



Silverton Wind Farm Fire Management Plan

FINAL REPORT

Prepared for GE Renewable Energy

29 April 2021

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- Julian Turner (mapping)

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Contents

1	First response summary	5
2	Introduction	6
2.1	Background	6
2.2	Approval conditions	6
2.3	Purpose	7
2.4	Relationship to other documents	7
2.5	Document procedures	8
2.6	Plan review and amendment.....	8
3	Legislative framework.....	10
3.1	Rural Fires Act 1997.....	10
3.2	West Darling Bushfire Management Plan 2011.....	10
3.3	Environmental Planning & Assessment Act 1979.....	11
3.3.1	Planning for Bushfire Protection	11
3.4	Environment Protection & Biodiversity Conservation Act 1999.....	12
3.5	Biodiversity Conservation Act 2016	12
3.6	Electricity Supply Act 1995 & Electricity Supply (Safety and Network Management) Regulation 2014	12
3.7	Vegetation management in the vicinity of electrical assets	12
4	Assets and risks	14
4.1	Climate and bushfire season.....	14
4.2	Economic assets.....	14
4.2.1	Overview	14
4.2.2	Risks	16
4.2.3	Minimising risk of ignition at STWF	16
4.3	Environmental assets.....	17
4.3.1	Overview	17
4.3.2	Risks	19
4.3.3	Identified fire thresholds for environmental assets.....	19
4.4	Cultural	20
4.4.1	Assets.....	20
4.4.2	Risks	20
4.4.3	Assessment of bushfire consequence cultural assets.....	22
4.5	Fire-fighting risks.....	24
5	Bushfire management zones	25
5.1	Asset Protection Zones.....	25
5.2	Strategic Fire Advantage Zones	25
5.3	Land Management Zone.....	26

5.4	Fire Exclusion Zone.....	27
6	Bushfire Preparedness	28
6.1	Roles and responsibilities – fire preparedness	28
6.2	Alarm system	28
6.3	Evacuation plan	29
6.4	Emergency evacuation routes	29
6.5	Assembly points	29
6.6	Site entry, exit and gates	31
6.7	Command centre	31
6.8	Corporate information	31
6.9	Training	31
6.9.1	Evacuation/emergency drills	31
6.9.2	Other training.....	31
6.10	Resources	32
6.10.1	On site equipment	32
6.10.2	Internal suppression systems and other specialist resources.....	32
6.10.3	Other water resources.....	32
6.10.4	Other general equipment	32
6.11	Chemical storage and handling.....	32
6.12	Hot works	32
6.13	Inspections	33
6.13.1	Housekeeping checklists	33
6.13.2	Fire detection system	33
6.13.3	Access, water supplies and weeds	33
6.13.4	Fire preparedness review.....	33
7	Emergency response.....	34
7.1	Chain of command	34
7.1.1	Silverton Wind Farm staff.....	34
7.1.2	Local FRNSW and RFS.....	35
7.2	Liaison with the emergency fire services.....	35
7.3	Fire response actions	36
7.4	End of emergency.....	38
7.5	Considerations post-fire.....	38
7.5.1	Contaminated fire-fighting water	38
7.5.2	Dealing with the media.....	38
7.5.3	Salvage.....	38
	References.....	39

Appendices	41
Appendix 1 Condition compliance.....	42
Appendix 2 Threatened fauna species	48

Tables

Table 1 Immediate fire response summary.....	5
Table 2 Silverton Wind Farm contacts in case of fire.....	5
Table 3 Risk for environmental assets.....	19
Table 4 Fire thresholds for environmental assets.....	19
Table 5 Cultural assets of the study area considered sensitive to fire.....	20
Table 6 Bushfire consequence for cultural assets	22
Table 7 Requirements for wind farm APZ establishment and maintenance (NSW RFS 2019).....	26
Table 8 Fire response checklist.....	36
Table 9 Responses for specific fire types	37

Figures

Figure 1 Location of the study area	9
Figure 2 Silverton Wind Farm infrastructure and vegetation.....	15
Figure 3 Ecological assets of Silverton Wind Farm	18
Figure 4 Cultural assets of Silverton Wind Farm considered sensitive to fire	23
Figure 5 Site access and fire response assets	30

1 First response summary

Table 1 Immediate fire response summary

Step	Action
Step 1	STAY CALM—assess the situation: • Check for danger – ensure safety of personnel. • Evacuate the immediate area. • Obtain information about the type and nature of the fire, including the direction of travel. • Document the exact location, reporting staff member, date and time. In the case of a fire in a turbine, substation, transformer, or any out of control fire, notify FRNSW immediately (as per Step 4).
Step 2	Enact any specific immediate fire procedures outlined in Table 9
Step 3	Contact Site Manager - Michael Brownlie (if not available, Site EHS Co-ordinator – Alana Philp) Advise location and type of fire (including direction of travel of a bushfire incident) and whether emergency services have been contacted. Leadership from Site Manager / Site EHS Co-ordinator must remain visible throughout.
Step 4	Call 000–Police, Fire, Ambulance, and other relevant personnel and STWF staff.
Step 4	Site Manager / Site EHS Co-ordinator to ensure personnel available to direct emergency personnel through the site from the locked gate . Keep personnel away from the area and out of the path of responding emergency vehicles.
Step 5	Fire response guidelines activated, checklists consulted (Section 7)

Table 2 Silvertown Wind Farm contacts in case of fire

Role	Name	Contact
Site Manager Site Crisis Management Team Leader (Emergency Contact)	Michael Brownlie	+61 447 513 865 UHF Channel 26
Senior Service Manager	Mark Savenkov	+66 (65) 727 6221 Mark.Savenkov@ge.com
Fire / Leakage/ Spillages	All /any of the below: Silvertown Rural Fire Service Fire and Rescue NSW Police Ambulance	000 (02) 6836 1226 (08) 8087 2233 (08) 8087 0299 (08) 8080 1333
Medical Emergency	Ambulance	(08) 8080 1333
Utilities	Richard Armstrong (AGL)	+61 299 212 270
Medical	Hospital	(08) 8080 1333
SES	SES	132 500
Customer/client contact	Richard Armstrong (AGL)	+61 299 212 270

2 Introduction

2.1 Background

Biosis Pty Ltd was commissioned by GE Renewable Energy (hereafter referred to as GE) to develop a fire management plan (FMP) for the Silverton Wind Farm (STWF). The wind farm is located approximately 5 kilometres north of Silverton and 25 kilometres north-west of Broken Hill, in the Unincorporated Area of the Far West District of NSW (Figure 1). The turbines are located on the ridgelines in and around the Mundi-Mundi and Barrier Ranges.

The Silverton Wind Farm project is being undertaken by the Powering Australian Renewables Fund (PARF), a partnership between AGL, QIC and Future Fund. PARF has engaged GE to operate and maintain the STWF. TransGrid (Network Service Provider – NSW) has been engaged under the Project Agreement to deliver the connection works.

As STWF is within a designated bushfire prone area (NSW RFS n.d.), a FMP is required for the operational phase of the wind farm. This plan is provided to meet this obligation as well as address the approval conditions of the wind farm as they relate to fire and bushfire (Section 2.2).

This plan has been developed in consultation with Don Peters of Fire and Rescue NSW (FRNSW), and Silverton RFS were provided with an opportunity to comment on the draft report.

2.2 Approval conditions

In May 2009, the STWF project was granted approval (Approval) under the now repealed Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) by the then NSW Minister for Planning. Approval was granted for the construction of 282 wind turbines and associated infrastructure. This included Concept Approval for the construction, operation and decommissioning of up to 598 wind turbines and associated infrastructure.

The most recent modification (Modification 3) to the Approval was granted by the NSW Planning and Assessment Commission (PAC) on 22 December 2016 in accordance with Clause 8J(8) of the Environmental Planning and Assessment Regulation 2000 and the transitional arrangements of the EP&A Act. Due to advances in technology since the initial proposal in 2009, Modification 3 sought to decrease the maximum number of turbines to 167, while increasing the dimensions and capacity of each turbine. The current project involves the operation of 58 of these turbines.

This report seeks to minimise the risk of fire ignition and spread during operation of the wind farm. In particular, this plan has been prepared in accordance with:

- Concept approval - conditions 2.57 and 2.58 (08_0022 dated 24 May 2009).
- Modification 3 - approval condition 32 and Statements of Commitment (SOC) 113-120 (08_0022 MOD 3 dated 22 December 2016).
- Operational Biodiversity Adaptive Management Plan (Biosis 2018a) - management actions 1.9, 2.19 and 2.20.

A summary of the approval conditions and how they will be met during the operational phase of the wind farm can be found in Appendix 1.

2.3 Purpose

The overall aims of this FMP are to identify bushfire threat, assets at risk and to provide fire suppression measures and response protocols in the event of a fire originating at the wind farm or in the event of an external wildfire threatening the wind farm or nearby properties.

The objectives of this FMP are to:

- Identify economic, environmental and cultural assets at risk from bushfire.
- Minimise the risk of fire ignitions from wind farm assets.
- Avoid personal injury and asset damage, including adjoining property assets.
- Ensure fire suppression guidelines are in accordance with relevant legislation and plans including:
 - *Rural Fire Act 1997*
 - *West Darling Bushfire Management Plan 2011*
 - *State Bushfire Plan 2017*
 - *Planning for Bushfire Protection 2019*
 - *Environmental Planning and Assessment Act 1979*
 - *Biodiversity Conservation Act 2016*
 - *Environment Protection and Biodiversity Conservation Act 1999.*
- Describe the emergency resources available on and off-site.
- Minimise damage to the environment in the case of bushfire.
- Outline and prioritise emergency response actions and responsibilities.

Guidelines provided within this plan have been prepared taking into account relevant legislative requirements (see Section 3 below) and biodiversity values outlined in the Silverton Wind Farm Operational Biodiversity Adaptive Management Plan 2018-2021 (Biosis 2018a).

Information relevant to this plan was obtained from the Silverton Wind Farm District Pre-Incident Plan (NSW RFS 2017), the Mumbida Wind Farm Fire Suppression Guidelines (STWFS 2013) and the Silverton Wind Farm - GE Site Emergency Response Plan (GE 2019).

2.4 Relationship to other documents

This document addresses the management activities associated with the prevention and suppression of any fire event on the site. It is to be read in conjunction with the Site Emergency Response Plan (ERP) (GE 2019), to which this plan will be appended.

Additionally, a number of reports have been prepared to document the environmental assets across STWF and inform management of these assets. As such, this plan has been developed with consideration of the following documents:

- Operational Biodiversity Adaptive Management Plan (Biosis 2018a).
- Barrier Range Dragon Management Plan (Biosis 2018b).
- Recovery Plan for Porcupine Grass Sparse Woodland (Biosis 2018c).
- Vegetation Management Plan (Biosis 2018d).

- Bird and Bat Adaptive Management Plan (Biosis 2018e).

