Crookwell 3 Wind Farm

Crookwell 3 Development Pty Ltd

GPG Australia Pty Ltd

Bushfire Emergency Management Plan

Version 2.1

3 February 2025

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Signature Page

3 February 2025

Crookwell 3 Wind Farm

Bushfire Emergency Management Plan

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Acronyms and Abbreviations

Name	Description
APZ	Asset Protection Zones
AS 3959-2018	*Australian Standard 3959 - 2018 Construction of Buildings in Bushfire-prone Areas*
BC Act	*Biodiversity Conservation Act 2016*
BESS	battery energy storage system
BOM	Bureau of Meteorology
EIS	Environmental Impact Statement
EP&A Act	*NSW Environmental Planning and Assessment Act 1979*
ERM	Environmental Resources Management Australia Pty Ltd
FDP	Fire Danger Period
Ha	hectare
IFEG	*International Fire Engineering Guidelines*
IPA	inner protection area
km/h	Kilometres per hour
kW/m^2	Kilowatts per metre squared
NSW RFS	NSW Rural Fire Service
PBP	Planning for Bushfire Protection 2019
RF Act	*NSW Rural Fires Act 1997*
TOBAN	Total Fire Ban
WTG	wind turbine generators

1. INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by Crookwell 3 Development Pty Ltd, a division of Global Power Generation Australia Pty Ltd (GPG) to prepare this Bushfire Emergency Management Plan (BEMP) for the recently approved Crookwell 3 Wind Farm (Crookwell 3).

Crookwell 3 includes the installation, operation, maintenance and decommissioning of a wind farm of up to 16 turbines and associated infrastructure (the 'Project'). The Project is located approximately 17 kilometres (km) south east of Crookwell and 25 km north west of Goulburn in the Southern Tablelands of NSW and covers an area of approximately 1,500 hectares (ha).

The location is shown in Figure 1-1. The approved windfarm layout is provided in Figure 1-2.

1.1 Purpose and Scope

This BEMP has been prepared to meet the requirements of Schedule 3, Condition 39 and 40 of the development consent and has been prepared as part of the overall Environmental Management Strategy (EMS)[1]. The purpose of the BEMP is to identify procedures that are to be implemented in case of a bushfire on site or in the vicinity of the site. It applies to the construction, operation and decommissioning phases of the Project.

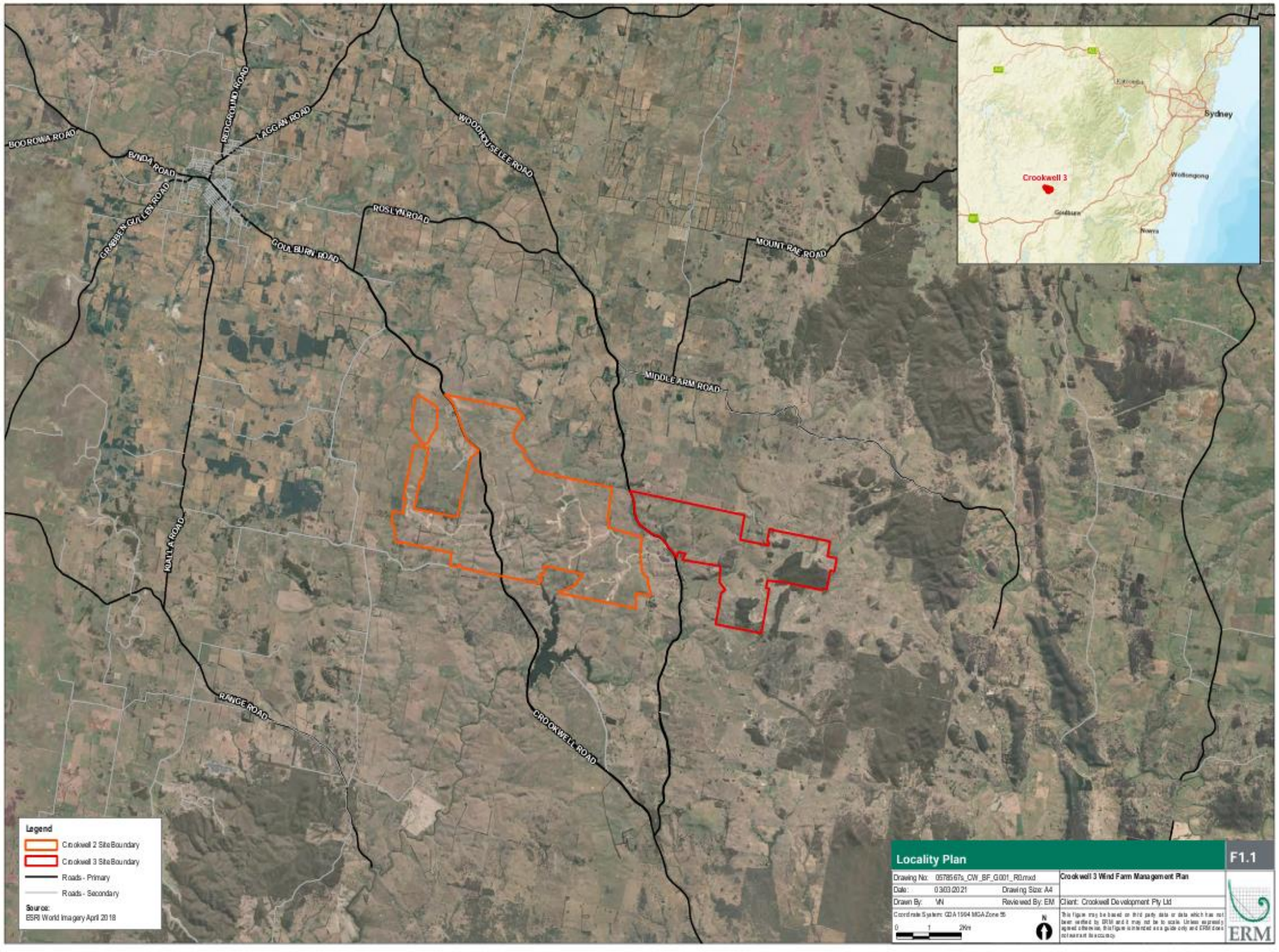
In particular, this BEMP:

- identifies those activities associated with the Project that could be a potential bushfire threat and establishes strategies to manage these risks;
- describes the bushfire and emergency related roles and responsibilities of all key personnel;
- provides objectives and targets that are important to the environmental performance of the Project; and
- outlines a monitoring regime to check the adequacy of controls as they are implemented.

The BEMP is required to be prepared in consultation with the RFS prior to the commencement of construction and will require both NSW RFS and DPIE endorsement prior to being implemented.

This BEMP has been prepared to be consistent with the NSW RFS's *Planning for Bushfire Protection 2019* and does not include consideration of any construction standards or fire safety engineering building solutions.

[1] An Emergency Response Plan (ERP) will be prepared by a Safety Representative prior to the commencement of construction. The ERP will be adapted for the operations phase and will form a component of the Safety Management System required by Schedule 3, Condition 41 of the CoC. This provides the emergency preparedness and evacuation process to be followed by all staff and contractors of the Project to manage environmental emergencies, should they occur. This is a separate document and is not included within this BEMP.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BINDA ROAD
GRABBEN GULLEN ROAD
BEDGEROO ROAD
LAGGAN ROAD
WOODHOUSELEE ROAD
ROSLYN ROAD
GOULBURN ROAD
MOUNT RAE ROAD
MIDDLE ARM ROAD
KATTA ROAD
RANGE ROAD
CROOKWELL ROAD
Sydney
Wollongong
Crookwell 3
Goulburn
Nowra
Legend
Crookwell 2 Site Boundary
Crookwell 3 Site Boundary
Roads - Primary
Roads - Secondary
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Locality Plan
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Crookwell 3 Wind Farm Management Plan
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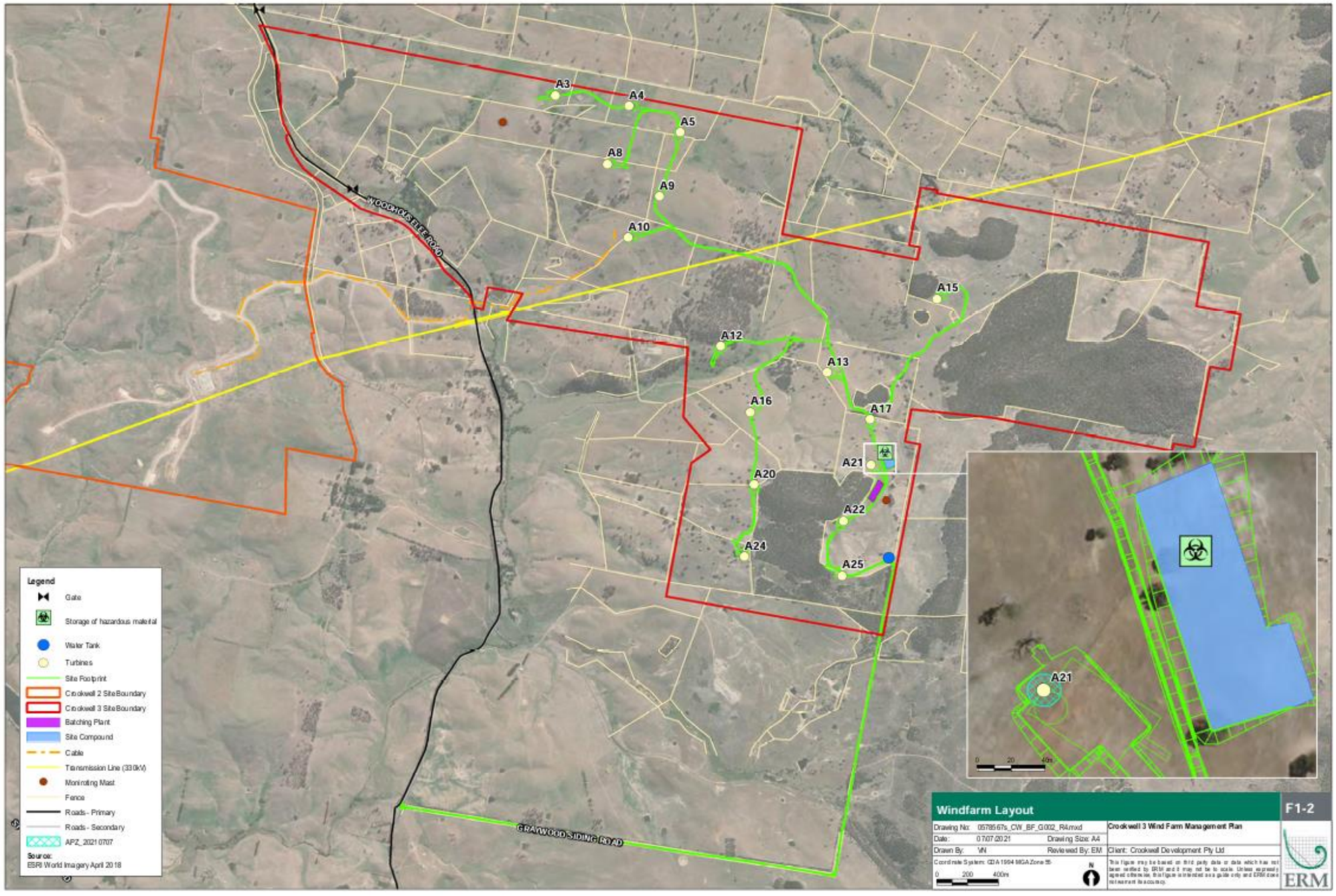
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WOODSIDE ROAD
GRAYWOODS IDING ROAD
Legend
Gate
Storage of hazardous material
Water Tank
Turbines
Site Footprint
Crookwell 2 Site Boundary
Crookwell 3 Site Boundary
Batching Plant
Site Compound
Cable
Transmission Line (330kV)
Monitoring Mast
Fence
Roads - Primary
Roads - Secondary
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2. PLANNING CONSIDERATIONS

2.1 Legislative and Other Bushfire Management Requirements

As outlined in Table 2-1, legislation relevant to bushfire management and emergency response includes the *Rural Fires Act 1997* (NSW).

