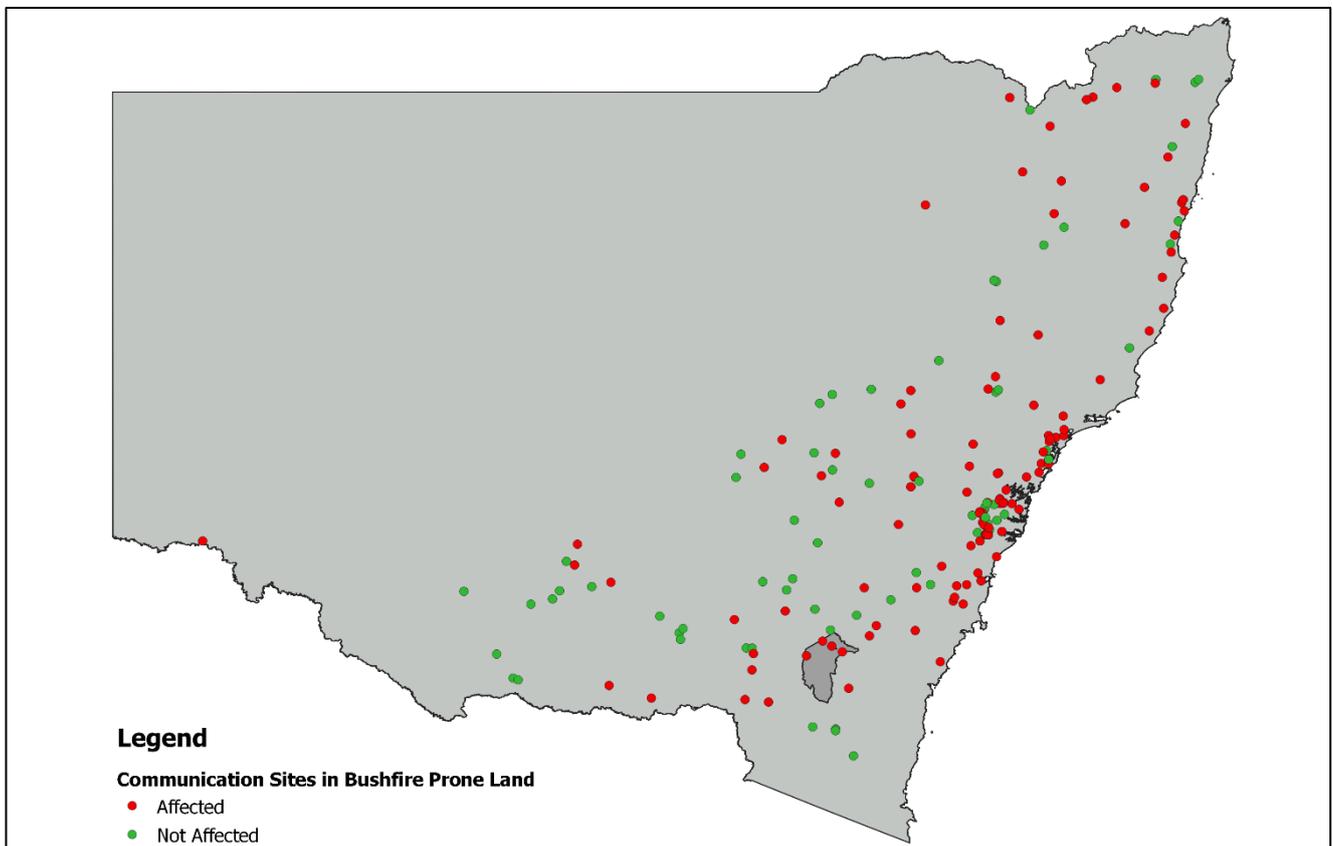


Figure 5 Communication Site Bushfire Risk Profile



3.2 Permanent / temporary declaration of areas by RFS and TransGrid's actions

Fire Areas 2, 6, 11 and 12 were declared as an early start 1 August 2019. The early start of the bushfire danger period was communicated by email to TransGrid delivery staff, including contractors, that schedule and deliver maintenance and construction work. The email reminded staff of the threats to bushfire risk when performing work on the assets, and the actions they need to take prior to commencing work in the affected Fire Area. For example, completing TransGrid fire risk assessment form that requests the staff to identify the weather conditions and appropriate controls to implement prior to commencing work.

Additionally, TransGrid published an internal article in the first week of September to communicate to all staff of the worsened weather conditions leading to many of the Fire Areas in the eastern seaboard having the bushfire danger period start before the 1st of October. The article reminded staff of TransGrid's process in managing bushfire risk when performing work on assets.