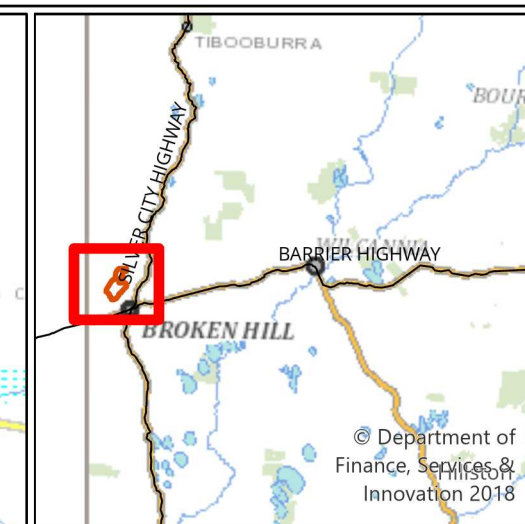
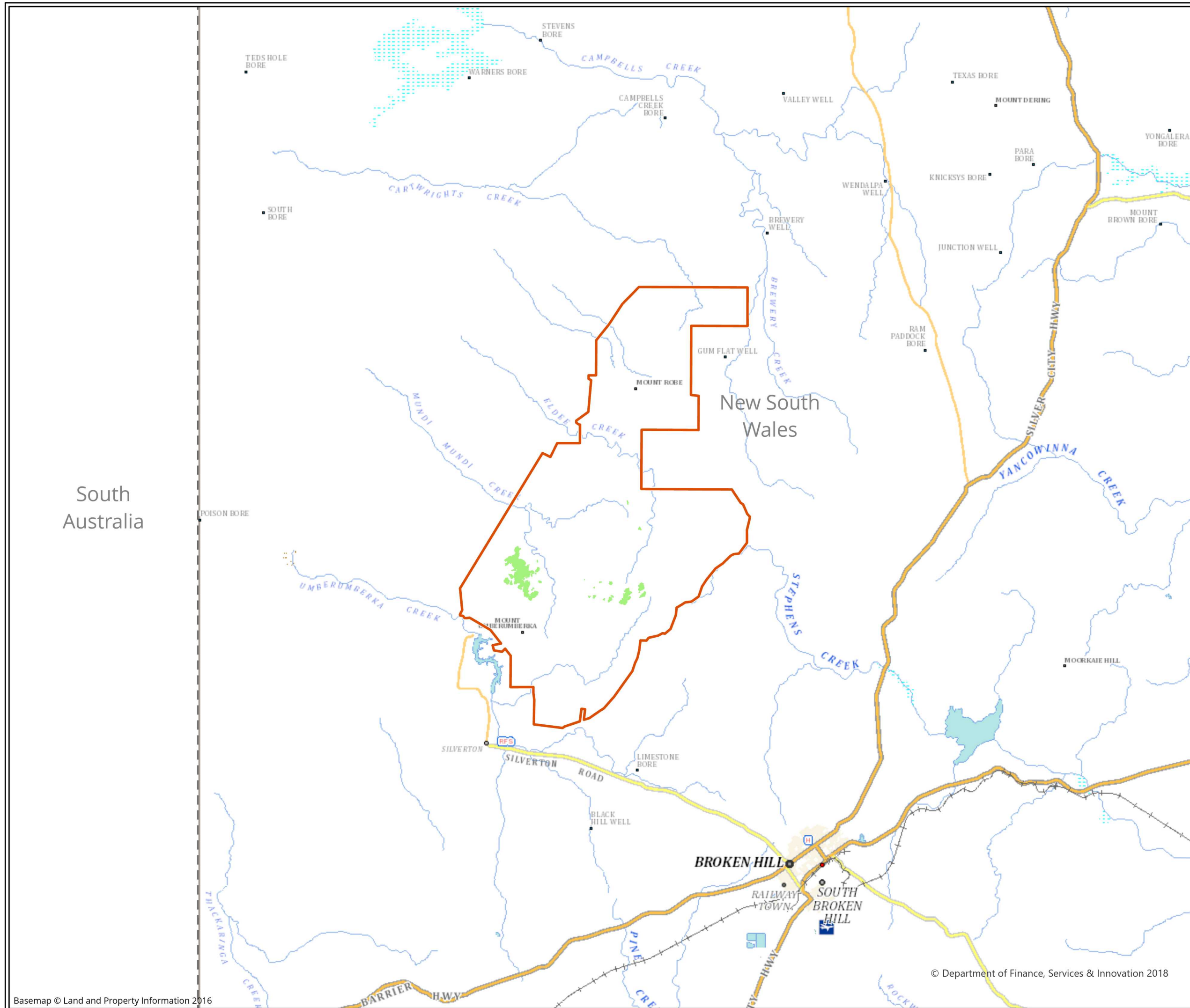
2.5 Document procedures

As outlined above, this FMP shall be maintained as a component of the ERP at STWF by the GE Site Manager/Client Representative/Environment, Health and Safety (EHS) Co-ordinator. These documents will be in a shared drive with a means of revision control. At least one up-to-date paper copy of the plan will be available in a central location at the Operations and Management (O&M) compound or safety notice board, in the event of a power outage or any other event that may limit access to a computer during an emergency.

Within two weeks of finalisation of any updated version of this plan, controlled copies should be distributed to FRNSW, the local RFS, local emergency response committee, and any other local emergency response agency that is expected to respond in a fire situation.

2.6 Plan review and amendment

This FMP will be reviewed annually in September as confirmed with DPIE as an amendment from the BAMP (Action 2.19). The plan will also be updated periodically throughout the operational phase of the wind farm. The plan will need to be revised whenever the ERP (GE 2019) is updated, the scope or methods of operational management of the wind farm change, or whenever the recommended bushfire management actions are found to be ineffective. Any new versions of the FMP will be submitted to FRNSW and the RFS for comment prior to finalisation.



Legend

- Study area
- Porcupine Grass Sparse Woodland

Figure 1 Location of Silverton Wind Farm, NSW



Scale: 1:250,000@ A3
Coordinate System: GDA 1994 MGA Zone 54



Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

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Matter: 29736
Checked by: RFW, drawn by: ARL
Last edited by: jturner on 28 May 2020
Location: P:\26300s\26380\Mapping\26380_PGWSW_GMP

3 Legislative framework

A summary of the key legislation, policies and plans of relevance to the wind farm is outlined below.

3.1 Rural Fires Act 1997

The *Rural Fires Act 1997* (RF Act) provides for the management of the RFS, the preparation of draft bushfire management plans, the classification of bushfire prone land and the requirement for bushfire hazard reduction.

The wind farm is located in a bushfire prone area (NSW RFS n.d.). As an occupier of the land, GE has a duty under Section 63(2) of the RF Act to prevent the occurrence of bushfires and minimise the danger of the spread of bushfires on the land that they manage.

As the occupier, in accordance with Section 64 of the RF Act, if a fire is burning on any land at any time during a bushfire danger period (October to March) GE must:

- Immediately take all possible steps to extinguish the fire.
- If unable to extinguish the fire without assistance, ensure that the fire is reported immediately to the 000 emergency telephone number.
- Take the notified steps (as set out in this FMP) and any other practicable steps to prevent the occurrence of bushfires on, and to minimise the danger of the spread of bushfires on and from that land.

Additionally, GE is to be aware of operations that may be carried out on days of Total Fire Ban and any prohibited activities or exemptions that are notified by the Commissioner of the NSW RFS under Section 99 of the RF Act.

The West Darling Bushfire Management Committee is responsible for implementing the bushfire risk management plan for the area that includes Silverton (Section 3.2 below).

No hazard reduction burning is planned or recommended for the STWF in accordance with the BAMP (Biosis 2018a).

3.2 West Darling Bushfire Management Plan 2011

The West Darling Bushfire Management Plan (BFMP) (WDBFMC 2011) was prepared by the West Darling Bushfire Management Committee (BMFC) as required under Section 52 of the RF Act. A BFMP is a strategic document that identifies community assets at risk, assigns a relative risk rating and identifies treatment options to reduce risk. The main aim of the BFRMP is to reduce the number of human-induced bushfire ignitions that cause damage to life, property or the environment.

Under the RF Act, the West Darling BFMC is required to have regard to the principles of ecologically sustainable development (ESD) in the preparation of a BFMP. For example, a plan might prohibit the use of fire due to its effect on threatened flora and fauna.

In accordance with Section 52(2) (b), the BFMP must be reviewed and updated every five years.

This FMP for the STWF has considered the BFMP in its approach.

3.3 Environmental Planning & Assessment Act 1979

The EP&A Act governs land use planning and development in NSW. It provides for the proper management, development and conservation of natural and artificial resources for the purpose of promoting the social and economic welfare of the community and the environment. Under Section 10.3(3) of the EP&A Act, land recorded as bushfire prone land on a bushfire prone land map is considered bushfire prone land for the purposes of this or any other Act.

All new development applications on bushfire prone land must comply with Planning for Bushfire Protection (PBP), see Section 3.3.1 below.

3.3.1 Planning for Bushfire Protection

The aim of Planning for Bushfire Protection (NSW RFS 2019) (PBP) is to use the NSW development assessment process to provide for the protection of human life and minimise impacts on property from the threat of bushfire, while having regard to development potential, on-site amenity and protection of the environment.

Planning for Bushfire Protection contains specific provisions regarding wind and solar farms (in Section 8.3.5 of that document) and these should be applied at the wind farm. These provisions relate to the clearance of combustible vegetation, as well as firefighting access and water.

The following should be implemented:

- A minimum 10 metre Asset Protection Zones (APZs) for the structures and associated buildings/infrastructure (excluding road, power and other services to the site and associated fencing).
- The APZs must be maintained to the standard of an Inner Protection Area (IPA) for the life of the development.
- Essential equipment should be designed and housed to minimise the impact of bushfires on the capabilities of the infrastructure during bushfire emergencies and not serve as a bushfire risk to surrounding bush.
- A Bushfire Emergency Management and Operations Plan should identify all relevant risks and mitigation measures associated with the operation of the wind farm including:
 - Detailed measures to prevent or mitigate fires igniting.
 - Work that should not be carried out during total fire bans, including any that are notified by the Commissioner of the NSW RFS under the RF Act s.99.
 - Availability of fire-suppression equipment, access and water.
 - Storage and maintenance of fuels and other flammable materials.
 - Notification of the local NSW RFS Fire Control Centre for any works that have the potential to ignite surrounding vegetation, proposed to be carried out during a bush-fire fire danger period to ensure weather conditions are appropriate.
 - Appropriate bushfire emergency management planning.

GE must be aware of any prohibited activities or exemptions on days of Total Fire Ban that are notified by the Commissioner of the NSW RFS under the RF Act s.99.

This plan has been developed to meet the Bushfire Emergency Management and Operations Plan requirements outlined above for the operational phase of the wind farm.

3.4 Environment Protection & Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection & Biodiversity Conservation* 1999 (EPBC) Act is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places as defined in the Act as matters of national environmental significance. A number of species recorded from or potentially occurring within or near the wind farm are listed under the EPBC Act (Appendix 2).

The preparation of this FMP considers threatened species and communities as required for bushfire risk management plans under the RF Act.

3.5 Biodiversity Conservation Act 2016

The NSW *Biodiversity Conservation Act* 2016 (BC Act) provides for the conservation of threatened species, populations and ecological communities of flora and fauna. It sets out a number of specific objects relating to the conservation of biological diversity and the promotion of ecologically sustainable development (ESD).

Although exemptions relating to emergency firefighting activities, emergency bushfire hazard reduction work and managed bushfire hazard reduction activities under the RF Act apply, managed bushfire hazard reduction activities must still be undertaken in accordance with the principles of ESD and consider threatened species and threatened species habitat.

In particular, this FMP addresses fire management for the critically endangered Porcupine Grass Sparse Woodland (PGSW) and the endangered Barrier Range Dragon at STWF.

3.6 Electricity Supply Act 1995 & Electricity Supply (Safety and Network Management) Regulation 2014

The Electricity Supply Act 1995 & Electricity Supply (Safety and Network Management) Regulation 2014 (Electricity Supply Act) contains requirements for maintaining vegetation and outlines the powers of a distributor to ensure trees do not cause interference with electricity assets. The Electricity Supply Regulation is the regulation specified by the Act regarding management of vegetation by a network operator.

GE has operational responsibility for all electrical equipment downstream of the 33KV Bus side connection of Isolators A154, A159 and A160, which occurs at the substation on-site.