Table 2-1 Key Legislation and Guidelines

Key Legislation/Guideline	Description
NSW Rural Fires Act 1997	The main objectives of the Rural Fires Act 1997 (RF Act) are to: ■ prevent, mitigate and suppress bush and other fires in NSW; ■ co-ordinate bushfire fighting and bushfire prevention throughout the State; ■ protect people from injury or death and property from damage as a result of bushfires; and ■ protect the environment. This BEMP considers the risk of spread of bushfires from the Project to the surrounds and provides measures to minimise the risk of bushfires.
Planning for Bushfire Protection 2019	Planning for Bushfire Protection 2019 (NSW RFS) (PBP 2019) is a planning document to link responsible planning and development control with the protection of life, property and the environment. PBP applies to all development applications on land that is classified as bushfire prone land on a council's Bushfire Prone Land Mapping (refer to Figure 3-1). Therefore, consideration has been given to the following overall aims and objectives of PBP 2019: ■ provide for a defendable space to be located around buildings; ■ provide appropriate separation between a hazard and buildings which, in combination with other measures, minimises material ignition; ■ ensure that appropriate operational access and egress for emergency service personnel and residents is available; ■ provide for ongoing management and maintenance of bushfire protection measures; and ■ ensure that utility services are adequate to meet the needs of firefighters. PBP 2019 provides specific requirements for wind farm development and notes that wind and solar farms require special consideration and should be provided with adequate clearances to combustible vegetation as well as firefighting access and water.
Australian Standard 3959 - 2018 Construction of Buildings in Bushfire-prone Areas	The Project is considered 'other development', as it is not residential subdivision, residential infill, or Special Fire Protection Purpose (SFPP) and the National Construction Code 2019 does not provide for any bushfire specific performance requirements.

Additional guidelines, specifications and policy documents relevant to this BEMP include:

- Development Planning: A guide to developing a Bush Fire Emergency Management and Evacuation Plan (NSW RFS 2014);
- Standards for Asset Protection Zones (NSW RFS);
- AS1940-2004: The storage and handling of flammable and combustible liquids; and
- ISSC 3 Guideline for Managing Vegetation Near Power Lines.

2.2 Conditions of Consent

The Environmental Impact Statement (EIS, Tract 2012) for Crookwell 3, a State Significant Development (SSD 6695) was placed on public exhibition in November 2012, and a Response to Submissions Report (RtS) was submitted in February 2014. SSD 6695 was approved by the NSW Land and Environment Court on 14 October 2020 (Appeal No. 2020/123021) under the *Environmental Planning and Assessment Act 1979* (EP&A Act) (NSW), subject to a number of conditions. Conditions of consent (CoC) relevant to this BEMP and where they have been addressed are detailed in Table 2-2.

Table 2-2 Relevant Conditions of Consent

Condition of Consent	Description	Reference Location
Schedule 3, Condition 39 **Bushfire**	(a) The Applicant must ensure that the development: Provides for asset protection in accordance with the RFS's *Planning for Bushfire Protection 2019* (or equivalent); and Is suitably equipped to respond to any fires on site	Section 4.1
	(b) The Applicant must develop procedures to manage potential fires on site, in consultation with the RFS; and	Section 4
	(c) The Applicant must assist the RFS and emergency services as much as possible if there is a fire in the vicinity of the site.	Section 5
Schedule 3, Condition 40 **Emergency Plan**	Prior to commencing construction, the Applicant must develop and implement a comprehensive Emergency Plan and detail emergency procedures for the development, to the satisfaction of FRNSW and the RFS. The Applicant must keep two copies of the plan on-site in a prominent position adjacent to the site entry points at all times. The plan must:	Whole Document
	(d) be consistent with the RFS's *Planning for Bushfire Protection 2019* (or equivalent);	Whole Document
	(e) identify the fire risks and hazards and detailed measures for the development to prevent or mitigate fires igniting;	Section 4
	(f) list works that should not be carried out during a total fire ban	Section 5.6
	(g) include availability of fire suppression equipment, access and water;	Section 4
	(h) include procedures for the storage and maintenance of any flammable materials;	Section 0
	(i) detail access provisions for emergency vehicles and contact details for both a primary and alternative site contact who may be reached 24/7 in the event of an emergency;	Section 6.3
	(j) include a figure showing site infrastructure, Asset Protection Zone and the on-site water supply tank;	Figure 1-2
	(k) include location of hazards (physical, chemical and electrical) that may impact on fire-fighting operations and procedures to manage identified hazards during fire-fighting operations;	Section 3
	(l) include details of the location, management and maintenance of the Asset Protection Zone and who is responsible for the maintenance and management of the Asset Protection Zone;	Section 4.1
	(m) include bushfire emergency management planning; and	Section 6
	(n) include details of the how RFS would be notified, and procedures that would be implemented, in the event that: there is a fire on-site or in the vicinity of the site; there are any activities on site that would have the potential to ignite surrounding vegetation; or there are any proposed activities to be carried out during a bushfire danger period.	Section 5.6 Section 6.6 Section 5.4

2.3 Agency Submissions

No agency submissions were received from Fire and Rescue NSW or the NSW Rural Fire Service during the exhibition period of the EIS[2].

2.4 Objectives and Targets

The key objective of the BEMP is to identify the bushfire risks and controls associated with the Project and identify procedures that are to be implemented in case of a bushfire on site or in the vicinity of the site. Specific objectives include:

- Ensure the health, safety and welfare of all personnel on site.
- Protect property, plant, equipment and the environment.

To achieve this objective, the following targets have been established and the proponent will aim to:

- Ensure appropriate controls and procedures are implemented during construction, operation and decommissioning phases of the Project to minimise bushfire risks.
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 2.1.

[2] It is noted that the EIS did not include any detailed bushfire hazard assessment and there was no detailed information for these agencies to respond to. It is therefore important to recognise that the development approval and this management plan is not based on any approved bushfire hazard and risk assessment and that all management, mitigation and emergency response measures must be reviewed and approved by the response agencies prior to the commencement of Project construction. Copies of all correspondence are to be provided in Appendix A.

3. BUSHFIRE RISK

Bushfire presents a threat to human life and assets and can adversely impact ecological values. Bushfire risk can be considered in terms of environmental factors that increase the risk of fire (fuel quantity and type, topography and weather patterns), as well as specific activities (such as hot works and construction activities) or infrastructure components that exacerbate combustion or ignition risks (such as transmission lines and other electrical components).

A regional overview of the bushfire environment and a brief history of windfarms within Australia is provided in Appendix B. This additional information is provided as background information only in the absence of any detailed bushfire hazard assessment being prepared as part of the EIS (Tract 2012).

Bushfire prone land mapping and regional fire history is presented in Figure 3-1 and Figure 3-2.

Note: The Project is located within a bushfire prone area and despite the mitigation measures and treatments that are put in place, it is noted that some bushfire risk will always remain. Some of the infrastructure may be subject to direct flame contact.

3.1 Site Characteristics

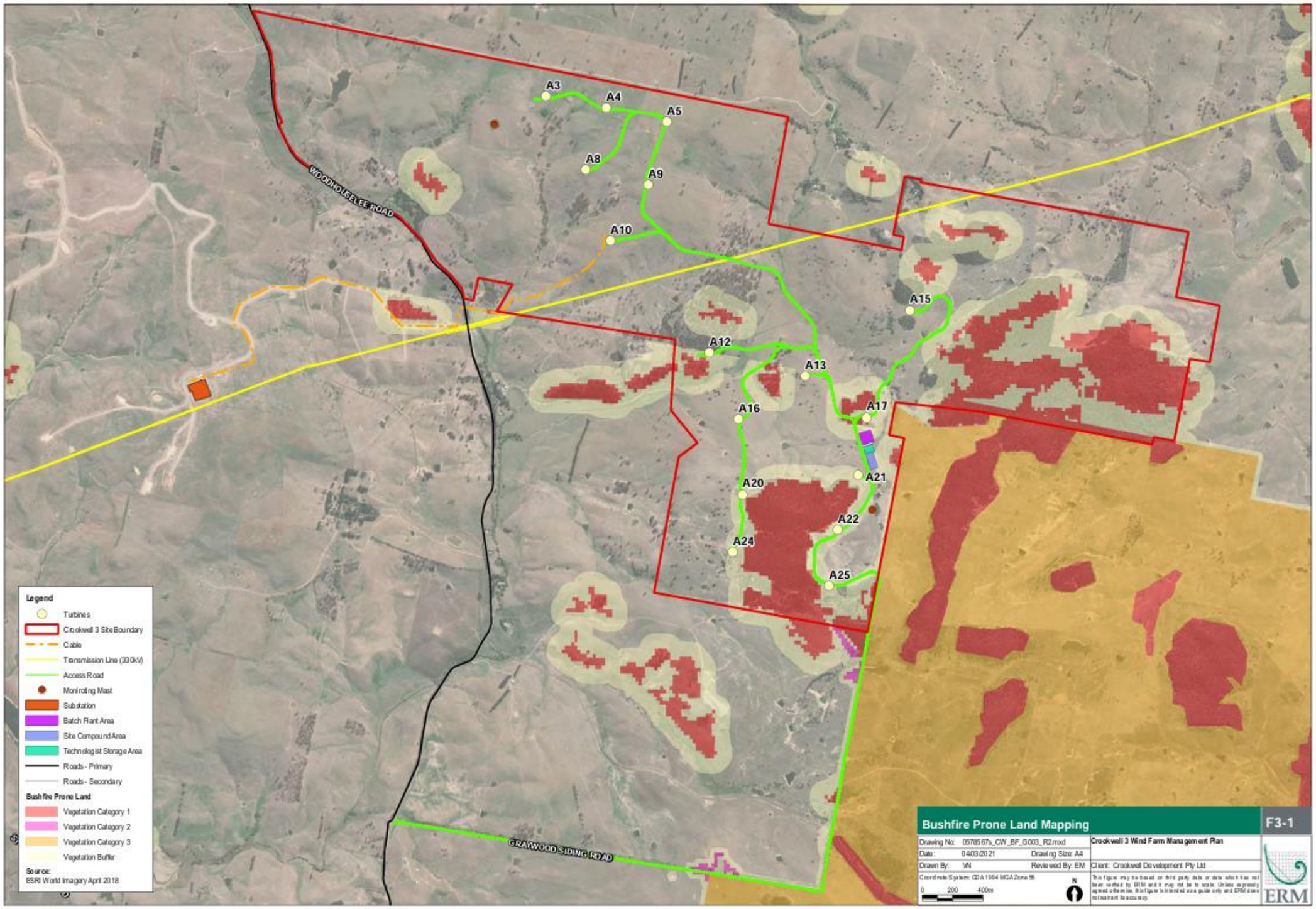
The Project site boundary is currently used for grazing and agricultural purposes and the understorey bushfire fuel loads can vary from season to season. Vegetation growth is encouraged by periods of wet weather, increasing the amount of fuel available (grass, leaf litter, twigs, bark). When the weather is hot, the humidity is low and there has been little recent rain, this vegetation dries out and becomes more flammable. A fire is more likely to start, and continue to burn, in hot, dry and windy weather.

Existing bushfire hazards are present within the site boundary, including several patches of woodland and derived native grasslands that are typical of a highly fragmented rural landscape (Figure 3-3). It is intended that the vegetation fuel around the turbine (hardstands), within the overhead transmission line easements and access roads will be maintained in a low fuel state by mechanical, manual and chemical clearing methods prior to construction activities commencing and as part of ongoing maintenance activities for the duration of the Project. Refer to Section 6.1 for detailed description of the recommended Asset Protection Zone (APZ).

Steeper slopes significantly increase the rate of spread of fires, and the relationship of the steepness of slope, and whether a fire moves upslope or downslope, is vital to understanding bushfire behaviour potential. For every 10˚ slope, the fire will double its speed. Slope and wind are often the major factors determining the direction of fire spread. The surrounding area is an undulating to hilly landscape with small areas of steeply sloping land generally near creeks. This presents an existing hazard within this landscape.

Grassfires should not be underestimated and can start and spread quickly. They can travel up to 25 km per hour and pulse even faster over short distances. As described by Bradstock et al (2012), grass is a fine, high surface area to volume ratio fuel with high thermal conductivity, low density and vertical orientation, which rapidly ignites (and rapidly burns out). Grassfires are also generally more open to wind than forest fuels (Cheney and Sullivan 2008) making them unpredictable. Grassfires tend to be less intense and produce fewer embers than bushfires, but still generate enormous amounts of radiant heat. Grassfires can also start earlier in the day than bushfires, because grass dries out more quickly when temperatures are high and humidity is low.