A bushfire risk assessment, as per TransGrid's Bushfire Risk Management Plan, was completed on work orders in the early start area that satisfy the below criteria:

- > Work orders are specific to managing the asset's bushfire risk exposure.
- > Work orders are on assets located in the affected Fire Area.
- > Work orders are open or outstanding.

The bushfire risk assessment is performed to provide assurance that TransGrid's bushfire risk exposure of assets is managed to as low as reasonably practicable.

The status of TransGrid's pre summer bushfire inspections is given below.

Table 15: Pre summer bushfire inspections

Pre-summer bushfire inspections	Population (spans / poles)	Target	Achieved	Outstanding	Comments
Inspections	37873	36076	36076	NA	The target count excludes 1797 structures that are part of 2 yearly inspection cycle as per Maintenance Plan – Transmission Lines

Table 16: Vegetation tasks

Bushfire risk category	Status	Encroachment Classification A1	Encroachment Classification A2	Encroachment Classification A3	Encroachment Classification A4	Hazard trees
Very High	Open	0	0	0	0	0
	Outstanding	0	0	0	0	0
High	Open	0	0	0	0	0
	Outstanding	0	0	0	0	0
Medium	Open	0	0	0	0	0
	Outstanding	0	0	0	0	0
Low	Open	0	0	0	0	0
	Outstanding	0	0	0	0	0
Very Low	Open	0	0	0	0	0
	Outstanding	0	0	0	0	0

Table 17: Asset tasks

Asset Category	Status	Within bushfire prone areas					Outside bushfire prone areas				
		Work order priority 1 24 hours	Work order priority 2 1 month	Work order priority 3 3 months	Work order priority 4 12 months	Work order priority 5 Next outage/ maintenance	Work order priority 1 24 hours	Work order priority 2 1 month	Work order priority 3 3 months	Work order priority 4 12 months	Work order priority 5 Next outage/ maintenance
Substation	Open	0	0	2	0	2	0	1	0	3	4
	Outstanding	0	0	1	0	0	0	0	1	0	0
Transmission Line	Open	0	0	19	120	22	0	6	23	155	26
	Outstanding	0	0	7	0	1	0	6	12	0	1
Automation	Open	0	0	0	0	0	0	0	0	0	0
	Outstanding	0	0	0	0	0	0	0	0	0	0
Network Property	Open	0	1	1	0	0	0	0	0	0	0
	Outstanding	0	0	0	0	0	0	0	0	0	0

3.3 TransGrid Comments

3.3.1 Table 1 - Pre-summer bushfire inspections

The Maintenance Plan – Transmission Line Assets (**the Plan**) states the frequency of aerial inspections for lines in NSW. If an aerial inspection was not completed, a ground inspection is performed in accordance with the Plan.

A review was performed to validate the aerial inspection or ground inspection of in-service lines required during the reporting period. The review found that lines that require a yearly inspection, and lines that have a 2 yearly inspection that falls in this reporting period, were completed by either aerial inspection or ground inspection.

3.3.2 Table 2 – Vegetation tasks

IPART's bushfire risk category is interpreted as TransGrid's vegetation risk category. Each span in the network is categorised into one of five vegetation risk categories.

- > Very High
- > High
- > Medium
- > Low
- > Very Low

TransGrid's vegetation management practice is to identify vegetation encroachment into the total sum of the expected growth rate of the vegetation and the minimum safe working distance. Any encroachment within this envelope is treated as a Planner Priority 01 – Within 24 hours (P1). Consequently, no open or outstanding vegetation work orders met the IPART criteria, as TransGrid does not perform vegetation management based on degree of encroachment. During the reporting period, only two P1 vegetation defect work orders were created and closed as completed.

A dedicated maintenance program was developed to identify and treat hazard trees on and off easement. During the reporting period, 144 work orders were created to treat hazard trees on and off easements. All 144 work orders were closed as completed before the end of the reporting period. As a result, zero open/outstanding work orders to address hazard trees is reported.

3.3.3 Table 3 - Asset tasks impacting bushfire risk

Substation and Transmission Line asset groups reported the total of 29 outstanding work orders, which will be addressed using a bushfire risk based prioritisation process outlined in TransGrid's Bushfire Risk Management Plan to ensure they are closed before the due date.

TransGrid's bushfire risk based prioritisation process is used to appropriately schedule the open and outstanding asset defects to ensure the bushfire risk is managed as low as reasonably practicable during the bushfire danger period.