TransGrid has operational responsibility for all electrical equipment from the 33 kV connection point (Network boundary). As such, TransGrid is responsible for protection of these assets and the maintenance vegetation, including the connection and beyond.

3.7 Vegetation management in the vicinity of electrical assets

Vegetation management adjacent to electricity assets at the STWF is required to meet the standards outlined in *ISSC3 Guide for the Management of Vegetation in the Vicinity of Electricity Assets and the Code of Practice*. (ISSC 2016). This guide provides a standard set of vegetation clearances to be maintained for vegetation in the vicinity of Electricity Assets to:

- Minimise danger to the public posed by trees in close proximity to power lines.
- Improve system reliability by reducing vegetation related interruptions to the electricity supply.
- Reduce the risk of fires caused by trees coming into contact with electricity wires.

- Minimise environmental impact.
- Reduce the risk of vegetation causing damage to, or interfering with power lines.
- Provide an approach consistent with industry practices and legal requirements.

At STWF, the majority of energy transmission occurs underground, minimising fire risk and the area required for management.

It is GE's responsibility to monitor the clearance between any power lines and vegetation, to ensure the clearance space is free of vegetation at all times in accordance with Section 5.1. Where the management of vegetation is required, an appropriately qualified contractor should be engaged to undertake the work.

4 Assets and risks

Important community assets considered to be at risk from bushfire in the West Darling BFRMP include human settlement and economic, environmental and cultural assets. The nearest human settlement is the town of Silverton. As it is located south-west of the wind farm, it is considered to be at low risk from a fire that may ignite at the wind farm. Therefore only the economic, environmental and cultural assets are considered below.

4.1 Climate and bushfire season

The West Darling BFMC area is characterised by a hot, arid climate with the driest months usually from May to September. There is significant variation in rainfall, which is often unreliable with long periods of low rainfall and drought a natural feature of this district. The bushfire season runs from October to March but it is unusual to have major fires until well into November or December (WDBFMC 2011).

Prevailing weather conditions associated with the bushfire season in the West Darling BFMC area are hot dry days with temperatures often exceeding 40 °C, humidity of less than 10% and dry westerly winds. There are frequent dry electrical storms during the bushfire season.

Bushfires on a large scale are an irregular occurrence in the West Darling Rural Fire District. Such events usually only occur after a prolonged period of above average rainfall leading to vegetation growth in otherwise sparsely vegetated areas. Such conditions occurred in 1950-51, 1955-56, 1975-76 and 1984-85. These large scale bushfires usually originate from electrical storms associated with hot, dry north westerly winds. There have been no recent significant fire events in the Broken Hill area (2020 Pers. comm. D Peters, 11 Feb).

4.2 Economic assets

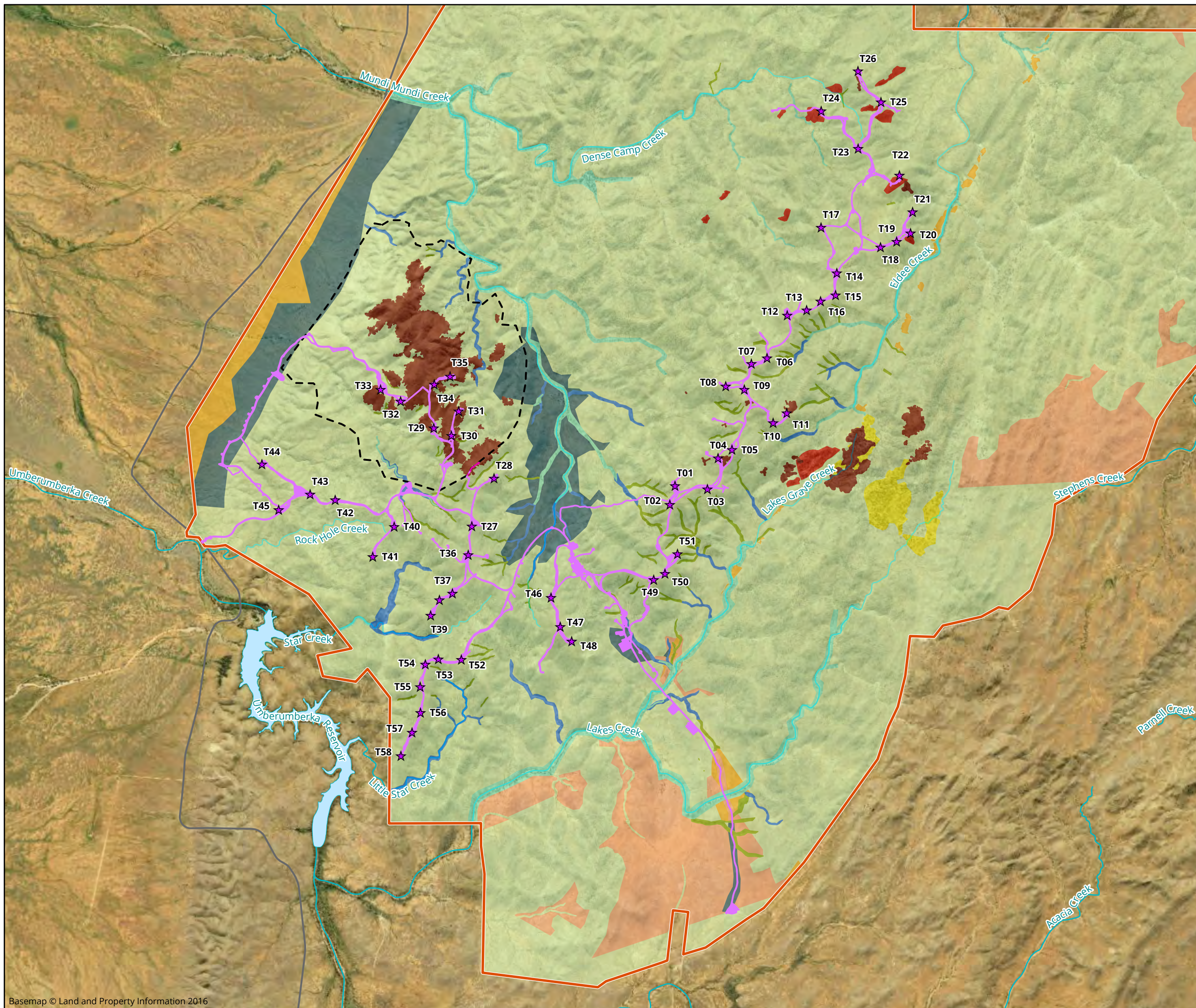
4.2.1 Overview

Generally, the economic assets described within the West Darling BFRMP (WDBFMC 2011) are considered to be low risk. However, the Plan is dated 2011 and does not identify the wind farm as an economic asset. The wind farm will generate 780,000 megawatt hours (MWh) of renewable electricity each year and is the seventh largest wind farm in Australia. This energy will power approximately 136,000 average Australian homes (AGL n.d.).

The site comprises a wind farm with its associated infrastructure including: 33kV switchyard, Collector System, electrical infrastructure, on-site control room, maintenance facilities, access roads and upgrades to adjacent off site roads (public roads) (Figure 2). It comprises:

- 58 wind turbines, each with three blades mounted on a tubular steel turbine and a generator transformer inside. These have a combined power generation capacity of 199 megawatts (MW).
- Electrical connections between wind turbines and the site substation through approximately 30 kilometres of 33 kilovolt (kV) underground power cables, and approximately 19 kilometres of overhead cables.
- One substation in a central location within the wind farm.

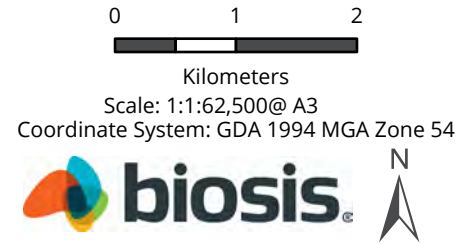
The wind farm's electrical power is then aggregated and finally delivered to Broken Hill Substation through approximately 25 kilometres of 220 kV overhead transmission lines.



Legend

- VMP area
 - Goat fence
 - Infrastructure
 - Pre-existing road
 - Turbine
- Management zone / Vegetation community**
- MZ1: Black Bluebush Shrubland (PCT153)
 - MZ2: Black Oak – Western Rosewood – Blue Bush/Saltbush (PCT60)
 - MZ3: Bluebush shrubland (PCT155)
 - MZ4: Chenopod shrubland (PCT156)
 - MZ5: Chenopod – Red Mallee Woodland/shrubland (VEG2)
 - MZ6: Mulga-Dead Finish (PCT123)
 - MZ7: Mulga/Red Mallee Shrubland (VEG1)
 - MZ8: Porcupine Grass Sparse Woodland (PGSW) (PCT359)
 - MZ9: Prickly Wattle open shrubland (PCT136)
 - MZ10: River Red Gum Woodland of rocky creeks (PCT234)
 - MZ11: River Red Gum Open Woodland of intermittent watercourses (PCT41)

Figure 2 – Infrastructure, vegetation and management zones



4.2.2 Risks

Overall, economic assets in the Silverton area are considered by the West Darling BFRMP to be low risk (WDBFMC 2011).

Economic assets in this area would be most at risk from Class 2 and 3 grass fires (NSW RFS 2017a). A Class 2 bushfire involves more than one agency and where the Bushfire Management Committee have appointed a person to take charge of fire-fighting operations. A Class 3 bushfire is a major bushfire where an appointment has been made by the NSW Rural Fire Service Commissioner under the provision of Section 44 of the RF Act.

The risk of fire ignitions at wind farms can be associated with malfunctioning turbine bearings, inadequate crankcases lubrication, cable damage through rotation and/or electrical shorting or arcing occurring in transmission and distribution facilities (CFA 2007). Potential ignition sources are provided by a combination of heat and flammable fuels housed within the wind turbine nacelle. As a result, the turbine nacelle provide the highest risk of ignition on the wind farm.

The potential impact to power transmission is low, as power transmission is located within the turbines and underground to the transformers (CFA 2007). Additionally, GE has the capacity to isolate turbines during an emergency event.

4.2.3 Minimising risk of ignition at STWF

Section 8.3.5 of PBP 2019 recommends that a bushfire emergency management and operation plan be prepared for wind farms that details measures to prevent fires igniting during the farms' operation, including:

- Detailed measures to prevent or mitigate fires igniting (this report).
- Work that should not be carried out during total fire bans (Section 6.12), including notification of the local RFS Fire Control Centre for any works proposed to be carried out during a fire danger period that have the potential to ignite surrounding vegetation, to ensure weather conditions are appropriate.
- Availability of fire-suppression equipment, access and water (Section 6.10).
- Storage and maintenance of fuels and other flammable materials (Section 6.11).
- Appropriate bushfire emergency management planning (Section 7).

Furthermore, Statements of Commitment (Appendix 2) outline the measures that STWF intends to take with regard to minimising ignition risks, including:

- To consult with the RFS and NSWFB in regard to the bushfire prevention measures to be implemented on site during operation (e.g. hot-work procedures) (Section 6.12).
- To handle and store flammable materials and ignition sources brought onto the site as per manufacturer's instructions (Section 6.11).
- To bund substation facilities with a capacity sufficient to contain the volume of transformer oil in the event of a major leak or fire and to maintain bunds to ensure that they remain clear and that leaks do not present a fire hazard (Section 6.11).
- To maintain the gravel and concrete areas surrounding substations free of vegetation to prevent the spread of fire from the substation and reduce the impact of bushfire on the structure (Section 5.1).

The bushfire management requirements and responsibilities for the operational phase of STWF are detailed in Appendix 1, which includes processes for documenting compliance.