It should be assumed that, under the most extreme weather, a fire would spread even in heavily grazed grass and embers may breach any APZ. Grasslands are therefore considered medium bushfire risk vegetation and often hold a higher risk rating than remnant vegetation.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WOODHOUSELEE ROAD
GRAYWOOD SIDING ROAD
Legend
Turbines
Crookwell 3 Site Boundary
Cable
Transmission Line (330kV)
Access Road
Monitoring Mast
Substation
Batch Plant Area
Site Compound Area
Technologist Storage Area
Roads - Primary
Roads - Secondary
Bushfire Prone Land
Vegetation Category 1
Vegetation Category 2
Vegetation Category 3
Vegetation Buffer
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Bushfire Prone Land Mapping
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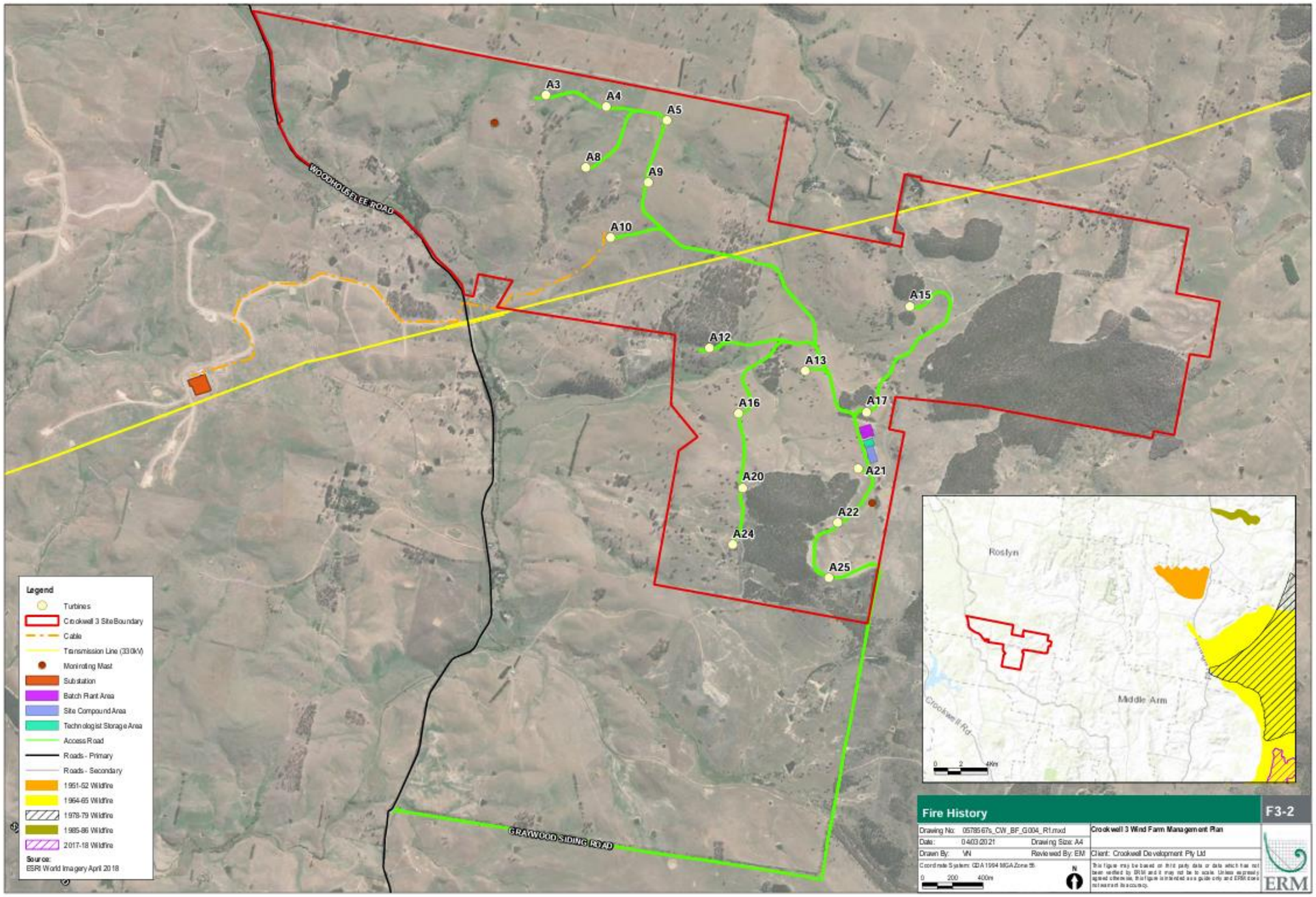
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Cable
Transmission Line (330kV)
Monitoring Mast
Substation
Batch Plant Area
Site Compound Area
Technologist Storage Area
Access Road
Roads - Primary
Roads - Secondary
1951-52 Wildfire
1964-65 Wildfire
1978-79 Wildfire
1985-86 Wildfire
2017-18 Wildfire
Source:
ESRI World Imagery April 2018
Roslyn
Middle Arm
Crookwell Rd
0 2 4Km
Fire History
F3-2
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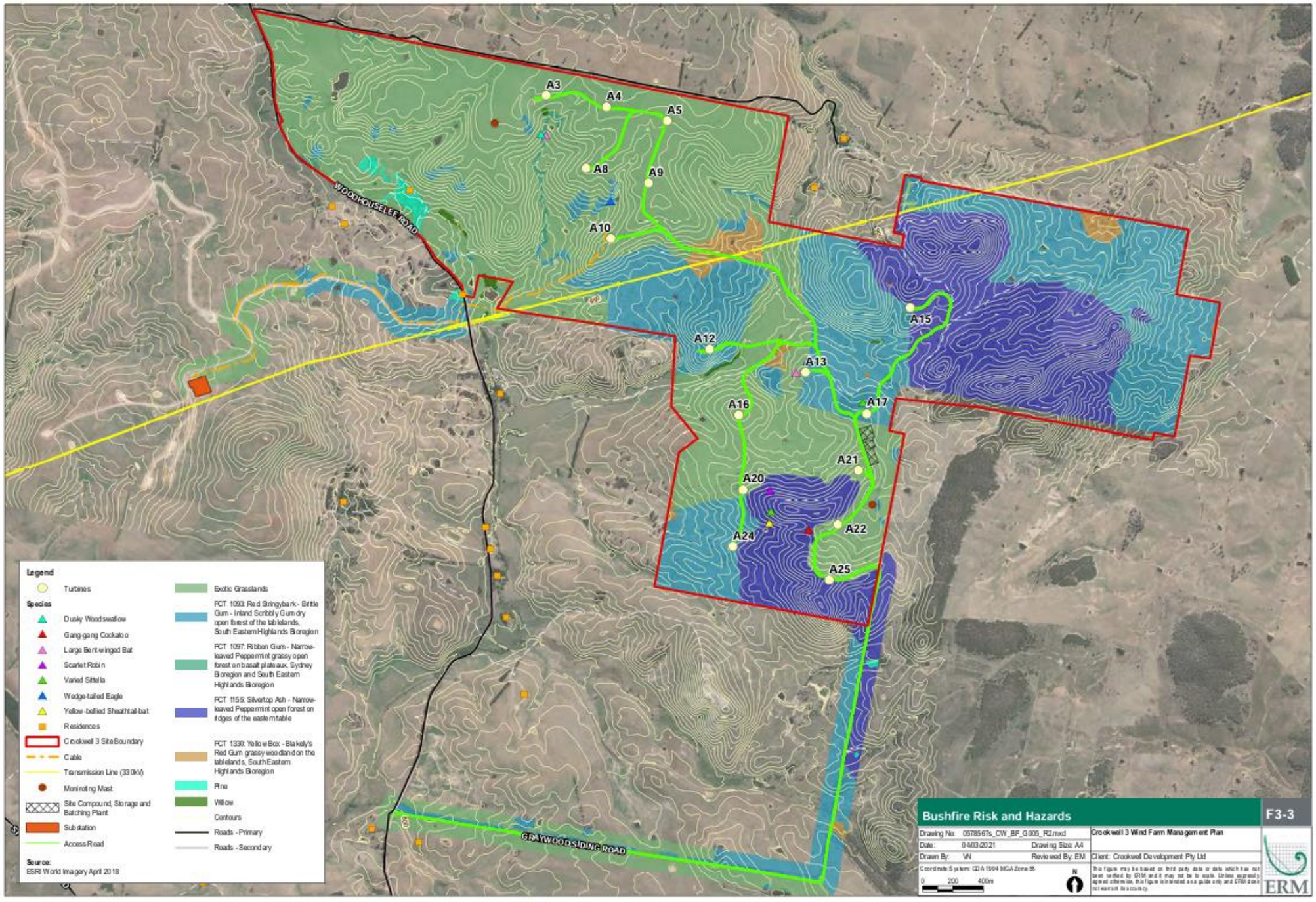
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STOCKHOUSELEE ROAD
GREYWOODS DING ROAD
Legend
Turbines
Species
Dusky Woodswallow
Gang-gang Cockatoo
Large Bent-winged Bat
Scarlet Robin
Varied Sittella
Wedge-tailed Eagle
Yellow-bellied Sheathtail-bat
Residences
Crookwell 3 Site Boundary
Cable
Transmission Line (330kV)
Monitoring Mast
Site Compound, Storage and Batching Plant
Substation
Access Road
Source:
ESRI World Imagery April 2018
Exotic Grasslands
PCT 1093: Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion
PCT 1097: Ribbon Gum - Narrow-leaved Peppermint grassy open forest on basalt plateaux, Sydney Bioregion and South Eastern Highlands Bioregion
PCT 1155: Silvertop Ash - Narrow-leaved Peppermint open forest on ridges of the eastern table
PCT 1330: Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
Pine
Willow
Contours
Roads - Primary
Roads - Secondary
Bushfire Risk and Hazards
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3.2 Identification of Key Assets at Risk from Bushfire

Key assets within and surrounding the Project site boundary requiring protection from bushfire are listed in Table 3-1 and shown on Figure 3-3. A full description of the windfarm infrastructure and construction methodologies are provided in the Environmental Management Strategy (EMS).

Table 3-1 Identification of Assets at risk of Bushfire

Asset	Description	Vulnerability to Bushfire
Assets within the Project Site Boundary (refer)		
Project Infrastructure	16 Wind Turbine Generators Obstacle Lighting Meteorological Monitoring Mast Temporary concrete batching plants during the construction phase only *As the Crookwell 3 Wind Farm would share most of the major infrastructure with Crookwell 2 Wind Farm, a separate substation, control room and facilities building are not required*. Co-ordinates of the Wind Turbines is provided in Appendix D.	Wind turbines, masts and obstacle lighting are made from non-combustible material and do not present a significance risk. Wind turbines also have a variety of on-board control systems specifically designed to mitigate the risk of fire. Each wind turbine is connected to a control centre (within the existing Crookwell 2 windfarm), which constantly monitors the wind turbine and shuts down the turbines if there is a risk of overheating. Turbines also automatically shut down if they are close to functioning outside their design conditions such as wind speeds greater than 25 m/s. Wind turbines will be shut down immediately during emergency operations – where possible, blades should be stopped in the 'Y' or 'rabbit ear' position, as this positioning allows for the maximum airspace for aircraft to manoeuvre underneath the blades and removes one of the blades as a potential obstacle.
Electrical Reticulation	33 kV Cable and Fibre Optic Network *Grid connection would be achieved from a connection to the existing 330kV electricity transmission line which runs through the site. The project would utilise and be connected to the single substation, control room and facilities that form part of the Crookwell 2 Wind Farm*	There will be no overhead transmission line installed as part of the Crookwell 3 project. For the safe operation of the existing transmission line which runs through the site, certain activities will be restricted within the easement such as planting and growing trees, construction of buildings, or erection of antennae or masts. Management measures must be applied in accordance with ISSC3 Guide for the Management of Vegetation in the Vicinity of Electricity Assets. This requires assets to be maintained to minimise the risk of fire ignition and to ensure that vegetation clearance are maintained. This will be the responsibility of the TransGrid as the asset owner.

Asset	Description	Vulnerability to Bushfire
Assets within the Project Site Boundary (refer)		
Site Access	The Project is bounded by Bolton's Lane to the north, Woodhouselee Road to the west and the Upper Lachlan Shire / Goulburn-Mulwaree Council border to the south east. The primary access would be from Graywood Siding Road to the south. Existing farm tracks would be used where possible to reduce the need for additional soil disturbance. During the construction phase of the project, these would be widened to approximately 8 to 10m in width to support the extra load of trucks carrying equipment and cranes for the erection of the towers. This width would then be reduced during the operation phase of the project to approximately 5m. The tracks would continue to be used by the farmer to access the property and to attend to grazing livestock.	As a minimum, and to enable access for RFS all roads will be maintained to the minimum standards as outlined within the NSW RFS Fire Trail Standards and the NSW RFS Fire Trail Design, Construction and Maintenance Manual (refer to Appendix C).
Assets surrounding the Project Site Boundary		
Residential Properties and Farms	There are a number of dwellings within and neighbouring the site, dispersed across the agricultural landscape at a low dwelling density. Houses are generally located along the major roads of Crookwell and Woodhouselee (Tract 2012). The closest residence is 10.6km from a turbine.	It is important to note that there are residential dwellings on rural properties scattered throughout the landscape that may be at risk from bushfire. This is an existing hazard.
Nearest Towns and Localities	At approximately 2,500 people, the Crookwell Township is the closest significant population centre to the site. Goulburn, 25km south east of the site, is a small city of approximately 22,000 people and is known for its contribution to the Australian wool and agricultural industry.	It is important to note that there are residential dwellings on rural properties scattered throughout the landscape that may be at risk from bushfire. This is an existing hazard.