4.3 Environmental assets

4.3.1 Overview

As outlined in the Silverton Wind Farm Vegetation Management Plan (Biosis 2018d), number of national and state listed threatened species have been recorded or potentially occur at the site. The critically endangered Porcupine Grass Sparse Woodland (PGSW) (BC Act) and the endangered Barrier Range Dragon (BC Act) are key environmental assets that occur at the wind farm and are subject to management in accordance with the BAMP (Biosis 2018a), PGSW Recovery Plan (Biosis 2018c) and BRD Management Plan (Biosis 2018b).

Threatened flora

Three threatened plant species (listed under either the BC Act) have been identified as having the potential to be affected by the STWF works (NGH Environmental 2008a, NGH Environmental 2008b). These include: Showy Indigo *Indigofera longibractea*, Yellow-keeled Swainsona *Swainsona flavicarinata* and Creeping Darling Pea *Swainsona viridis*. Additionally, there are unconfirmed records of Purple Wood Wattle *Acacia carneorum* on the flats of the Mundi Mundi sandplain surrounding Silverton Wind Farm (Blore 2008). It has not been found on the hills. This species is listed as vulnerable under both the BC Act and the EPBC Act.

Two species of regional significance, Curly Mallee *Eucalyptus gillii* and White Cypress Pine *Callitris glaucophylla* have been recorded within the study area (NGH Environmental 2008a, NGH Environmental 2008b).

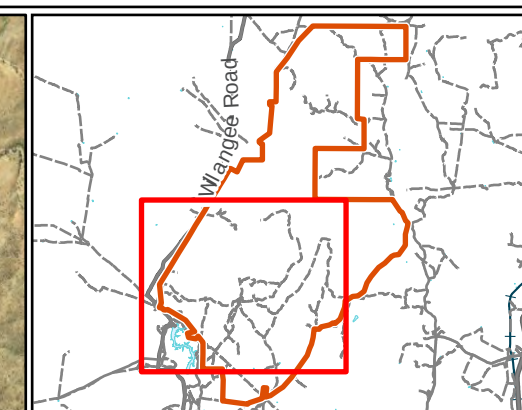
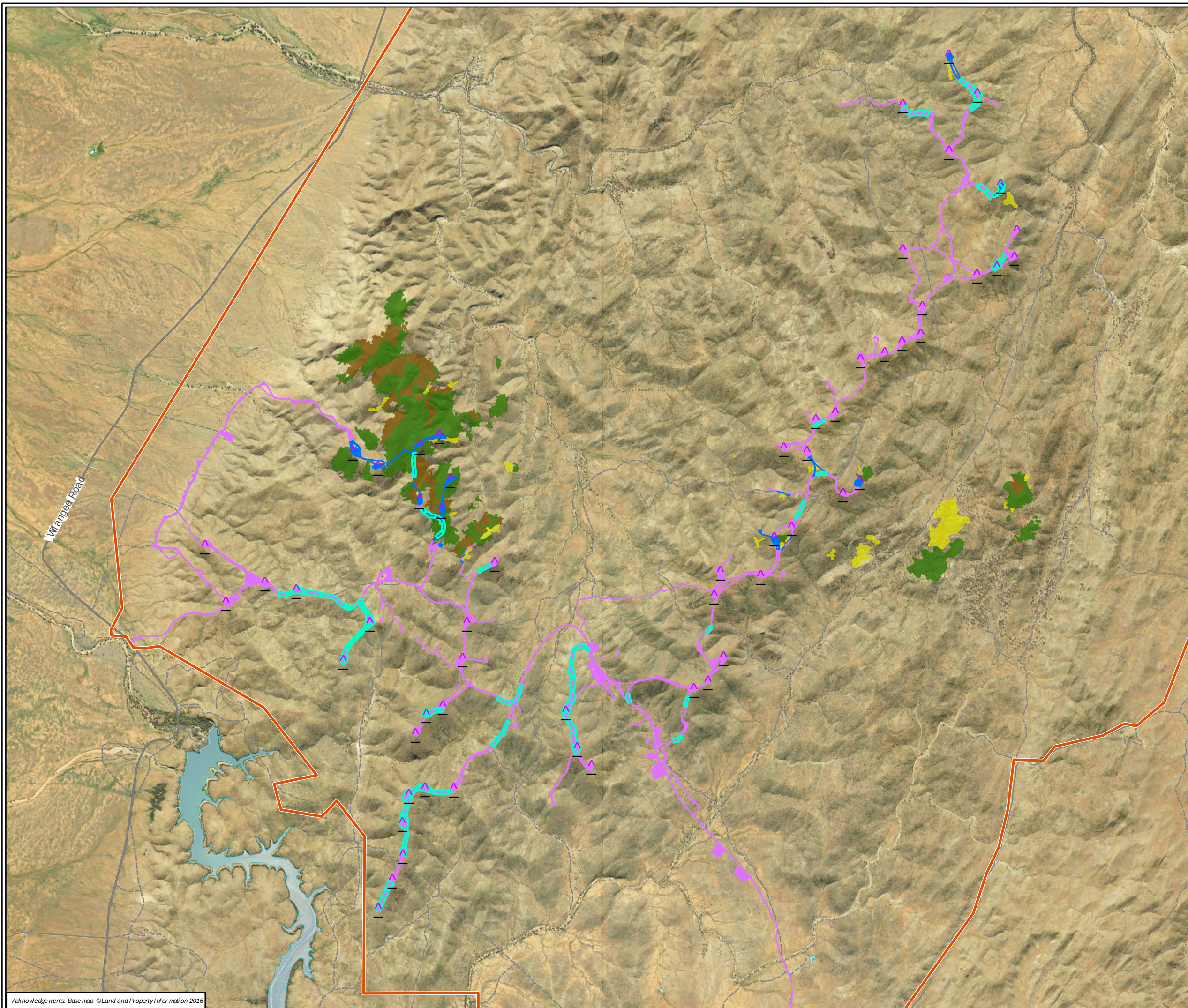
Significant vegetation communities

Significant vegetation communities within the STWF have been identified and described by NGH Environmental (2008a, 2008b, 2016) and Biosis (2018c). These include:

- Porcupine Grass - Red Mallee - Gum Coolibah hummock grassland / low sparse woodland on metamorphic ranges on the Barrier Range, Broken Hill Complex Bioregion – (PGSW) (PCT359) which is listed as a critically endangered ecological community (CEEC) (NSW Scientific Committee 2010) under the BC Act.
- Mulga / Red Mallee Shrubland on Rocky Slopes of the Barrier Range (an undescribed vegetation community).
- Chenopod – Red Mallee Woodland /Shrubland on Gravelly Lower Slopes (an undescribed vegetation community).

Threatened fauna

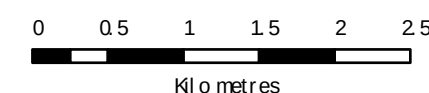
Twenty-three species of threatened vertebrate fauna have been recorded at the site or are considered likely to occur there. These are species listed under a category of threat under either or both of the BC Act and the EPBC Act. The threatened fauna species and their habitat types are detailed in Appendix 2. The species may be found outside these habitat types, but are most likely to be associated with the communities outlined. Key issues related to potential effects of the wind farm on significant fauna and management aimed at minimising impacts are addressed in detail in the Barrier Range Dragon Management Plan (Biosis 2018b) and the Bird and Bat Adaptive Management Plan (Biosis 2018e).



Legend

- Study area
- Turbine
- Roadside BRD habitat
- Infrastructure
- Infrastructure with PGSW downslope
- PGSW structural variants
- Porcupine grass with eucalypts
- Porcupine grass only
- Eucalypts only

Figure 3 Ecological assets of the study area



Scale 1:50,000 @A3
Coordinate System GDA 1994 MGA Zone 54



Matter: 28776
Date: 07 February 2020
Checked by: RFW Drawn by: JPT, Last edited by: jturner
Location: P:\28700s\28776\ Mapping\28776_Project.aprx

4.3.2 Risks

The risks for endangered and vulnerable flora and fauna species have been assessed in the West Darling area (WDBFMC 2011). These assessments are summarised in Table 3 below.

Table 3 Risk for environmental assets.

Asset type	Asset name	Likelihood	Consequence	Risk
Environment	Endangered flora and fauna	Likely	Moderate	High
Environment	Vulnerable flora and fauna	Unlikely	Major	Medium

Within STWF, PGSW and potentially eight endangered species (3 flora, 5 fauna) are considered to be high risk environmental assets. A further 19 vulnerable species (1 flora, 18 fauna) that have been recorded or potentially occur on the site are considered to be medium risk environmental assets.

4.3.3 Identified fire thresholds for environmental assets

The vegetation within the STWF has been identified as arid shrublands with a combination of chenopod and acacia sub-formations as per Table 3.3 in the West Darling BFRMP (WDBFMC 2011). These have been classified into fire threshold categories and are summarised in Table 4 below.

Therefore, fire should be avoided across the wind farm, and active fire suppression is required to protect PGSW (Section 4.3.1).

Table 4 Fire thresholds for environmental assets

Vegetation Formation	Minimum SFAZ ¹ threshold	Minimum LMZ ² threshold	Maximum threshold	Notes
Arid shrublands (chenopod sub-formation)	NA	NA	NA	Fire should be avoided
Arid shrublands (acacia sub-formation)	10 years	15 years	No maximum	Not enough data for a maximum fire threshold
Porcupine Grass Sparse Woodland	NA	NA	NA	Fire should be avoided

Note: SFAZ¹ - Strategic Fire Advantage Zone

LMZ² - Land Management Zone

4.4 Cultural

4.4.1 Assets

As detailed in the Operational Heritage Management Plan (Biosis 2018f), 471 Aboriginal and 24 non-Aboriginal heritage sites have been identified within or in close proximity to the wind farm.

4.4.2 Risks

The majority of these assets are of stone origin. Therefore, only five sites are considered sensitive to the impacts of fire, due to the presence of fire prone material, particularly wood. These are detailed in Table 5 below and mapped in Figure 4.

Table 5 Cultural assets of the study area considered sensitive to fire

Name Location	Description	Plates
Scarred Tree (EHP 2017) E 526378 N 6479803	The tree is a River Red Gum located in sandy soils in a creek bed with a diameter of 2.7 m. The scar is a shield scar which faces north and measures approximately 1.2 m in length and 32 cm at its widest point. The tree is located approximately 100 m east of an existing track.	 View of canopy of tree facing east  Left: View of scar. Right: Top of scar detail

Name Location	Description	Plates
SU94/HS1 Forge (Dibden 2008) E 526731 N 6480379	A blacksmiths forge adjacent to the remains of a road (SU93/HS1) that leads from Lakes Grave Creek to the mine workings on the ridgeline to the north. Includes a hollow tree stump (probably an introduced slab) adjacent the forge. Likely that this site relates to mining activities at the end of the nineteenth century.	 Remains of the wooden stump and forge hearth.
SU141/HS2 Stockyards (Dibden 2008) E 526751 N 6478690	A series of largely disused stockyards. The yards are constructed from a mixture of mulga and star picket posts with galvanised wire netting it is likely that the yards date to the middle of the twentieth century, possibly	 Stockyards, looking east
SU191/HS1 Building Platform (Dibden 2008) E 522296 N 6487120	This site comprises the well preserved remains of a shack that appears to date to the early to middle twentieth century. There is a rough windbreak of dead finish around the western and southern sides. There are six mulga posts in situ including four corner posts that are about 80 cm high and have pieces of wire still attached, there are also two central posts in the centre of the eastern and western ends that are 1.5- 2 m high. This site appears to be the remains of a miner's hut/tent from the first half of the twentieth century.	 Looking north. Note brush fencing in foreground and mulga posts at corners of platform
Zinc sintering works (Dibden 2008)	Remains of zinc sintering works. The site encompasses an area of approximately 2.4 ha and comprises remains of Silverton Tramway permanent way embankment, underground Umberumberka pipeline, and includes various wooden artefacts.	No plate available.

Name Location	Description	Plates
536100e 6465800n	These remains have been assessed to be historically significant as a site type that is relatively rare, well preserved and representative of particular technological processes	

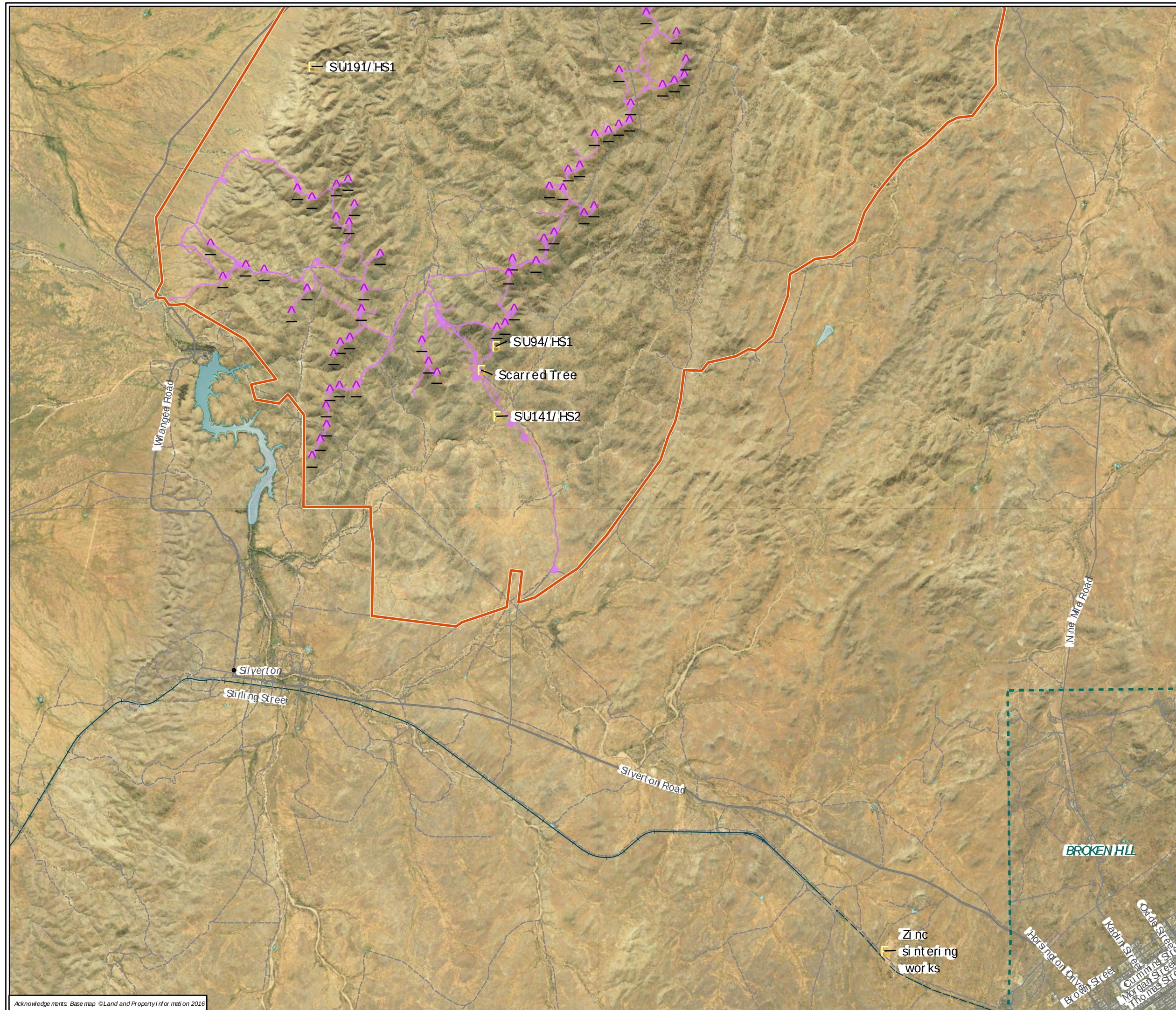
4.4.3 Assessment of bushfire consequence cultural assets

Bushfire consequence assessments of cultural assets are provided in Appendix 2 of West Darling BFRMP (WDBFMC 2011). These assessments are summarised in Table 6 below. For STWF, this includes sites of Aboriginal significance on private land.

To date, there has been no assessment of bushfire consequence for assets on non-Aboriginal cultural assets.

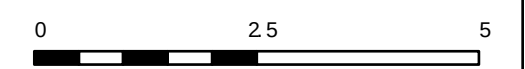
Table 6 Bushfire consequence for cultural assets

Asset name	Likelihood	Consequence	Risk
Aboriginal significance on private land	Likely	Minor	Medium
Non-Aboriginal sites on private land	Likely	Not assessed in West Darling BFRMP	Not assessed West Darling BFRMP



- Legend
- Study area
 - Infrastructure
 - Turbine
 - Asset for protection in a fire event

Figure 4 Cultural assets of the study area



Kilometres
Scale: 1:85,000 @ A3
Coordinate System: GDA 1994 MGA Zone 54



Matter: 28776
Date: 10 February 2020
Checked by: RFW Drawn by: JPT, Last edited by: jturner
Location: P:\28700sl\28776\ Mapping\28776_Project.aprx

4.5 Fire-fighting risks

The primary hazard within the STWF area is the generation of high voltage electricity, which excludes the use of conventional fire extinguishers. Therefore ANY fire suppression actions within the turbine, turbine or substation areas is to be managed under the direction of STWF personnel with support from FRNSW or the RFS.

The turbines produce 6 kV AC which is converted to 33kV in the basement of each turbine. This is subsequently converted at the substation adjacent to the O&M Site Office to 220 kV for transmission offsite. All turbines can be shut down in an emergency. This can occur at the turbine, in the office at the SCADA computer, or the Remote Operation Centre (ROC) in India can assist in the shutdown of the whole site down, individual turbines or certain strings of turbines.

Additional considerations include:

- Under no circumstance spray water on or near the turbine door or vents unless supervised to do so to avoid any risk of electric shock.
- All suppression action is to be outside the turbine and turbine to:
 - Contain fire from escaping if it is an internal ignition.
 - Prevent fire entering the area of the turbine if the fire activity is external.
- Should there be a fire in the nacelle or blades, ensure that personnel and appliances are not directly below to avoid injury from falling debris. Personnel will evacuate immediately and retreat as far away as they can safely.
- Steep slopes need to be considered when advising firefighting personnel on site access.

Depending on the location of fire, there is a risk that response activities could impact sensitive environmental or heritage assets. Emergency response personnel will be informed of the locations of PGSW and heritage locations through the mapping in this report, and during a joint site inspection of the site to be conducted by GE, Silverton RFS and FRNSW will occur prior to the 2020 fire season. Emergency vehicles, plant, equipment will avoid these areas during response activities, where reasonably practicable.

5 Bushfire management zones

Bushfire management zones are identified and mapped in the West Darling BFMC area (WDBFMC 2011) (BFRMP 2011). The management zones relevant to wind farm are:

- Asset Protection Zone (APZ).
- Strategic Fire Advantage Zone (SFAZ).
- Land Management Zone (LMZ).
- Fire Exclusion Zone (FEZ).

5.1 Asset Protection Zones

An APZ is a mown, slashed or hard stand area around an asset designed to reduce the potential for flame, radiant heat or embers to ignite a structure and to create a defendable space where occupants or fire-fighters can protect that asset.

The establishment and maintenance of APZs to protect economic assets is to be in accordance with the STWF approval conditions, as well as requirements set out in PBP 2019 (NSW RFS 2019) and the Standards for Asset Protection Zones (NSW RFS n.d.). Requirements to be implemented and managed by GE to reduce fire risk are outlined and include:

- A minimum 10 metre asset protection zone (APZ) for:
 - Wind farm structures and associated buildings/infrastructure.
 - Control room and substations and within the electricity substation easements
- These APZs must be maintained to the standard of an IPA for the life of the development (Table 7). (NSW RFS 2019).
- The substations are to be surrounded with a gravel and concrete area free of vegetation.
- Maintenance of adequate clearances to combustible vegetation.
- Provision of firefighting access and water.

Connecting road, power and other services to the site and associated fencing are not the responsibility of GE (NSW RFS 2019).

It should be noted that hazard reduction burning as a means of establishing and/or maintaining APZ is neither planned nor recommended (Biosis 2018a). Other methods (e.g. slashing, thinning, pruning) should be used to maintain APZs (NSW RFS n.d.). Any native biomass (slash material) generated during APZ creation and asset maintenance will be placed in low fire risk areas that are prone to disturbance and of low regeneration potential to assist with the stabilisation of soils and the establishment of native vegetation (Biosis 2018a).

5.2 Strategic Fire Advantage Zones

An SFAZ is an area where vegetation management is conducted to reduce fuel loads with the aim of reducing the speed and intensity of a future bushfire. It aims to reduce the risk of fires spreading within the site and assists in stopping fires spreading into adjoining lands.

It is not proposed to implement SFAZs at STWF.

Table 7 Requirements for wind farm APZ establishment and maintenance (NSW RFS 2019)

Vegetation	Asset protection zone specifications (minimum 10 m width)
Trees	- Tree canopy cover should be less than 15% at maturity. - Trees at maturity should not touch or overhang the building, they should be located greater than 2 m from any part of the roofline of a dwelling. - Lower limbs should be removed up to a height of 2 m above the ground. - Tree canopies should be separated by 2 to 5 m.
Shrubs	- Create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided. - Shrubs should not be located under trees. - Shrubs should not form more than 10% ground cover. - Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.
Grass	- Grass should be kept mown/slashed (as a guide grass should be kept to no more than 100 mm in height). - Leaves and vegetation debris should be removed. Litter fuels should be kept below 10 mm in height and be discontinuous.

5.3 Land Management Zone

A Land Management Zone (LMZ) includes any areas managed to meet relevant land management objectives where APZ and SFMZ are not appropriate. Most of the STWF site comprises low risk LMZ and, the West Darling BFRMP (2011) recommends the following treatments relevant to the wind farm:

- Ensuring compliance with Planning for Bushfire Protection (NSW RFS 2019) .
- Requiring permits during bushfire danger periods.
- Supporting any investigation of bushfire cause.
- Supporting normal fire suppression activities.

The following guidelines summarised from the BAMP are also relevant to management of environmental assets within the LMZ:

- Maintenance access will be limited to the use of already cleared areas
- Where it is necessary to cross vegetated areas:
 - Trees and shrubs will be avoided where possible.
 - Fallen timber and rock outcrops will be avoided where possible.
 - Mapped areas of PGSW and Barrier Range Dragon habitat will be avoided (Figure 4).
 - Threatened species will be avoided.
- Any native vegetation (including dead trees and woody debris) removed will be used in restoration areas to stabilise soils and aid in rehabilitation

- If disturbance is such that landforms are destabilised and an erosion risk is created, these areas will be rehabilitated as set out in Section 4.2 of the VMP (Biosis 2018d) .

5.4 Fire Exclusion Zone

A Fire Exclusion Zone (FEZ) is an area where it is necessary to exclude fire.

Given the very small area of occupancy of PGSW Critically Endangered Ecological Community, fire poses a potential risk of consuming a large proportion of the community. Therefore in the case of STWF, it is recommended that PGSW should be protected from any type of fire (hazard reduction burning or wildfires) (Section 4.3.1 Biosis 2018c, Biosis 2018a).