3.3 Identification of Hazards

Hazards to fire-fighting operations within the Project area will be reduced by management strategies identified throughout this report. The main hazards to fire-fighting operations, including physical, chemical and electrical, within and surrounding the Project site are shown in Figure 3-3.

Fire-fighting equipment for fire-fighters will be located permanently on site for rapid initial response should a fire occur. As discussed in Section 4.3, the appropriate firefighting equipment and a dedicated water supply with appropriate access will be present at the site in accordance with PBP (NSW RFS 2019). These water supply points will be clearly marked by appropriate signage to assist firefighting personnel.

Emergency vehicle access will be available for emergency services at all times to assist firefighting operations. As detailed in Section 4.3, the road systems within the Project site have been designed in accordance with PBP 2019 to provide safe and unobstructed access to firefighting operation in all weather conditions. These road systems will be maintained and kept free of parked vehicles to enable rapid response for firefighting personnel and to avoid entrapment of staff in the case of a bushfire occurring. Temporary blockages of access roads may be required during the construction stage. If this occurs alternative access points must be identified prior to blockages and all staff on site must be notified.

To reduce the chemical risks to firefighting operations, emergency crews will be provided with a manifest detailing the storage location and details of flammable materials on site. The appropriate material (including absorbent, neutralisers, equipment and personal protective equipment) for the clean-up of spills will be provided and available on site at all times.

To further reduce hazards and risks to firefighting operations a cooperative bushfire management approach will be taken, as detailed in Section 5.1. This will involve continued ongoing involvement with the local emergency services to discuss bushfire management of the site.

3.4 Summary of Bushfire Risks

Bushfires occur in most years in this district, and natural ignitions such as lightning strikes are likely and historically common across the region. Human induced ignitions (both accidental and arson) are also known to occur across the region. The risk of fire starting as a result of a lightning strike may actually be reduced by the presence of wind turbines, particularly if they are located along a ridgeline (AFAC 2018). A built-in lightning protection system safely dissipates the electricity from the blades or the nacelle into the ground although there are no ignition occurrence records for the Project Area that provide statistical validity or a guide to likelihood of ignition.

Wind turbines also have a variety of on-board control systems specifically designed to mitigate the risk of fire. Each wind turbine is connected to a control centre which constantly monitors the wind turbine and shuts down the turbines if there is a risk of overheating. Turbines also automatically shut down if they are close to functioning outside their design conditions such as wind speeds greater than 20-25 m/s (Tract 2012).

Earth moving equipment, power tools (e.g. welders, grinders), mowers and slashers are well known for starting bushfires under conditions of high temperature, low humidity and high wind. Therefore, construction and ongoing maintenance of the wind farm will be a potential source of ignitions. Potential bushfire (including grass fire) hazards relate to the risk of the Project's infrastructure causing a bushfire and the risk of any bushfires affecting the wind farm[3]. This could include:

- Hot works activities such as welding, soldering, grinding and use of a blow torch.
- Sparks and contact ignition from vehicles in long combustible vegetation.
- Smoking and careless disposal of cigarettes.
- Use of petrol-powered tools.
- Operating plant fitted with power hydraulics on land containing combustible material.
- Electrical faults during testing and commissioning.
- Storage of chemicals and hazardous materials.

As evidenced by the Curran Dooley fire in 2017, bird flashover faults on high voltage power lines can also cause bushfires when fuel conditions beneath the fault location are conducive to fire ignition and spread. This risk can be reduced by maintaining reduced fuel loads beneath transmission lines and will be the responsibility of the asset owner.

In the event that a fire does breach any containment lines and threatens the windfarm assets, it is possible that the windfarm infrastructure will sustain direct flame contact and that firefighting will require aerial support. As the WTG towers are made from non-combustible material and do not present a significance risk, efforts would be concentrated on defending those assets that could contribute to widespread fire. It is therefore important that key assets such as the switching station, substation and O&M buildings have adequate defendable space all sides. As the Crookwell 3 Wind Farm would share most of the major infrastructure with Crookwell 2 Wind Farm, a separate substation, control room and facilities building are not required for Crookwell 3.

[3] *It is noted that the EIS did not include any detailed bushfire hazard assessment and the identification of bushfire risk presented here is a summary only. No detailed risk identification workshops have been undertaken to date.*

In the unlikely event that a fire did spread from the wind farm to surrounding properties, the turbines would not limit aerial firefighting capabilities on other properties in the surrounding area. Fire suppression aircraft only operate in areas where there is no smoke and during daylight hours (CFA 2015). Wind turbines, similar to high voltage transmission lines, are part of the landscape and would be considered in the incident action plan, thus not resulting in any increased risk to aerial fire fighters.

It is also important to note that there are residential dwellings on rural properties scattered throughout the landscape that may be at risk from fire. This is noted to be an existing bushfire risk although it cannot be discounted.

4. BUSHFIRE MANAGEMENT STRATEGIES

4.1 Asset Protection Zone

An Asset Protection Zone (APZ) is typically designed to separate a vulnerable asset from the bushfire hazard (vegetation/fuel). APZs do not eliminate the fire risk, but may lower it to an extent where fire control is more feasible or damage to the asset is reduced or eliminated.

Understanding the value and limitations of APZ is important, as is the understanding that bushfires attack built assets by either flame contact, radiant heat or burning debris. An APZ can be used to lower or eliminate the bushfire attack from flame contact and radiant heat around the perimeter of the wind farm and all built assets, but under strong winds or during a major fire event burning debris can result in a fire breaching an APZ.

Despite the limitations of any APZ and in accordance with the requirements of the development consent:

- a minimum 10 m APZ is to be established around all of the windfarm infrastructure. A 10 m wide APZ is consistent with the requirements of the RFS's Planning for Bushfire Protection (2019) guidelines and the Victorian CFA renewable energy guidelines (CFA 2018); and
- each WTG will be mounted on a concrete foundation (approximately 20m x 20m in area) located on a cleared hardstand area.

The specifications recommended for the APZ are as follows:

- APZ will not extend beyond the property boundary or rely on actions being undertaken by adjacent landowners;
- mineral earth fire break i.e. dirt or gravel where possible;
- no trees and shrubs planted within the APZ; and
- where possible, increase the distance between the trees and the APZ.

It is noted that the construction contractor would be responsible for implementing and maintaining the APZ during the construction phase of the Project. This responsibility would be handed back to CPG during the operation and maintenance phase of the Project,

4.2 Fire Suppression Equipment

Water is essential for firefighting. The amount and reliability of water is critical when considering development during both the construction and operation of the facility.

Appropriate fire-fighting equipment will be held on site to respond to any fires that may occur at the site (noting that Crookwell 3 Wind Farm will share all the grid connection infrastructure with Crookwell 2 Wind Farm, and thus a separate substation, control room and facilities building are not required for Crookwell 3). This equipment will include, as a minimum:

- fire extinguishers will be provided in all construction and operations vehicles;
- 9 L knapsacks to be available at all times; and
- a 1000 L water cart retained on site. This water cart should be tested monthly during the Fire Danger Period.

A dedicated water supply with appropriate access is required at the site to assist in the event of a fire. The location of water supply access points are provided in Figure 1-2. The location of these access points aim to allow for safe, effective and timely fire suppression. In accordance with the requirement of PBP (NSW RFS 2019) the designated water supply points allow for the following measures:

- 65mm Storz outlet with a ball valve is fitted to the outlet;
- a hardened ground surface for truck access is supplied within 4m;
- unobstructed access can be provided at all times;
- a vehicle turning circle with a radius of 12.5m;
- a minimum combined storage of 32,000 litres is provided, based on refilling four tanker units (4,000 litres) twice each; and
- water access points are to be marked by appropriate signage.

4.3 Emergency Vehicle Access

Security measures for the Project will ensure local Emergency Services are able to access the site at all times. PBP 2019 requires that the access road system:

- provides firefighters with access to structures allowing more efficient use of firefighting resources;
- provide evacuation routes for firefighters and the public; and
- provides access to areas of bushfire hazard for firefighting and hazard mitigation purposes

The Project is bounded by Bolton's Lane to the north, Woodhouselee Road to the west and the Upper Lachlan Shire / Goulburn-Mulwaree Council border to the south east. The primary access would be from Graywood Siding Road to the south. Emergency access is also available via existing farm tracks from Woodhouselee Road.

Existing farm tracks would be used where possible to reduce the need for additional soil disturbance. During the construction phase of the Project, these would be widened to approximately 8 to 10m in width to support the extra load of trucks carrying equipment and cranes for the erection of the towers. This width would then be reduced during the operation phase of the Project to approximately 5m. The tracks would continue to be used by the farmer to access the property and to attend to grazing livestock.

The road system is designed to provide sufficient width to ensure safe unobstructed access and firefighting operation in all weather conditions and are capable of accommodating a vehicle of 15 tonnes (RTF Fire Trail access standards). Key specifications are:

- a minimum vertical and horizontal clearance of 4 metres must be provided;
- curves have a minimum inner radius of 6 metres. The minimum distance between inner and outer curves is 6 metres; and
- the construction and formation of the trail is trafficable under all weather conditions.

All access and egress tracks on the site would be maintained and kept free of parked vehicles to enable rapid response for firefighting personnel and to avoid entrapment of staff in the case of a bushfire occurring.

Temporary blockages of access roads may be required during the construction stage. If this occurs alternative access points must be identified prior to blockages and all staff on site must be notified.

4.4 Storage and Maintenance of flammable materials

During construction, flammable materials will be stored at the laydown area only.

A manifest (and safety data sheets) must be prepared for any battery, diesel or other dangerous goods storage/handling, including the class identification, quantity, type (bulk or packaged) and location. Appropriate material (including absorbent, neutralisers, equipment and personal protective equipment) for the clean-up of spills is to be provided and available on site at all times.

The manifest must be maintained and made available to emergency crews as per NSW Work Health and Safety Regulation 2017.

5. BUSHFIRE AWARENESS AND PREPAREDNESS

The key principles for bushfire preparedness and response that support the BEMP are:

- measures appropriate to the level of bushfire danger, should be implemented to reduce the potential for accidental or careless fire ignitions to occur;
- any bushfire should be extinguished as soon as possible unless a conscious decision is made not to extinguish the fire immediately and resources are available to manage the event to the desired end point (such as to burn safely out to formed containment lines);
- rapid initial attack is the most efficient means to extinguish a bushfire (to achieve rapid initial attack fire detection must occur first);
- the safety of fire fighters and people is paramount in suppression operations; and
- cooperation among land managers / owners and NSW RFS is important for successful bushfire suppression.

Table 5.1 outlines mechanisms to develop bushfire awareness on the NAPL site and Table 5.2 outlines actions to be taken prior and during the fire season.

Table 5-1 Mechanisms to Develop Bushfire Awareness

Awareness activity/product	Detail
Induction process	Induction of new staff members and contractors in bushfire awareness (Section 5.2).
Staff briefings and pre-season drills	As part of fire and emergency procedures coordinated by HS&E Officer (Section 5.3).
Formal meetings	Prior to the bushfire season, as part of bushfire preparedness, when higher fire danger is forecast or large scale fire events in the surrounding area. Potential participants include staff, site users, contractors and external fire authorities/land managers.
Standard procedures	Review and distribution of Emergency Procedures.

Table 5-2 Fire Danger Season Preparedness and Planning

Measure	Timing	Procedures
Monitor fire weather	Daily during the fire danger season	Communicate fire weather warnings, severe weather warnings and total fire bans to all personnel, visitors and contractors within the site.
Review condition of access roads, hardstand areas and gates	Annually – works to be completed prior to September	Inspect to identify works required to achieve the minimum standards.
Inspect and maintain the APZ prior to the onset of the bushfire season each year.	Annually – prior to onset of Fire Danger Period (FDP)	Inspect and maintain the APZ annually, prior to the onset of the bushfire season each year. Grass should be no more than 10cm in height and leaf litter no more that 10mm deep for a distance of ten (10) metres around all windfarm infrastructure. There should also be no long grass or deep leaf litter in areas where plant and heavy equipment will be working.
Inspect and maintain the firefighting equipment and water supply points.	Annually – prior to onset of FDP	Inspect firefighting equipment. Replace as required. Inspect water supply points and fill tanks if required.
Fire prevention site inspections by the local NSW RFS	6 monthly or as agreed with NSW RFS. Works to be completed prior to September	Identification of issues regarding access, fire-fighter safety, roads and water supplies. Any outstanding actions must be completed prior to onset of FDP.

5.1 Cooperative Bushfire Management Arrangements

It is recognised that a cooperative approach to engaging major stakeholders will increase the effectiveness of bushfire prevention, mitigation and management of the windfarm during both construction and operation. Indeed, many of the works outlined in this plan are reliant on cooperative relationships with RFS e.g. effective response.

To foster a cooperative approach to bushfire management, the following has been included in the BEMP:

- continued and ongoing local RFS familiarisation of the property;
- monitoring the scheduling/completion of bushfire mitigation works and bushfire awareness programs;
- discussion and resolution of issues regarding access, fire-fighter safety, roads and water supplies;
- identification of areas in which collaboration/assistance may be required from local fire services to reduce fire risk across the landscape; and
- identification and discussion of safety and environmental restrictions and safeguards.

NSW RFS will be provided with co-ordinates of the final wind turbine layout and identification information for individual wind turbine sites for their internal response planning (Appendix D).

The proponent commits to assist the RFS and emergency services in the event of a fire occurring in the vicinity of the site.

5.2 Environmental Induction

All employees, contractors and staff working on site will undergo induction training covering all procedures and protocols included in this BEMP. The site induction provides an introduction to bushfire risks and preventative controls as well as emergency procedures. Further details regarding staff induction and training are outlined in the EMS.
During the FDP, staff and contractors undertaking major construction or maintenance work will undertake daily tool-box meetings, which will include, but not be limited to:

- a review of daily fire risk rating and predicted weather including maximum predicted temperature and wind speeds;
- emergency communication protocol;
- recent bushfire events on or in the vicinity of the site; and
- specific bushfire risks relevant to the day's activities and any restrictions based on the Fire Danger Ratings.

5.3 Fire Drills and Fire Prevention Inspections

The local RFS would be invited on an as-needs basis to assist in the running of fire drills during construction and operation. Greater attention to awareness and readiness will be given at start of the FDP and prior to the bushfire risk increasing.

During construction, the HS&E officer would be responsible for arranging fire drills at least every 6 months or more frequently if warranted. These operations would test and measure:

- site preparedness for fire emergencies including but not limited to the availability and location of suitable fire-fighting agents, access and egress and fire warden training. Fire extinguishers will also be provided in construction and operations vehicles;
- the site emergency evacuation procedures, including staff awareness of emergency protocols; and
- consultation and communication protocols with emergency services.

As the approved Crookwell 3 Wind Farm will share most of the major infrastructure with Crookwell 2 Wind Farm, these drills will also be co-ordinated with the Crookwell 2.

5.4 Activities with Potential to Cause Ignition

If a risk assessment is undertaken for an activity with the potential to ignite the surrounding vegetation, as detailed in Section 3.4, determines there to be a high fire risk associated with that activity the NSW RFS will be contacted on 1800 NSW RFS for consultation prior to works commencing.

5.5 Bushfire Detection

Early detection of bushfires is an integral component of effective fire response, which will ultimately affect the extent and severity of a bushfire. Bushfire detection uses both formal and informal networks. In general, the first response upon detection of a bushfire or ignition is to contact '000' or '112' (from a mobile phone).

On site staff and visitors may receive bushfire threat warnings and need to be familiar with actions to prepare for and respond to the three levels of alert under the national bushfire warning system. These alerts are broadcast where there is a known potential bushfire risk to a locality, via the media (radio, television, social media applications and internet) and potentially by text message (to all mobile phone users at a locality). The National Bushfire Warning System has three phases, which align well

with the 'Prepare, Act, Survive' framework.

	**Advice** A fire has started. There is no immediate danger. Stay up to date in case the situation changes.
	**Watch and Act** There is a heightened level of threat. Conditions are changing and you need to start taking action now to protect you and your family.
	**Emergency Warning** An Emergency Warning is the highest level of Bush Fire Alert. You may be in danger and need to take action immediately. Any delay now puts your life at risk.

5.6 Restrictions during a Total Fire Ban

Fire danger ratings (FDR) issued by the Bureau of Meteorology provide a mechanism to restrict certain activities and increase preparedness levels at the site to reduce the likelihood of fire incidence and provide a quick response if a bushfire occurs.

Fire Danger Rating
Fire danger ratings indicates the consequences of a fire, if one was to start. The higher the fire danger, the more dangerous the conditions.
On some days a total fire ban may be declared due to the conditions. Fire danger ratings and total fire bans are determined each afternoon for the following day. If 'forecast ratings' is shown, this is an indication only and you should check back later for when the ratings are finalised.

These forecasts are updated daily during the fire danger season and are available on the RFS website (http://www.rfs.nsw.gov.au/fire-information/fdr-and-tobans) and the BOM website (http://www.bom.gov.au/nsw/forecasts/fire-danger-ratings.shtml).

To reduce the risk of fires damaging or destroying life, property and the environment the NSW RFS Commissioner may declare a Total Fire Ban (TOBAN). In a Total Fire Ban no fire may be lit in the open and all fire permits are suspended. This includes incinerators and barbecues (BBQ) which burn solid fuel, e.g. wood, charcoal or heat beads.

Additional restrictions during a Total Fire Ban are:

- no activities likely to cause sparks or flame;

no welding, grinding or gas cuttingThe proponent commits to notifying the RFS if for whatever reason, there are any proposed activities likely to cause sparks or fire during a total fire ban.

Table 5-3 Bushfire Preparedness depending on the Fire Danger Index

Fire Danger Rating	What does it mean	Working Restrictions and Emergency Actions	Preparedness
Low-Moderate	There is little risk to personnel or property from a fire in these conditions, as long as it is monitored/suppressed by suitably qualified fire personnel. Be aware of how fires can start and minimise the risk. Controlled burning off may occur in these conditions if it is safe – check to see if permits apply.	No fires (such as hot works) to be left unattended. No other specific restrictions in place.	Users to verify emerg points.
High	Fires can be controlled but there is risk of local spot fires developing as a result of embers carried by wind.	Consider suspending activities with the potential to cause accidental ignitions. The following activities are considered to be high fire risk activities: ■ welding; ■ gas cutting; ■ soldering; ■ grinding; ■ charring; and ■ the use of power operated abrasive cutting discs. Any person conducting or engaging in a high risk activity must ensure: a shield or guard of fire resistant material is placed or erected in such a way as to prevent the emission of sparks, hot metal or slag; and ■ the area for a radius of at least 1·5 m from the activity is clear of all flammable material or wetted down sufficiently to prevent the spread of fire; and ■ there is available for immediate use in the event of fire a reticulated water supply or an effective water spray pump of the knapsack pattern with a tank capacity of not less than 9 L and fully charged with water.	Monitor weather cond RFS alerts. When bu warnings are issued to understand what e means. Be aware that action necessary.
Very High	Some fires may be fast moving and difficult to control. There is risk of spot fires developing up to 2 km away from fire front, as a result of embers carried by wind.		

Fire Danger Rating	What does it mean	Working Restrictions and Emergency Actions	Preparedness	Site Restrictions
Severe	Some fires will be very fast moving, unpredictable and difficult to control. There is a risk of spot fires developing up to 4 km away from the fire front, as a result of embers carried by wind. Expect hot, dry and possibly windy conditions. If a fire starts and takes hold, it may be uncontrollable. You must be physically and mentally prepared to defend in these conditions.	Suspension of activities likely to cause sparks or fire. Non-essential users are to depart the windfarm. When working on a Severe Fire Danger Rating day, a risk assessment of the work site must be undertaken before works can start. If for any reason activities likely to cause sparks or fire are required, NSW RFS must be notified. Some wind turbines may be shut down. Where possible, blades should be stopped in the 'Y' or 'rabbit ear' position, as this positioning allows for the maximum airspace for aircraft to manoeuvre underneath the blades and removes one of the blades as a potential obstacle.	Be aware of local conditions. Check the NSW Rural Fire Service Fires Near Me for current incidents (https://www.rfs.nsw.gov.au/fire-information/fires-near-me). Listen to local media. Check social media such as NSW RFS Facebook and NSW RFS Twitter. Bush Fire Information Line - 1800 679 737.	Parts of the site may be closed in response to escalating fire danger and all non-essential access to the site will be restricted.
Extreme	Expect extremely hot, dry and windy conditions. If a fire starts and takes hold, it will be uncontrollable, unpredictable and fast moving. Spot fires will start, move quickly and come from many directions. You must be physically and mentally prepared to defend in these conditions.	Suspension of activities likely to cause sparks or fire. Non-essential users are to depart the windfarm. When working on a Severe Fire Danger Rating day, a risk assessment of the work site must be undertaken before works can start. If for any reason activities likely to cause sparks or fire are required, NSW RFS must be notified. Some wind turbines may be shut down. Where possible, blades should be stopped in the 'Y' or 'rabbit ear' position, as this positioning allows for the maximum airspace for aircraft to manoeuvre underneath the blades and removes one of the blades as a potential obstacle.	Be aware of local conditions. Check the NSW Rural Fire Service Fires Near Me for current incidents (https://www.rfs.nsw.gov.au/fire-information/fires-near-me). Listen to local media. Check social media such as NSW RFS Facebook and NSW RFS Twitter. Bush Fire Information Line - 1800 679 737.	Parts of the site may be closed in response to escalating fire danger and all non-essential access to the site will be restricted.
Catastrophic	These are the worst conditions for a bush or grassfire. Homes are not designed or constructed to withstand fires in these conditions. The safest place to be is away from high-risk bushfire areas.	Suspension of activities likely to cause sparks or fire. Non-essential users are to depart the site. There is to be no high risk activities other than Emergency works.	Be aware of local conditions. Check the NSW Rural Fire Service Fires Near Me for current incidents (https://www.rfs.nsw.gov.au/fire-information/fires-near-me). Listen to local media.	The site should be closed in response to escalating fire danger and all non-essential access will be restricted.

Fire Danger Rating	What does it mean	Working Restrictions and Emergency Actions	Preparedness	Site Restrictions
		If for any reason emergency works likely to cause sparks or fire are required, NSW RFS must be notified. All wind turbines will be shut down. Where possible, blades should be stopped in the 'Y' or 'rabbit ear' position, as this positioning allows for the maximum airspace for aircraft to manoeuvre underneath the blades and removes one of the blades as a potential obstacle.	Check social media such as NSW RFS Facebook and NSW RFS Twitter. Bush Fire Information Line - 1800 679 737.	

5.7 Roles and Responsibilities

The following outlines who has the responsibility of implementing the emergency procedures in the event of a bushfire.

Position	Responsibility
Project Manager/ Site Supervisor	■ Ensure that the management plan is developed, reviewed and approved. ■ Ensure that the emergency committee is established ■ Ensure that wind turbines are shut down in the event of an emergency. *Note that the GPG site supervisor and the 24/7 personnel in the Control Room in Canberra will have the authority to shut turbines down as required.*
Safety Advisor	■ Review procedures and organise test evacuations. ■ Report emergencies as per Incident Management Procedure ■ Ensure that emergency equipment inspections are completed as per requirements. ■ Ensure the Site Emergency Procedure is up to date and communicated adequately to all site personnel. ■ Plan and facilitate emergency evacuation trials. ■ Plan and arrange training for Emergency Wardens as required. ■ Liaise with Chief Emergency Warden and assist as required. ■ Monitor changes in the work environment which may require the BEMP to be updated.
Chief Warden/Superintendent	■ The Chief Wardens' primary responsibility is to respond and co-ordinate any emergency event until Emergency Services arrive
Deputy Chief Warden/Supervisors	■ During an emergency evacuation collect the visitors register and sign on sheets and conduct a head count at the muster point. ■ Report head count status to the Chief Warden. "All persons accounted for" or "persons unaccounted for" giving details of missing persons.
Emergency Planning Committee (EPC)	The EPC is a consultative group comprised of senior management, landowners, staff and chief and deputy chief wardens. The role of the EPC is to actively participate in the planning process and identify the roles and likely participants who will be responsible for the implementation of the Plan and its procedures during an emergency. The role of the EPC is to: ■ establish and implement emergency plans and procedures; ■ identify duties and responsibilities of positions; ■ formulate emergency procedures; ■ ensure employees and other occupants are educated and trained on emergency procedures; ■ ensure all occupants are aware of the emergency procedures for the development; and ■ Regularly review the plan to ensure it remains practical and current
Emergency Services	■ The role of Emergency Services is to provide the supporting resources to assist in the management of the emergency.