A strategy of fighting bushfires will allow the occasional establishment of recently burnt areas and ensure the development and retention of areas of medium to long-unburnt vegetation (Giljohann et al. 2015). Any strategic use of prescribed fire in the surrounding vegetation types (which are also fire sensitive) as a 'fire-break' to reduce the risk of wildfire involves a trade-off and must be carefully considered before being implemented.

6 Bushfire Preparedness

Fire-fighting plans, equipment and training to prepare for a fire event at STWF are detailed below.

6.1 Roles and responsibilities – fire preparedness

It is recommended that all staff load the free *Emergency +* application onto their mobile phone, which facilitates immediate contact to emergency service providers and provides GPS co-ordinates of their location.

The Site Manager shall:

- Be responsible for oversight of fire preparedness of STWF site and staff.
- Ensure adequate emergency response/escape equipment is available at the site/turbines.

The EHS Co-ordinator shall:

- Ensure that all Visitors/ Contractors undertaking work at the site are aware of the Muster Point and associated emergency response procedures.
- Complete, and update annually, the site-specific information listed in this plan and track via the Gensuite Reporting Tool. This includes ensuring:
 - All inspections and associated recordkeeping are completed.
 - All fire drills and associated recordkeeping are completed.
 - All evacuation drills and associated recordkeeping are completed.
 - Ensure all training and associated recordkeeping is completed.
- Review this procedure twice yearly in September and January as required by the BAMP (Biosis 2018a).

Silverton Wind Farm Employees shall:

- Ensure they are aware of the Emergency Procedures, the location of fire equipment and the evacuation routes.
- Undertake regular training as required in Section 6.9.2.
- Control fuel and ignition sources.

6.2 Alarm system

Silverton Wind Farm is equipped with fire alarm system that is automatically activated in the event of detection of fire, smoke or excessive heat.

The wind farm's fire detection system is connected to GE Wind's Supervisory Control And Data Acquisition (SCADA) System. In the event of alarm activation, the Remote Operation Centre (ROC) team receive a signal about a possible emergency at the site.

The alarm has been introduced to alert site personnel and visitors, and to minimise the risk to their life, who in absence of alarm may inadvertently enter a hazardous area. Any activation of the Fire Alarm would necessitate evacuation.

Fire Alarm testing will be done at regular intervals as per the company requirements.

6.3 Evacuation plan

All GE employees have the authority to order an evacuation if the situation deems necessary. An evacuation will be ordered by any or all of the following methods:

- Activation of fire alarm.
- Verbally to the persons concerned.
- By internal communications or radio system.

If an evacuation is deemed necessary, the evacuation plan (below) must be followed in accordance with GE's Operational Emergency Response Plan (GE 2019).

6.4 Emergency evacuation routes

From within the O&M building, all emergency exits aisles shall be clearly marked and kept free of obstructions to provide for the orderly evacuation of personnel. There must be at least two exit routes available to allow for prompt evacuation. The exit routes must be located as far away as practical from each other so that if one exit route is blocked by fire or smoke, employees can evacuate using the second exit route.

If the direction of travel to the exit or exit discharge is not immediately apparent, signs must be posted along the exit access indicating the direction of travel to the nearest exit.

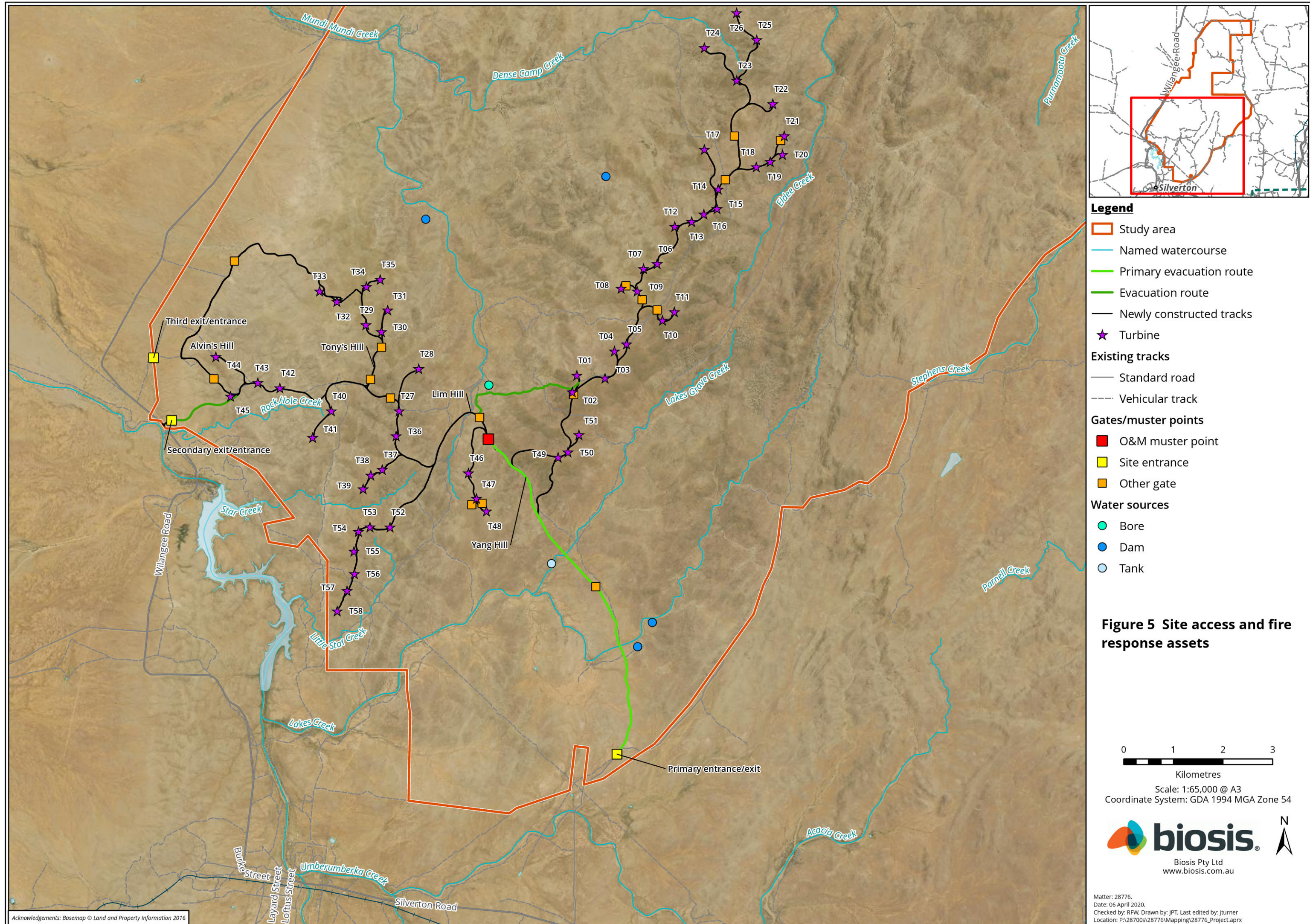
If required, evacuation from the site will be directed by the Site Manager / Site EHS Co-ordinator via the primary or other evacuation routes indicated in Figure 5.

6.5 Assembly points

The main Assembly (Muster) Point is the north-east side of Carpark at the O&M Building (Figure 5).

When required:

- Employees should leave premises by the nearest available exit. They should then move directly to the Muster Point and report to the Site Manager, EHS Co-ordinator or Administrator.
- The Site Manager, EHS Co-ordinator or Administrator will act as the Muster Point Co-ordinator (MPC).
- The MPC may nominate an alternate assembly location, if the primary assembly area is deemed "unsafe".
- A roll call will be conducted by the MPC.
- The MPC will report to the Site Manager when he/she has determined that all personnel have been accounted for.
- Outside of normal working hours, it is the responsibility of Site Manager or EHS Co-ordinator to account for all personnel.
- Employees are not to leave the area until advised.



6.6 Site entry, exit and gates

All GE employees, visiting employees, visitors and contractors must enter and exit through the primary site entry gates to the O&M building (Figure 5), where the Site Manager maintains the Sign In/Sign Out sheet. Gates within the STWF are also mapped in Figure 5.

6.7 Command centre

For the purposes of maintaining communication with the Emergency Services, Office Reception or the Muster Point will serve as the command centre. The command centre will be “run” by the Site Manager until the arrival of the Emergency Services, where upon control of the Command Centre and the site will be passed to the EMS Incident Commander (i.e. Chief Fire Officer or their representative).

All essential personnel who have mobile phones should carry them when responding to an Alert or fire alarm. Staff in vehicles should utilise the site radio system.

6.8 Corporate information

During the emergency situation, under no circumstances is the safety of any person to be jeopardised by securing company documents or cash. Such action is only to be taken when time permits and only after it is determined safe to do so by competent personnel/ authority i.e. EMS commanding officer.

6.9 Training

Site employees, managers and all other employees should be familiar with:

- The layout of the area for which they are responsible.
- The operation of installed SCADA system and its use.
- Mechanisms of fire detection at the site.
- Fire-fighting equipment installed in their area.
- The number and location of any mobility impaired persons in their area.

Site employees shall be trained in Basic Fire Operations annually and have the necessary Personal Protective Equipment (PPE) to fulfil fire response roles if applicable. Training will be coordinated and documented by the Site EHS Co-ordinator.

All staff shall be advised of Emergency Procedures during site inductions, including being taken to the location of fire equipment and the evacuation routes.

6.9.1 Evacuation/emergency drills

The STWF will conduct at least one emergency drill per quarter. All employees will be notified prior to an alarm being tested or a drill exercise.

A debriefing shall be held as soon as practically possible, after each drill, or actual evacuation.

6.9.2 Other training

All site employees require the following:

- First Aid Training (completed every 12 months).

- Fire Extinguisher Training (refreshed every 12 months).
- Emergency Response Training (conducted every 12 months).

6.10 Resources

The provision of suitable fire-fighting resources is required as under the conditions of approval for the STWF. In particular this is suitable equipment for the suppression of small fires site employees have capacity to contain. Support from FRNSW or the RFS will be required for any other fire event.

6.10.1 On site equipment

The following equipment is available on site and may be asked for during any grass or scrub fire response (RFS 2017):

- Each vehicle carries one fire extinguisher.
- Each turbine holds two extinguishers - one at the top in the nacelle and one at ground level.
- There is a 16 litre fire fighting backpack on-site in the O&M building.

6.10.2 Internal suppression systems and other specialist resources

Each turbine is fitted with a fire detection system, however no internal suppression system is fitted within the turbines.

6.10.3 Other water resources

A number of ground tanks (dams) and bores may be suitable for use in a fire emergency. These are mapped in Figure 5.

6.10.4 Other general equipment

- Each vehicle is equipped with a first aid kit.
- The main office is equipped with two larger first aid kits.

6.11 Chemical storage and handling

All chemicals are stored in the designated chemical store at the end of the O&M building. This is equipped with appropriate bunding as well as provision of spill kit and a hydrocarbon skip bin. Material Safety Data Sheets (MSDS) are located in a folder in the chemical shed for reference before any chemicals are handled.

Substation facilities are bunded with sufficient capacity to contain the volume of transformer oil in the event of a major leak or fire and to maintain bunds to ensure that they remain clear and that leaks do not present a fire hazard.

The layout of general chemical storage is available from the Site emergency information pack located at the O&M site office.

6.12 Hot works

No hot work will be undertaken outside on Total Fire ban Days. If essential hot work must be conducted, it will occur indoors. Silverton Wind Farm can apply for exemption to undertake Hot Works if applicable.

6.13 Inspections

It is important that maintenance routines be undertaken with regards to fire-fighting equipment, water supplies, access roads/tracks, APZs and vegetation management near electrical assets. All fire response resources will be checked and serviced annually, including communication systems.

6.13.1 Housekeeping checklists

Monthly Housekeeping Checklists will be conducted to ensure:

- High standard of general housekeeping and basic fire protection.
- Continual compliance to fire protection and emergency preparedness requirements respectively.

6.13.2 Fire detection system

The STWF fire detection system is connected to the SCADA System. As required by Australian regulation, all fire protection or detection systems shall be inspected and tested by an approved third party testing agency.

6.13.3 Access, water supplies and weeds

- Roads will be inspected on a monthly basis, as well as after any significant rain events (> 25 millimetres) in accordance with the BAMP (Biosis 2018a)
- Technicians are to check the roads as they move around the wind farm each day and report any defects.
- All weeds within infrastructure facilities and temporary disturbance areas are to be managed and monitored in accordance with the BAMP (Biosis 2018a).
- Water supplies (if applicable) are to be checked annually prior to the commencement of the fire season and maintained as serviceable including signage.

6.13.4 Fire preparedness review

Fire preparedness is to be reviewed in September each year as confirmed with DPIE as an amendment from the BAMP (Action 2.19). This will include a documentation of:

- An inspection of the on-site fire-fighting equipment (Section 6.10)
- A review of currency this FMP plan by the Site Manager.

Additionally, a joint site inspection the site will be conducted by GE, Silvertown RFS and FRNSW will occur prior to the 2020 fire season. This will provide emergency response teams with an understanding of site conditions at STWF and provide further opportunity to discuss the implementation of this plan.

7 Emergency response

In the event of a fire the following priorities will be observed:

- Protect and rescue human life.
- Render assistance in affected areas.
- Protect property, environment and information.

The STWF fire detection system is connected to SCADA System. In the event of alarm activation, the onsite team, ROC and offsite team receive signal about a possible emergency at site (Section 6.2).

7.1 Chain of command

The chain of command on site in the case of a fire is as follows:

1. Site Manager and/or EHS Co-ordinator (whomever is in attendance first).
2. On arrival at the STWF, Emergency Services have total authority to deal with the fire.

7.1.1 Silvertown Wind Farm staff

The Site Manager or EHS Co-ordinator will co-ordinate the incident response.

The Site Manager shall:

- Ensure adequate emergency response/escape equipment is available at the site/turbines.
- Ensure overall procedure implementation and coordination.
- Ensure the Australia and New Zealand (ANZ) Services and EHS Leader is contacted in the event of an injury, fire, chemical spill, or major emergency.
- Coordinate with the first responders and liaise with FRNSW or the RFS.
- Determine when an evacuation should take place.
- Account for every employee during an evacuation.

The EHS Co-ordinator shall:

- Be responsible for assisting the Site Manager with coordination of response activities as necessary.
- Identify the proper emergency response equipment and procedures to be used by site employees and visitors.
- Assist with follow up activities, including incident investigation and implementation of corrective actions.
- Enter all events/incidents into the Gensuite Reporting Tool.

Silvertown Wind Farm Employees shall:

- Ensure all Visitors and Contractors entering via the reception area are logged into the sign-in book.
- Follow the emergency procedures listed in this plan.

- Notify the Site/Area Manager immediately of any possible emergency.
- Evacuate immediately once the evacuation alarm has been activated.
- Contact the appropriate response personnel in the event of an emergency (ambulance, fire department, police department, etc.).

7.1.2 Local FRNSW and RFS

The FRNSW are located in Broken Hill, approximately 25 kilometres away. The nearest Rural Fire Service Fire Control Centre for the Far West is located at Cobar located approximately 480 kilometres away and would initiate a response from the local Silverton RFS if required.

In the event of a fire at STWF, the GE Site Manager will notify FRNSW of the incident, who will implement the following steps in liaison with the RFS:

- Duty Fire Officer to be informed as soon as possible.
- Coordinate nearest most appropriate appliance to respond. Depending on the information provided at the time, the response may be the local brigade or the next closest.
- Duty Fire Control Officer will authorise any further responses and may delegate that function to another District staff member.
- Record all details.
- Identify both the incident classification and other relevant details.
- Notify personnel that are affected of the situation and control strategies.
- Maintain dedicated communication for incoming and outgoing emergency calls.
- Far West Duty Officer will ensure that there is a continuous exchange of information with the Silverton identified point of contact and the escalation of resources is appropriate for the situation as advised.

7.2 Liaison with the emergency fire services

On arrival at the fire location, the Chief Fire Officer (or their designated Officer) has total authority to deal with the fire and any infrastructure in any way they deem appropriate. The Chief Fire Officer (or their designated Officer) will however, require assistance from the Site Manager / Site EHS Co-ordinator in dealing with the particular hazards relevant to any location.

Whilst FRNSW have been involved in fire response planning at STWF, they may require the following assistance:

- Provision of mapping of site access, Muster Points gates and potential water sources as mapped in Figure 5.
- Notification of fire-fighting risks outlined in Section 4.5.
- Location and nature of all Dangerous Goods.
- General layout of the O&M building, including its fire hydrant system.
- Notification of priority environmental (Figure 3) and cultural (Figure 4) assets as discussed in Section 4. As specified in Section 4.5, emergency vehicles, plant, equipment will avoid these areas during response activities, where reasonably practicable.

- Actions, which may be taken by the RFS to assist in subsequent salvage of, company property and assets.
- Advise on any life safety considerations e.g. missing persons etc.
- The primary responsibility for liaising with the RFS during normal working hours rests with the Site Manager/ EHS Co-ordinator.
- Outside of normal working hours any employee present onsite is responsible for advising and assisting the RFS.

7.3 Fire response actions

Response to a fire at STWF is to follow the procedure outlined in Table 8 below.

Table 8 Fire response checklist

Step	Action
First Response	
Step 1	STAY CALM–assess the situation: • Check for danger – ensure safety of personnel. • Evacuate the immediate area. • Obtain information about the type and nature of the fire, including the direction of travel. • Document the exact location, reporting staff member, date and time. In the case of a fire in a turbine, substation, transformer, or any out of control fire, notify the RFS immediately.
Step 2	Enact any specific immediate fire procedures outlined in Table 9 below.
Step 3	Contact Site Manager - Michael Brownlie (if not available, Site EHS Co-ordinator – Alana Philp) Advise location and type of fire (including direction of travel of a bushfire incident) and whether emergency services have been contacted. Leadership from Site Manager / Site EHS Co-ordinator must remain visible throughout.
Step 4	Call 000–Police, Fire, Ambulance and other relevant personnel and STWF staff.
Step 5	Site Manager / Site EHS Co-ordinator to ensure personnel available to direct RFS through the site. Keep personnel away from the area and out of the path of responding emergency vehicles
Step 6	Fire response guidelines (below) activated, checklists consulted
Fire response guidelines	
Step 7	Site Manager / Site EHS Co-ordinator should: • Determine need for GE Security (offsite) or Medical Department (offsite) involvement. • Ensure follow-up with any injured victims. • Make customer/client notifications: ○ AGL Services/AGLDC ○ Senior Service Manager - Mark Bennett ○ Senior ANZ EHS • Determine the need to contact GERE Management, to provide internal and external communications.

Step	Action
Step 8	All personnel not directly involved in the fire response are to evacuate to nearest safe Muster Point as indicated in Figure 5. The Site Manager and designated personnel will ensure the evacuation of personnel has been successfully completed and that all personnel are accounted for.
Step 9	Vehicles and equipment to be moved out of the path of any fire to and parked on clear ground. If at turbine hard stands, park vehicles in the centre of the hardstand, close all vents and windows, seek shelter inside vehicle. If indoors in a bushfire, all doors and windows to be closed, vents and doors to be ember sealed. Be ready to evacuate at short notice.
Step 10	The Site Manager will ensure that equipment is shutdown as necessary.
Step 11	Assist emergency services where possible.
Step 12	Once fire is contained, ensure all threatening areas are inspected for any mop-up or additional fire suppression and safety requirements.
Step 13	Personnel involved logging all events and actions in Gensuite, and making records available.
Step 14	The local RFS and the Site Manager will determine when normal operations can be resumed.
Step 15	If evacuations of staff are expected to extend beyond the normal work shift, prepare contingency plans for managing displaced employees
Step 16	Complete tasks following end of emergency in Sections 7.4 and Section 7.5.

Table 9 Responses for specific fire types

Fire location / type	Specific responses
O&M building	Attempt to extinguish the fire if in its early stages, if the employee has the appropriate fire extinguisher training and only if it is safe to do so
Substation / transformer	• RFS must be contacted immediately to contain this type of fire • Do not try to extinguish the fire due to high voltage hazards. Cannot use conventional fire extinguishers. • Site to report the fire to Customer representative and appropriate utility company
Turbine	• Push the emergency-stop button if it is physically safe to do so and it will not delay your exit from the turbine. • RFS must be contacted immediately to contain this type of fire. • Personnel outside the turbine should not approach the turbine to push the emergency-stop button. • Always use the turbine ladder where possible, only using firefighting equipment to ensure a safe escape route from the turbine. • Evacuate the immediate area. • Set up an exclusion zone around the turbine. Seek shelter upwind of the turbine.
Bush / grass fire	• Raise the alarm using the site radio and report location and direction of fire. • Site Manager to immediately notify Fire & Emergency Services.

Fire location / type	Specific responses
	Site Manager to identify site support resources available and put on short notice standby.
Out of control fire	- Restrict access to the hazardous area. - Fires which cannot be extinguished by an employee using a fire extinguisher must be fought by an external fire department.

7.4 End of emergency

The Site Manager / EHS Co-ordinator will evaluate the need for invoking business interruption and return-to-normal plans.

A debriefing of STWF staff shall be held as soon as practically possible, after each drill, or actual evacuation. Counselling is to be provided for those involved in the incident.

The Site Manager / EHS Co-ordinator to ensure a full incident investigation regarding the cause of the incident and the response so that the procedures can be reviewed and if necessary corrective measures introduced as soon as possible.

A collaborative de-brief between Emergency Personnel from GE and the RFS should be undertaken within a week of the recovery process to identify any deficiencies or shortcomings in the organisation or procedures. This will be provided as a written report to the Site Manager providing any recommendation necessary to amend the plan. These will be entered into Gensuite and tracked to closure and to ensure amendments to the FMP are incorporated into a revision of this document promptly.

A detailed assessment of impacts to economic, environmental and cultural assets will be undertaken within 2 months of any fire incident. The extent of the incident and damage caused will be communicated to AGL, NSW DPIE and other relevant authorities.

7.5 Considerations post-fire

7.5.1 Contaminated fire-fighting water

Contaminated fire-fighting water, wherever possible should be prevented from entering any drainage or natural water course. If contamination of a water course has occurred, then notification to the appropriate environmental agency should be made as soon as practicable by the Site Manager.

7.5.2 Dealing with the media

False or misleading stories can cause considerable concern to employee's families in the event of even a very minor fire. News coverage of a fire can have serious complications for the Company's own employees.

All staff are to refer any enquiries for information from the media to the Site Manager, for referral to AGL.

7.5.3 Salvage

The Projects and Services Director is to be available to advise the RFS on any matters affecting salvage of company property and assets. Salvage work within particular areas will be under direction of the manager concerned. The Finance Manager is to advise the Site Manager on any matters affecting both salvage and possible insurance claim.

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Appendices

Appendix 1 Condition compliance

Table A 1 Management obligations related to fire and bushfire.

*Note these are the conditions of approval for all phases of the wind farm (construction, operation and decommissioning). This plan has been prepared to cover the requirements of the operational phase as detailed below.