Position	Responsibility
All Staff and Contractors	■ Perform all duties in a manner which will ensure their own and others safety. ■ Comply with the responsibilities assigned under relevant legislation. ■ Comply with all site safety rules and procedures. ■ Remain alert at all times to potential fire hazards. ■ Participate in the identification and elimination of hazards. ■ Immediately report any dangerous occurrence, injury, hazard or defective equipment. ■ Maintain knowledge of how to implement safe work practices using the hazard identification, risk assessment and risk control techniques. ■ Maintain knowledge of emergency response procedures, including evacuation protocols and bushfire action statements. ■ Actively participating in safety meetings and programs, including training.
First Aid Personnel	■ Initial actions of First Aid Personnel (under the direction of the Chief Warden or Emergency Services): - Proceed to scene with relevant Area Warden. - Evaluate the extent of any injuries. - Administer first aid (first aid personnel only, and only where safe to do so); or - Assess if injured personnel can be evacuated safely. ■ Ongoing actions of First Aid Personnel - Evacuate and attend any injuries at muster points. - Notify Emergency Services of any remaining personnel, and location, within building. - Provide details to Emergency Services of suspected injuries. - Assist Emergency Services onsite where required with ongoing treatment of injuries.

Important Note: Given the low number of staff on site during the operational phase of the windfarm, personnel may hold more than one role.

6. EMERGENCY PLAN AND RESPONSE

All workers accessing the Project site boundary are obligated and have a duty of care to have an understanding of this plan and when necessary assist in ensuring it is implemented to the greatest extent possible.

Two copies of the BEMP must be kept on-site in a prominent position adjacent to the site entry points at all times. A copy will also be provided and stored at the Upper Lachlan Fire Control Centre.

The Proponent commits to implementing the BEMP following approval.

Emergency Preparedness: GPG prepares personnel for emergency situations through an annual schedule of activities including desktop and field based emergency scenario training on top of 6 monthly fire drills during construction, and annual fire drills during operation. The preparedness activities are risk focused (e.g. looks at practical likelihood and consequence) but also attempts to prepare personnel for a wide range of emergencies situations. The emergency preparedness sessions are documented and actions created to rectify any deficiencies or issues identified. All permanent staff on site are first aid trained.

The Primary Action to follow under normal bushfire conditions is to:

☐ Shelter ☒Evacuate

6.1 Premises Details

Name of Facility	Crookwell 3 Wind Farm
Street Address	Crookwell 3 Site: 794, Woodhouselee Road, Woodhoueselee, NSW Substation Site (within the Crookwell 2 Site): access via 692 Woodhouselee Road, Woodhouselee, NSW
Suburb / Locality	Crookwell, NSW
Local Government Area	Upper Lachlan Shire Council
Operation	Windfarm
Contact Person and Role	Graham Young, Site Supervisor: 0419 605 728 GPG Control Room in Canberra: 02 6274 3210
Number of on-site staff	During Construction: up to 86 During operation: 6
Site Access	The primary access would be from Graywood Siding Road to the south. Emergency access is also available via existing farm tracks from Woodhouselee Road.

6.2 Bushfire Action Statement

Stage	Trigger	Action
Preparation	Prior to bushfire season	Ensure all personnel are trained in emergency procedures. Ensure any firefighting equipment is serviceable and available. Replace as required. Inspect water supply points and fill tanks if required Update emergency contact details. Maintain recommended 10m wide APZ's around infrastructure and ensure grass is less than 100mm high; Ensure maintenance and weed control is undertaken prior to onset of the bushfire season each year; Ensure continued access to the site Contact NSW RFS to organise site inspections and fire drills.
	At start of bushfire season	Ensure all fire control measures are in place. Ensure buildings are prepared to limit impact of a bushfire. Ensure all personnel are aware of the 'Works Not to be carried out during a Total Fire Ban' Check to see if any activities require permits
Response	Bushfire approaches	Alert emergency services. Initiate evacuation procedure (Refer to Section 0).
	Fire front impacts site	Remain at refuge.
Recovery	After fire front has passed	Check with emergency services that it is safe to return to site before doing so. Complete post-fire report (Refer Section 6.8).

6.3 Emergency Contacts

Table 6-1 details the emergency contact details.

Table 6-1 Emergency Contacts

Name	Organisation/ Name	Role	Phone Number
Emergency Services	Ambulance Police Fire Brigades	-	000
	NSW Rural Fire Service Southern Tablelands	General enquires	(02) 6226 3100
	State Emergency Services	-	13 25 00
	NSW EPA	-	131 555
Site contacts	Seb Halsall	Site Manager	0448 111 532
	Jason Gilligan	Superintendent	0400 525 035
	Darren Keno	Supervisor	0448 006 014
	Martin Shanley	Safety Advisor	0419 207 922
	Saeid Mahmoudi	Project Quality and Environmental Management Representative (PQAEMR)	0409 082 193

IMPORTANT NOTE: CONTRACTORS ARE NOT TO USE LOCAL VHF CHANNELS.

THESE CHANNELS ARE MONITORED 24/7 BY LOCAL FIRE BRIGADE PERSONNEL AND MUST BE KEPT CLEAR.

6.4 Emergency Communication

Radio and/or mobile telephone communications will be the main means of communications in the event of an emergency. A detailed communications strategy incorporating use of mobile phones, radio use (type, channels and call-signs) will be established and implemented.

During an emergency, personnel are alerted by the call “Emergency, Emergency, Emergency.”

The Chief Warden/Superintendent responds. The Chief Warden/Superintendent shall be in control of radio communications during an emergency. **In the event of an emergency, persons not involved in the emergency shall maintain radio silence so as to allow radio communications between the Chief Warden/Superintendent and other services/ personnel involved in the emergency to flow uninterrupted.**

A Sign in/Sign out register will be kept on site. This will be clearly sign posted to notify emergency response personnel and provide accountability of onsite personnel during the event of an emergency.

6.5 Monitoring Issuing and Responding to Bushfire Warnings

Emergency management authorities can issue general broad community warnings on bushfire via a number of means – mobile phone SMS messages, radio communication (provided through local ABC radio), the internet (on the NSW RFS website), and sirens in some local communities.

The warnings are designed to make the determination to stay and defend or to leave and leave early easier, as this has been shown to be critically important to the survival of those directly at risk of bushfire. Remember – don't wait for a warning. Some fires start and spread so quickly there may not be any time for a warning. If you get a Bushfire Alert, you must take it seriously.

Table 6-2 Bushfire Warning Response Action

Bushfire Warning Issued	Information Type Sample Text	Action
ADVICE 	A fire has started. There is no immediate danger. Stay up to date in case the situation changes.	Users of the site will stand down from activity. Stay up to date in case the situation changes. Prepare to leave the site Property managers are to be notified. An Advice Alert has been issued.
WATCH AND ACT 	There is a heightened level of threat. Conditions are changing and you need to start taking action now to protect you and your family.	The next stage of the alert systems is a warning which indicates the approach of a bushfire and that further action is needed, including: All users of site to leave the site Property managers to close the site, and check for persons Emergency services to be called if assistance is needed
EMERGENCY WARNING 	An Emergency Warning is the highest level of Bush Fire Alert. You may be in danger and need to take action immediately. Any delay now puts your life at risk.	If unable to leave the site, enact emergency management plans. Once the emergency has past, the incident controller will perform a head- count and ensure everyone is accounted for. Site Manager to conduct post-activity report and determine extent of damage to site

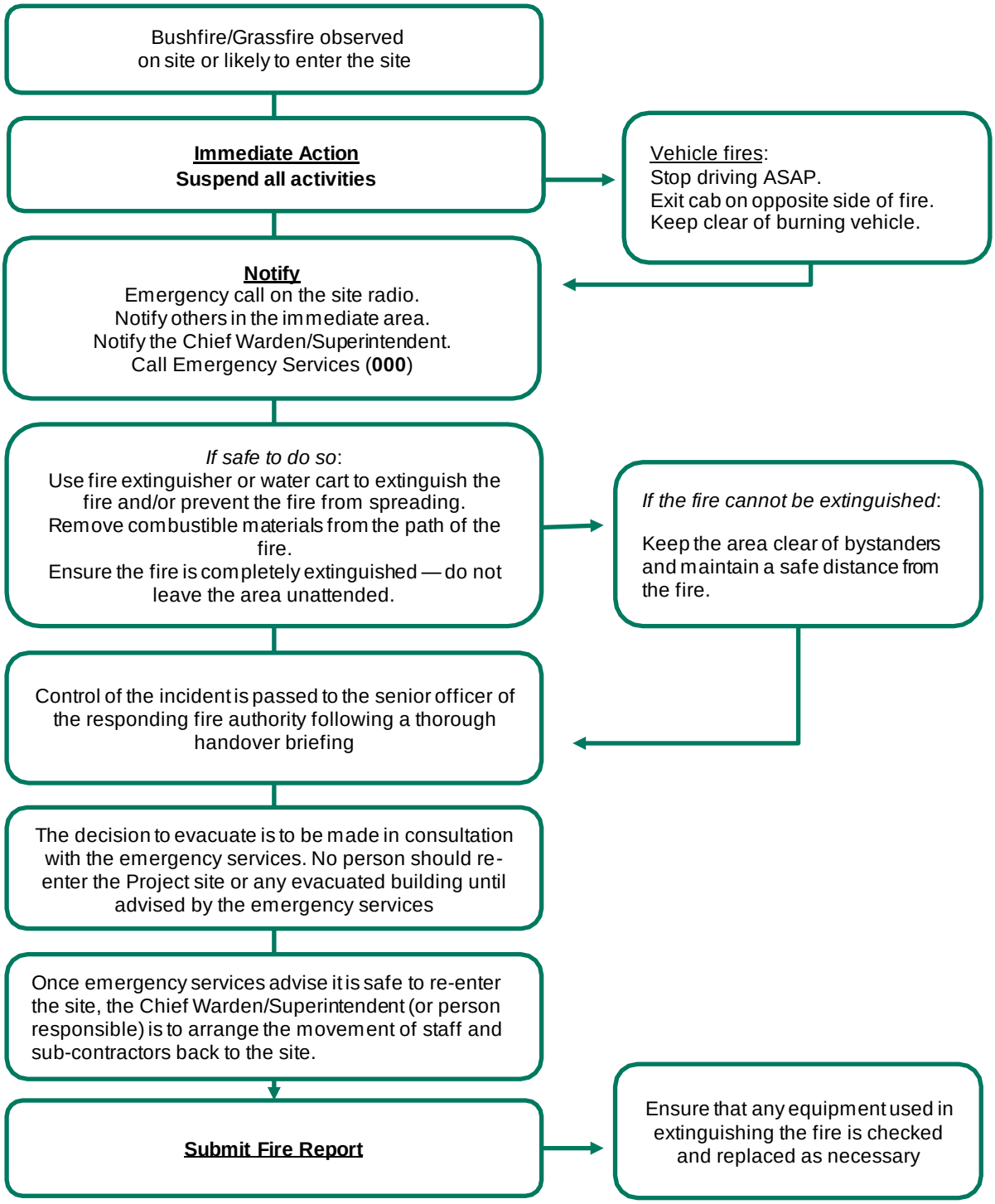
6.6 Evacuation Procedures

Figure 1-2 defines the primary and secondary evacuation points.

Table 6-3 Evacuation Procedures

Trigger	Action
Prior to Bushfire Danger Period	■ Ensure that all staff and sub-contractors are prepared in accordance with the BEMP. ■ Ensure that all persons are informed of the evacuation procedures. ■ Ensure areas around buildings are prepared and maintained. ■ Ensure any firefighting and fire suppression equipment is serviceable and available. ■ Update contact details of staff and sub-contractors. ■ Contact and update emergency services with the premises' contact details.
Procedures for Evacuation during a bushfire emergency	The decision to evacuate is to be made in consultation with the emergency services. The following is the initial procedure for reporting a bushfire to assist in the determination of the need to evacuate and the chosen evacuation strategy: Ring '000' or the NSW Rural Services and advise emergency services of: ■ The exact location of the incident; ■ The nature of the incident; ■ Any persons trapped or injured or likely to be injured; ■ A contact number; ■ A contact name; and ■ Any requirement for further assistance. When aware of the bushfire in the local area: ■ Consult the NSW RFS website, 1800 NSW RFS, smart phone applications and local firefighting resources for fire situation and updates. ■ Immediately inform staff and sub-contractors of the fire situation. ■ Ensure that the person in charge has a mobile phone and a back-up communication option (radio) and is contactable.
Post Bushfire Emergency	■ No person should re-enter the Project site or any evacuated building until advised by the emergency services ■ Once emergency services advise it is safe to re-enter the site, the Chief Fire Warden (or person responsible) is to arrange the movement of staff and sub-contractors back to the site. ■ All individuals are to be accounted for on their return. ■ Inform the police/emergency service of the return of persons to the premises.

6.7 Bushfire Response Flow Chart, Construction Phase



6.8 Fire Report for All Fire Incidents

A fire report should be completed for all fires that occur on or in the vicinity of the site, including all small fires and ignitions, prescribed ecological burn fires and wildfires.

If the incident is managed by the NSW RFS or NPWS, the fire reports from that agency will be obtained, reviewed and kept on record for monitoring and reporting purposes for the Project.

A fire reporting should include details of the following:

- Fire name, ID and location;
- The person / agency responsible for the fire;
- The command and control arrangements / incident team;
- A fire map, including a hand sketch or geographical information systems (GIS) map of the fire perimeter, at 1:25,000 or greater (e.g. 1:10,000) scale over a topographic base map. Fire mapping should include known or suspected ignition point/s, fire perimeter, fire paths, asset damage, islands of unburnt areas, fire control lines, and other information specific to the fire;
- Fire behaviour at different times and locations;
- Fire management/control measures and strategies. This may include a list of equipment, personnel, vehicles utilised and their role (including agencies/equipment/personnel);
- Any unintended fire impacts to ecological values or other assets; and
- Follow up action and additional reporting requirements, such as near-miss or injury, extent of the damage, post-fire assessment requirements.

The annual monitoring for the Project will include a summary of all ecological burns and fire incidents. The fire reports and outcome will also be used to inform an adaptive management approach (improvements in fire mitigation procedures and/or response procedures) and incorporated as part of the document amendment procedure (refer Section **Error! Reference source not found.**).

7. BUSHFIRE RECOVERY REQUIREMENTS

The bushfire recovery objectives are to promote the effective and efficient implementation of management decisions to restore infrastructure to working condition and stabilise or rehabilitate where necessary so that environmental and landscape values can recover, and to support people involved with or affected by bushfire.

The following describes the processes for the implementation and monitoring of the recovery of people, infrastructure and landscape across the site.

7.1 Human Aspects

The impacts of bushfires on the community can be long-lasting and the recovery process can be long. The Royal Commission into the 2009 Victorian Black Saturday Bushfires formulated significant recommendations to increase community resilience to these devastating events.

Programs to increase community resilience to bushfire can be effective; however there are times when certain fire events require additional resources to assist with both the physical and mental recovery process. Personnel who have been affected by a bushfire emergency should contact their workplace health and safety officer or access the employee-assistance-programs for support, including counselling services.

7.2 Animal Welfare

Fire can cause injury and death to animals, as well as destruction of habitat. The intensity of a fire influences recovery of the vegetation community which forms habitat for Fauna. As part of the post fire recovery, it may be necessary to treat, rehabilitate and/or relocated animals that have been impacted by fire. Wildlife Rescue Carers (managed through the National Parks and Wildlife Service, NPWS), and the RSPCA may be able to facilitate and assist with this process.

8. AUDIT AND REVIEW

This plan has been prepared prior to the construction of the development site. This is intentional as the plan is to address the evacuation of staff during the construction activities. Typically, Bushfire Emergency Management Plans are prepared once the operational arrangements of the site are known, such as numbers and arrangement of staff and the details of the layout and operation of the development. This plan is therefore a detailed 'template' that contains the principles of emergency planning applicable to the site but will require review and updating upon knowing details of construction operations (such as staging), staff numbers and working locations.

The BEMP will be annually discussed and reviewed by site personnel at a toolbox meeting (October is suggested) or other meeting convened separately and may coincide with the planned fire drills The objectives of the discussion will be to ensure all site workers are aware of the plan and what steps are required in an emergency situation.

The plan will be reviewed by GPG on an annual basis and updated as required.

8.1 Monitoring and Reporting

Monitoring will be undertaken to ensure the fire management program is achieving the required outcomes. This allows for an adaptive management approach and will enable the identification of issues and any remedial actions or adjustments to the BEMP. Reporting requirements are listed in Table 8-1.

Table 8-1 Reporting requirements

Reporting/ monitoring requirement	
Prepare fire reports for ecological burns, accidental ignitions and bushfire incidents (See Section 6.8).	Immediately post-fire/incident.
Obtain copies of external agency fire reports for burns or incidents.	Immediately post-fire/incident.
Review of fire reports to identify improvements needed and/or rehabilitation action – i.e. implementation of an adaptive management approach.	Immediately post-fire/incident Annually for reporting purposes.
Checklist to ensure all fire mitigation and prepared /response measures and procedures are in place.	Annually – pre- and post- fire season.
Fire regime analysis and report on success / failure of fire management activities/ actions.	Annually.
Archiving of all fire reports, reviews, fire management actions and monitoring results.	As required.
Fire prevention site inspection and reporting	6 monthly during construction Annually during operation

APPENDIX A CONSULTATION

A.1 Summary of Consultation

Agency Comment	Response
NSW Rural Fire Service	
Thursday 27 May 2021 Phillip Walker, Operational Officer Southern Tableland Zone provided the following inputs in the draft Crookwell 3 Bushfire Emergency Management Plan: Please change to the new bushfire warning symbols (triangles) page 20 and table 6.3 <u>There are three levels of Bush Fire Alerts:</u>  **Advice** A fire has started. There is no immediate danger. Stay up to date in case the situation changes.  **Watch And Act** There is a heightened level of threat. Conditions are changing and you need to start taking action now to protect you and your family.  **Emergency Warning** An Emergency Warning is the highest level of Bush Fire Alert. You may be in danger and need to take action immediately. Any delay now puts your life at risk. <u>Table 6-1 Emergency contacts:</u> "000" for all fire and emergency calls. Remove: Goulburn Mulwaree Rural Fire Service and phone number. Replace: NSW Rural Fire Service Southern Tablelands (02) 6226 3100 General enquires Also Upper Lachlan Shire Council is not an emergency service, the number is there general enquire number. <u>Table 6-2 Local RFS contacts</u> Please remove this table. Any local contact will be through the above number.	All changes have been made as per NSW RFS advice. ■ The new bushfire warning symbols have been used ■ Table 6.1 has been updated ■ Table 6.2 has been deleted RFS have made no further comments on the management plan

A.2 Ongoing Consultation Schedule

Regular consultation with the local NSW RFS is to occur during the pre-construction, construction and operational phases of the Project. The below consultation schedule will be implemented to ensure the appropriate bushfire management procedures and mitigation measures are in place to manage potential fires.

Stage of Project	Consultation Requirements	Responsibility
Pre-construction	■ Submission of the Draft Bushfire Emergency Management Plan to NSW RFS for review, comment and input.	CPG
	■ Submission of the Final Draft Bushfire Emergency Management Plan to DPIE for review and approval.	CPG
	■ Copy of the final Bushfire Emergency Management Plan supplied to the NSW RFS once approved	CPG
Construction	■ Initial fire prevention site inspection within 3 months of site establishment ■ Fire prevention site inspections by the local NSW RFS (6 monthly or as agreed with NSW RFS)	Safety Advisor to organise and ensure that all inspections are reported and any actions are implemented.
	■ Initial fire drill practice on site within the first 3 months of site establishment ■ Regular fire drill practice on site with the local NSW RFS (6 monthly)	Safety Advisor to co-ordinate drill with the local NSW RFS.
Operation	■ Initial fire drill practice on site within 3 months of operation commencement ■ Regular Fire Drill Practice on site with the local NSW RFS (annually or as agreed with NSW RFS)	Safety Advisor to co-ordinate drill with the local NSW RFS.

APPENDIX B OVERVIEW OF THE REGIONAL BUSHFIRE ENVIRONMENT

B.1 History of Windfarms and Bushfire in Australia

A technical report into the financial and market impacts of wind turbine fires (Sharma, 2015) found that turbine fires are relatively infrequent, with approximately around 50 each year out of 300,000 wind turbines internationally (a rate of 1:6000).

A review of available literature identifies that there have been five reported fires involving wind farms within Australia:

- Ten Mile Lagoon in Western Australia in the mid-1990s. Damage limited to the relevant turbines, no damage to surrounding environment. Involved technology that is now redundant;
- Lake Bonney in South Australia in 2006. This fire was related to maintenance works during a shutdown. Damage limited to the relevant turbines, no damage to surrounding environment;
- the Star Fish Hill Wind Farm near Cape Jervis in South Australia experienced a turbine fire in October 2010. The turbine was damaged and surrounding spot fires were extinguished. The blades did not cease rotating in this instance, compounding the firefighting response due to the exclusion perimeter that was established and the spot fires due to flames coming off the rotating blades;
- a turbine fire occurred at Cathedral Rocks Wind Farm, South Australia, in February 2009. The turbine was damaged and surrounding spot fires required extinguishing (Parsons Brinkerhoff, 2012); and
- the Currandooley Fire in January 2017 was caused when a crow connected with overhead electrical infrastructure, caught alight and dropped into dry foliage underneath a power line that transfers electricity from Infigen's Woodlawn Windfarm to a substation at their Capital Wind Farm. The fire burnt approximately 3,400 hectares and was subject to a class action.

Another example of a fire that impacted a wind farm (as opposed to the previous five examples that involved wind farm infrastructure) a bushfire started on a paddock near the Waterloo Wind Farm in South Australia. Fanned by gusty westerly and north westerly winds, the fire quickly spread through the area and raced up the ridge where the wind farm was located. 200 Country Fire Service volunteers were involved in firefighting operations and were supported by three water bombing aircraft. The wind farm operator confirmed that there was no damage to any wind farm infrastructure and no danger at any time to human life as a result of the fire. Normal wind farm operations resumed once the Country Fire Service advised the operator that it was safe to do so. Similarly, Pacific Hydro reported that a bushfire near Taralga Wind Farm in January 2018 was attended by NSW RFS firefighting teams on the ground, supported by firefighting aircraft and heavy plant. Turbines were shut down to assist aerial firefighting and no injuries to staff or damage to the wind farm was reported.

A number of learnings for emergency management procedures and protocols in relation to wind farms and bushfires have been reported by AFAC (2018) and Clean Energy Council (2017). These include:

- the wind farm's access roads were beneficial in helping fight the bushfire on the ground and provided an effective firebreak;
- the wind farm's turbines did not present a hazard to aerial firefighting and the turbines were clearly visible to the pilots involved in operations. However, transmission infrastructure, transmission lines and meteorological masts were difficult to see by pilots and did pose a safety risk;
- to maximise air space for firefighting between the turbines, turbines should be locked in the 'Y' position;

- improved communication protocols need to be in place between wind farm operators and fire and land management agencies to direct turbine shut-down procedures in an emergency situation and initiate emergency response plans;
- wind farm operators should ensure that they have the capacity to respond to emergency events; and
- additional precautionary measures should be considered to allow for aerial identification of meteorological masts (measurement towers), guy wires and other infrastructure such as transmission lines that are not easily visible from air.

The Australia Institute (2006) describe the fire risk associated with wind farms as minuscule provided the wind farm is properly constructed and managed. They determine fires caused by wind turbines are very rare and pose little risk to surrounding property. While it is possible for a catastrophic failure to cause fire within the turbine mechanism, the system is designed to contain fire and the likelihood of fire commencing from a tower equipment failure is much lower than from a faulty header or other farm machinery. The Government of South Australia (2004) also conclude that with normal maintenance and servicing practices in place, a wind farm will not pose an increased fire hazard to the host community and further that there has never been an incident involving a member of the public during normal operation.

B.2 Climate Change and Bushfires

Eastern Australia is documented to be one of the most bushfire-prone areas in the world. As reported by the Bureau of Meteorology (BOM 2020 http://www.bom.gov.au/weather-services/fire-weather-centre/bushfire-weather/index.shtml), human induced climate change is influencing the frequency and severity of dangerous bushfire conditions in Australia and other regions of the world, influencing temperature, environmental moisture, weather patterns and fuel conditions. Observed changes in southern and eastern Australia include more extreme conditions during summer, as well as an earlier start to the bushfire season with dangerous weather conditions occurring significantly earlier in spring than they used to.

While climate change might not ignite the fire, it is giving fires the chance to turn into catastrophic fires by creating warmer temperatures, increasing the amount of fuel (dried vegetation) available, and reducing water availability due to higher evaporation. In relation to fire ignition, there is some indication that human induced climate change could also influence the risk of ignitions from dry-lightning (i.e. lightning that occurs without significant rainfall).

Bushfire weather conditions in future years are projected to increase in severity for many regions. This will result in:

- an earlier start to the bushfire season;
- reduced opportunities for fuel reduction burning;
- management of fire risk to property, people and biodiversity will become increasingly challenging; and
- an increase in the number of extreme fire danger days.

B.3 Regional Bushfire Characteristics

Crookwell is located in the Southern Tablelands region of New South Wales (NSW). The Southern Tablelands Zone Bushfire Management Committee (BFMC) area has on average 265 bushfires per year, of which five are considered large fires. Major fires occur sporadically with about three in a five year period. Generally, major fires occur in a cycle of five to seven years (Southern Tablelands Zone BFMC 2019).