ID	Condition	Evidence of completion	Responsibility	Timing
Concept approval				
Bushfire Risk				
2.57	Throughout the life of the project, the Proponent shall regularly consult with the RFS to ensure its familiarity with the project, including the construction timetable and final location of all infrastructure on the site. The proponent shall comply with any reasonable request of the local RFS to reduce the risk of bushfire and to enable fast access in emergencies.	Continue to liaise with the RFS and comply with reasonable requests. Document dates and evidence of liaison in GE project compliance spreadsheet. GE Site Manager / EHS will support RFS fire response in accordance with Section 7	GE RFS	Ongoing throughout operation of STWF.
2.58	The proponent shall: a) ensure there is appropriate fire-fighting equipment held on-site to respond to any fires that may occur at the site during construction and operation of the project; and b) assist the RFS and emergency services as much as possible if there is a fire on-site during the project.	Ensure provision of appropriate fire-fighting equipment in discussion with RFS in accordance with Section 6.10. In a fire event, assist FRNSW, the RFS and emergency services with access and advice on site conditions in accordance with the GE Renewable emergency planning procedures (GE 2019) and this plan (Section7).	GE	Ongoing
Modification 3				
Approval condition 32 - Bushfire				
The proponent must:				
a)	ensure that the project: provides for asset protection in accordance with the RFS's Planning for Bushfire Protection 2006 (NSW RFS & NSW DoP 2006) (or its latest revision (NSW RFS 2019))	Asset protection to be provided in accordance with this plan (Section 5.1). The site is suitably equipped to respond to fires as agreed with FRNSW and RFS (Section6).	GE	Ongoing

ID	Condition	Evidence of completion	Responsibility	Timing
	is suitably equipped to respond to any fires on site.			
b)	develop procedures to manage potential fires on site, in consultation with the RFS; and	A fire risk checklist will be completed with FRNSW and the RFS to identify potential fire risks on site (Section 4). This plan documents the procedures to manage potential fires on-site (Section 7) and has been developed in consultation with Don Peters of FRNSW. Silverton RFS were provided with an opportunity to comment on the draft plan.	GE Project ecologist	Completed in this plan. This plan is subject to annual review in accordance with Section 2.6.
c)	assist the RFS and emergency services as much as practicable if there is a fire in the vicinity of the site.	In a fire event, assist FRNSW and/or the RFS and emergency services with access and advice on site conditions in accordance with the GE emergency planning procedures (GE 2019) and this plan.	GE	In the case of a fire at STWF.
SOCs - Fire and bushfire				
Operational requirements to minimise risk of increased risk of fire ignition or spread:				
SOC 113	Consult with the Rural Fire Service (RFS) and NSW Fire Brigade (NSWFB) in regard to the adequacy of bushfire prevention measures to be implemented on site during construction, operation and decommissioning. These measures would in particular cover hot-work procedures, asset protection zones, safety, communication, site access and response protocols in the event of a fire originating in the wind farm infrastructure, or in the event of an external wildfire threatening the wind farm or nearby properties.	As is regionally appropriate, this Operational Fire Management Plan developed in liaison with the FRNSW and RFS rather than the NSWFB, covering the required measures GE will continue to consult with FRNSW, and where required RFS, during operation of STWF Document dates and evidence of liaison with FRNSW in GE project compliance spreadsheet.	GE FRNSW Project ecologist	This plan covers the fire prevention and suppression measures for the operational phase of the wind farm, and has been developed in consultation with Don Peters of FRNSW for the operational phase of STWF. Silverton RFS were provided with an opportunity to comment on the draft plan. Any future iterations of this plan

ID	Condition	Evidence of completion	Responsibility	Timing
				will be reviewed by FRNSW and the RFS prior to finalisation.
SOC 114	Hold appropriate fire-fighting equipment on site and train an appropriate number of site personnel in its use. Determine the equipment and level of training in consultation with the local RFS.	Monthly inspections of equipment will be conducted in accordance with Section 6.13.		
SOC 115	Handle and store flammable materials and ignition sources brought onto the site as per manufacturer's instructions.	Flammable materials will stored on-site in accordance with Section 6.11. Hot works will be conducted in accordance with Section 6.12.	GE	On-going
SOC 116	Maintain asset protection zones, based on the RFS Planning for Bushfire Protection, around the control room, substations and in electricity transmission easements. Develop workplace health and safety protocols to minimise the risk of fire to workers.	Asset Protection Zones established in accordance with Section 5.1. These will be maintained on a twice-yearly basis throughout the operational phase of the STWF and maintenance documented in the project compliance checklist. Fire management plan developed to minimise risk to workers.	GE	Appropriate Asset Protection Zones are currently in place. APZs will be inspected twice yearly. This FMP outlines protocols to minimise risk of fire to workers.
SOC 117	Bund substation facilities with a capacity sufficient to contain the volume of transformer oil in the event of a major leak or fire. Maintain bunds to ensure leaks do not present a fire hazard, and to ensure the bunded area is clear (including removing any rainwater).	Substation bunds installed around substations as required. Bunds inspected twice yearly and documented in project compliance spreadsheet with photographic evidence stored in the Box folder.	GE	Ongoing, with twice yearly inspections.
SOC 118	Surround substations with a gravel and concrete area free of vegetation to prevent the spread of fire from the substation and reduce the impact of bushfire on the structure.	Substation is surrounded with gravel and concrete - ensure the APZ is maintained in accordance with Section 5.1. Substation APZ inspected twice yearly and documented in project compliance spreadsheet with photographic evidence	GE	Ongoing, with twice yearly inspections.

ID	Condition	Evidence of completion	Responsibility	Timing
		stored in the Box folder.		
SOC 119	Hold fire extinguishers on site in all control buildings, substation buildings and facilities buildings.	Fire extinguishers on site in facilities as required. Equipment will be inspected monthly in accordance with Section 6.13.1 and documented in the project compliance spreadsheet.	GE	Ongoing, with monthly inspections.
SOC 120	Periodically inspect overhead transmission easements to monitor regrowth of encroaching vegetation.	There are no overhead transmission requiring monitoring within STWF. Transmission beyond the 33KV connection point (Network boundary) is the responsibility of Transgrid as outlined in Section 3.6.	GE and Transgrid	Annual inspections and subsequent maintenance as required.

Biodiversity Adaptive Management Plan (Biosis 2018a)

Management Actions – Fire preparedness and exclusion

1.9	Develop fire suppression guidelines in consultation with Project Ecologist, using Mumbida Wind Farm documentation as a template (STWFS 2013, GEP&W 2015).	This plan	GE operational staff / Project Ecologist	Completed April 2020.
2.19	Review fire preparedness - Check fire response plans and equipment twice yearly	Document twice yearly review in project compliance spreadsheet.	GE Operational staff	September each year
2.20	Extinguish any wildfire as soon as practical as per fire suppression guidelines Fire events responded to in accordance with fire suppression guidelines Investigate cause and review response Implement any necessary corrective measures	Shapefile of fire extent prepared Document cause of fire, response and any required corrective measures	GE Operational staff	As required

Planning for Bushfire Protection

Specific provisions regarding wind farms (in Section 8.3.5 of (NSW RFS 2019)

ID	Condition	Evidence of completion	Responsibility	Timing
PBP1	A minimum 10 metre asset protection zones (APZs) for the structures and associated buildings/infrastructure (excluding road, power and other services to the site and associated fencing).	Asset Protection Zones established in accordance with Section 5.1.	GE	Appropriate Asset Protection Zones are currently in place.
PBP2	The APZs must be maintained to the standard of an Internal Protection Area (IPA) for the life of the development.	APZs will be maintained on a twice-yearly basis throughout the operational phase of the STWF and maintenance documented in the project compliance checklist.	GE	APZs will be inspected twice yearly.
PBP3	Essential equipment should be designed and housed to minimise the impact of bushfires on the capabilities of the infrastructure during bushfire emergencies and not serve as a bushfire risk to surrounding bush.	The underground transmission of electricity throughout the STWF significantly reduces the bushfire risk to surrounding bush. The implementation of this plan will significantly reduce fire risk at STWF.	GE	Ongoing. Operations buildings are fire rated to approximately 30 minutes holding.
PBP4	A Bushfire Emergency Management and Operations Plan should identify all relevant risks and mitigation measures associated with the operation of the wind farm including: - Detailed measures to prevent or mitigate fires igniting. - Work that should not be carried out during total fire bans, including any that are notified by the Commissioner of the NSW RFS under the RF Act s.99. - Availability of fire-suppression equipment, access and water. - Storage and maintenance of fuels and other flammable materials. - Notification of the local NSW RFS Fire Control Centre for any works that have the potential to ignite surrounding vegetation, proposed to be carried out during a bush-fire fire danger period to ensure weather conditions are appropriate. - Appropriate bushfire emergency management planning.	Development of this bushfire management plan that addresses these requirements.	GE Project ecologist	This plan - completed September 2020.
PBP5	GE must be aware of any prohibited activities or exemptions on days of Total Fire Ban that are notified by the Commissioner of the NSW RFS under the RF Act s.99.	GE will liaise with then RFS	GE	Ongoing

Appendix 2 Threatened fauna species

Table A 2 Summary of BC and EPBC Act fauna species recorded, or likely to occur in the study area

Scientific name	Common name	BC Act	EPBC Act	Habitat type(s)
Birds				
<i>Stictonetta naevosa</i>	Freckled Duck	Vul		River Red Gum Woodland (both communities)
<i>Hamirostra melanosternon</i>	Black-breasted Buzzard	Vul		All vegetation communities
<i>Hieraaetus morphnoides</i>	Little Eagle	Vul		All vegetation communities
<i>Falco hypoleucos</i>	Grey Falcon	End		All vegetation communities
<i>Circus assimilis</i>	Spotted Harrier	Vul		All vegetation communities
<i>Cacatua leadbeateri</i>	Pink Cockatoo	Vul		All vegetation communities
<i>Calamanthus campestris</i>	Rufous Fieldwren	Vul		Mulga Dead Finish Woodland
<i>Pyrrholaemus brunneus</i>	Redthroat	Vul		Bluebush shrubland
<i>Certhionyx variegatus</i>	Pied Honeyeater	Vul		All vegetation communities
<i>Grantiella picta</i>	Painted Honeyeater	Vul	Vul	All vegetation communities
<i>Epthianura albifrons</i>	White-fronted Chat	Vul		Bluebush shrubland
<i>Melanodryas cucullata cucullata</i>	Hooded Robin	Vul		Mulga Dead Finish Woodland / River Red Gum Woodland (both communities) / Bluebush shrubland
<i>Daphoenositta chrysoptera</i>	Varied Sittella	Vul		Mulga Dead Finish Woodland
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	Vul		Mulga Dead Finish Woodland
<i>Stagonopleura guttata</i>	Diamond Firetail	Vul		Mulga Dead Finish Woodland / River Red Gum Woodland (both communities) / Bluebush shrubland
Mammals				
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	Vul		All vegetation communities
<i>Chalinolobus picatus</i>	Little Pied Bat	Vul		All vegetation communities
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	Vul	Vul	All vegetation communities
<i>Vespadelus baverstocki</i>	Inland Forest Bat	Vul		All vegetation communities
<i>Mormopterus eleryi</i>	Bristle-faced Freetail Bat	End		All vegetation communities
Reptiles				
<i>Ctenophorus mirrityana</i>	Barrier Range Dragon	End		Rock outcrops within all vegetation communities
<i>Delma australis</i>	Marble headed snake lizard	End		PGSW
<i>Cyclodomorphus melanops</i>	Southern Spinifex Slender Blue-tongue Lizard	End		PGSW
<i>Hemiergis millewae</i>	Triodia Earless Skink	*		PGSW
<i>Tiliqua occipitalis</i>	Western Blue-tongued Lizard	Vul		All vegetation communities

* New record for NSW, listed status to be confirmed (Farquhar 2019)