The main sources of ignition in the Southern Tablelands Zone BFMC area are reported to be:

- Lightning is the greatest source of ignition within the area, and is mainly associated with late spring and summer thunderstorm activity which is normally (but not always) accompanied by some rainfall.
- Illegal burning off is mainly in rural areas but can occur in any part of the area. These activities are mainly but not exclusively in autumn through to spring;
- Escapes from legal burning are mainly in rural areas, and can occur in any part of the area. These activities are mainly but not exclusively in autumn through to spring;
- Ignition caused by human error covers the use of farm machinery (eg during slashing), use of motor mowers, welding, and large numbers of tourists increasing the risk of careless lighting of fires and disposal of ignition sources (e.g. cigarette butts on major highways); and
- Arson has not tended to be a major concern in many although it is of concern in urban areas and around rubbish tips.

An analysis of the fire weather experienced in the locale and the surrounding region provides insight into bushfire behaviour potential. A **Fire Danger Index (FDI) of 100** has been used to inform bushfire behaviour on windfarm site.

The average climate in the Southern Tablelands Zone BFMC area is reported to be temperate to cool characterised by warm to hot summers and cool winters, with peak rainfall generally occurring during winter and spring. The Zone experiences yearly temperatures from about -5 degrees Celsius (°C) (in the winter months of June, July and August) to 35-37°C in the summer months (December, January and February) although colder and higher temperatures are not uncommon. As the Zone is both large and diverse, rainfall varies considerably. Generally, rainfall is both unreliable and at the lowest during summer months, resulting in substantial curing of pastoral and grazing land which covers a large proportion of the Zone (Southern Tablelands Zone BFMC, 2009).

Prevailing weather conditions associated with the bushfire season in the Southern Tablelands Zone BFMC area are north/north-westerly winds, although in late afternoons southerly and easterly winds may occur for short periods. Lightning strikes during storms occur frequently in the bushfire season.

APPENDIX C NSW RFS FIRE TRAIL DESIGN, CONSTRUCTION AND MAINTENANCE MANUAL

NSW GOVERNMENT

NSW RURAL FIRE SERVICE

NSW RFS
FIRE TRAIL STANDARDS

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STATEMENT

NSW RFS FIRE TRAIL STANDARD 2016 V1.0, PRINTED 2016, 2018
NSW RFS FIRE TRAIL STANDARD 2016, V1.1, PRINTED JUNE 2019.
INCLUDES CORRECTION TO LAT/LONG FORMAT FROM 'DDM' TO 'DD' FORMAT.

1. Introduction

1.1 Background

Bush fires have been a natural part of the landscape for many thousands of years. As communities have developed and properties and towns have been established, the risk of bush fires impacting on communities has increased. Throughout NSW there are approximately 1.3 million properties on bush fire prone land.

Firefighters rely on public roads, trails and other tracks on public and private land to access the landscape to prevent and contain bush fires. Fire trails exist for the purpose of providing access to respond to bush fires, and it is critical to identify and maintain an effective network of accessible trails.

Historically, decisions regarding the establishment and maintenance of fire trails have rested with land managers guided by a cooperative framework established by the NSW Bush Fire Coordinating Committee (BFCC). A need for a different approach was identified to achieve a more consistent and strategic outcome across both public and private lands.

The NSW Government is establishing a more integrated and strategic network of fire trails and access arrangements to improve accessibility for firefighters during bush fires and hazard reduction burns.

Amendments to the *Rural Fires Act 1997*, through the *Rural Fires Amendment (Fire Trails) Act 2016,* provide a legislative basis for the establishment and maintenance of the enhanced network of fire trails.

The *Rural Fires Amendment (Fire Trails) Act 2016* provides for the NSW RFS Commissioner to make *Fire Trail Standards* that (without limitation) may set out:

- classification, length, width, gradient, signage, construction standards and maintenance of fire trails, and
- the structure and form of Fire Access and Fire Trail (FAFT) plans and Treatment Registers prepared by local Bush Fire Management Committees (BFMC).

1.2 Purpose

This document constitutes the *Fire Trail Standards* made by the NSW RFS Commissioner pursuant to section 62K of the *Rural Fires Act 1997*.

These Standards establish the requirements to achieve an integrated and strategic fire access and fire trail network. The Standards set out design and construction requirements for identified fire trails in NSW, and prescribe the structure of the FAFT plan and associated Treatment Registers to be prepared by BFMCs.

The Standards are to be used by organisations across NSW responsible for undertaking fire access and fire trail planning, and land managers responsible for the design, construction and maintenance of fire trails.

A suite of documents developed by the NSW RFS Commissioner and the NSW BFCC provide supplementary guidance and direction to land managers to assist in the design, construction and maintenance of fire trails on their land, and BFMCs involved in fire trail planning and the preparation of FAFT plans. These include:

- FAFT workshop presentation
- FAFT Plan Instructions
- Maps
- List of current fire trails
- Treatment Register (populated with BFMC fire trails)
- Trail ranking and prioritisation tool.

1.3. Aim

The aim of the Standards is to facilitate the planning and implementation of an integrated and strategic network of fire trails.

1.4 Objectives

The objectives of the Standards are:

- To provide a process to identify an integrated and strategic network of fire trails for the protection of the community and its assets, including environmental and social values;
- To establish a network of strategic fire trails which meet minimum standards and allow standard off- road capable firefighting vehicles to safely and effectively traverse the landscape;
- To ensure fire trails enable a vehicle to be driven safely along the trail without damage to the vehicle due to overhanging vegetation, built structures, rough trail surface or other physical impediments;
- To ensure fire trails are of an expected standard that is known and understood by firefighters, can be readily identified including in limited visibility conditions, and are available when required; and,
- To provide a sustainable fire trail network that meets operational requirements, minimises adverse impacts on the environment, and delivers value for money.

1.5 Assumptions

The Standards have been prepared on the basis of the following assumptions:

- The fire trail network will be used by suitably trained and competent firefighters capable of operating in the expected physical environment.
- Firefighting vehicles will meet NSW RFS standard specifications and be driven by licensed and competent drivers in accordance with local procedures.

1.6 Limitations

The Standards have been prepared with regard to the following limitations:

- Fire trails provided for in the Standards are for the purposes of bush fire suppression and other fire management purposes. While it is recognised that fire trails may also be used for other purposes (including other land management and commercial purposes, forming a part of fire breaks, fire containment lines and the like), such uses do not fall within the scope of these Standards.
- While fire trails will be built to a consistent acceptable standard in consideration of operational needs, the safety of firefighters cannot be guaranteed given variability in topography, weather and fire conditions.
- The design and construction standards specified in the Standards cater for standard off-road capable firefighting vehicles currently used in NSW.
- The implementation of a new standard is often challenging and subject to available funding and priorities. The NSW RFS Commissioner and the BFCC acknowledge that a cooperative and incremental approach in implementing this Standard will be required over several years, and the effectiveness of the Standard will be continually monitored to ensure it meets the intent of the legislation.

1.7 Definitions

Expressions defined in 62J of the *Rural Fires Act 1997* apply to the Standards. Definitions are per the NSW RFS Dictionary and apply to the Standards except where otherwise defined in section 62J of the Act. Key terms relevant to the Standards are included below for reference:

Designated fire trail	A fire trail identified by the NSW RFS Commissioner that must be upgraded or established to meet the Standards.
Certified fire trail	A fire trail that has been certified as compliant with the *Fire Trail Standards*.
Registered fire trail	A fire trail, regardless of tenure, that has been certified to meet these Standards and is placed on the Public Register.
Strategic fire trail	A fire trail on any tenure identified by a BFMC during the FAFT planning process, or by the NSW RFS Commissioner, to be of significant value in the suppression or management of fire within the landscape. These trails are placed on the Treatment Register approved by the NSW RFS Commissioner and subsequently designated. These may include multi- purpose trails.
Tactical fire trail	A fire trail on any tenure identified by a BFMC during the FAFT planning process, or by the NSW RFS Commissioner, that should remain open to support the prevention and suppression of fire. These may include multi-purpose trails.
Private land	means that is not public land (section 62J).
Public land	means managed land, unoccupied Crown Land, or land owned or occupied by a public authority. A public authority responsible for any particular land is taken to be occupier of the land for this Part (section 62J).

1.8 What is a fire trail for the purpose of these Standards?

There are a range of access ways across the landscape available for use by firefighters. These include public roads, tracks and trails or other roads used for land management, asset management or recreational purposes.

The purpose of these Standards is to define a network of fire trails for vehicular use identified through the processes established by the Act and deemed necessary for the protection of the community and its assets. These vehicular trails will be identified at a local level by the BFMC and recorded in a FAFT plan and the Treatment Register, or by the NSW RFS Commissioner. The NSW RFS Commissioner may provide guidance relating to the factors to be considered in this process.

While the Standards are principally concerned with fire trails designated and registered under provisions of the Act, it is recognised that other fire trails and access ways will continue to exist and serve an important role in bush fire suppression and fire management. These other fire trails will also be informed by the Standards. All fire trails and access ways will be identified as part of the overall fire access network captured in the FAFT planning process.

1.9 Performance-based approach

The Standards adopt a performance-based approach which allows for flexibility and innovation in the design of fire trails having regard to site-specific opportunities and constraints.

The performance criteria must be satisfied for registered fire trails, and should be achieved for other fire trails. Performance criteria are set out for each requirement and the outcome that needs to be achieved. Meeting the performance criteria is essential to maintain the safety and operational performance of firefighting resources. Compliance with the performance criteria can be achieved in one of two ways:

2. Acceptable solution – Acceptable solutions have been specified for each performance criteria and are 'deemed to satisfy'. Materials, components, design factors, and construction methods may be included which, if used, will result in compliance with the performance criteria. It is expected that designated and registered fire trails on the whole will fall into this category; or,
3. Performance solution – A performance solution may be proposed where constraints mean compliance with the acceptable solution is not practicable, and it is demonstrated that it otherwise achieves the performance criteria.

The process of demonstrating compliance, including where a performance solution is proposed, is outlined in Chapter 3.

1.10 Environmental approvals

Fire trail works are required to be undertaken in accordance with applicable environmental and other regulatory requirements. A range of environment approval mechanisms exist for fire trails, these include:

- Bush Fire Hazard Reduction Certificate issued in accordance with the Bush Fire Environmental Assessment Code;
- Review of Environmental Factors (REF) under Part 5 of the *Environmental Planning and Assessment Act 1979*;
- Assessment in accordance with the Infrastructure State Environmental Planning Policy (ISEPP); or
- Any other relevant environmental approval methods.

The following applies to the Bush Fire Environmental Assessment Code.

The Bush Fire Environmental Assessment Code 2017* (the *"Code"*) provides a streamlined environmental assessment process for mechanical and burning methods for undertaking bush fire hazard reduction work, including fire trails.

For the purposes of clause 3.8 of the Code, the Code applies to the following works, provided the works are to bring the fire trail into closer compliance with an acceptable solution set out in, or performance solution approved in accordance with, the design and construction requirements set out in Chapter 2 and the work is in accordance with the *NSW RFS Fire Trail Design, Construction and Maintenance Manual* issued by the NSW RFS Commissioner:

- a designated fire trail;
- a registered fire trail;
- a fire trail that constitutes part of the fire trail network within a FAFT plan approved for the area;
- a fire trail shown on the BFMC's fire trail layer and categorised as 'essential' or 'important' as at 1 August 2017 where there is no FAFT plan approved for the area; or
- an existing fire trail identified as a treatment in an approved Bush Fire Risk Management Plan where there is no FAFT plan approved for the area.

For the purposes of clause 3.9 of the Code, the Code applies to works for a vehicular control line, where those works are in accordance with an acceptable solution set out in, or performance solution approved in accordance with, the design and construction requirements set out in Chapter 2 and *NSW RFS Fire Trail Design, Construction and Maintenance Manual* issued by the NSW RFS Commissioner.

*Note: Once approved and Gazetted.

2. Fire Trail Standards

2.1 Classification of fire trails

The Standards provide for the classification of fire trails based on the type of firefighting vehicle required to access an area. Three categories are provided:

- Category 1: A fire trail that can be safely traversed by a Category 1 firefighting vehicle.
- Category 7: A fire trail that can be safely traversed by a Category 7 firefighting vehicle.
- Category 9: A fire trail that can be safely traversed by a Category 9 firefighting vehicle.

Specific requirements have been developed for each category of fire trail. The specifications are based on the engineering details contained in Appendix A.

The category of each fire trail will be identified in the FAFT plan as set out in Chapter 4 and as identified by the NSW RFS Commissioner in the designation and registration of the fire trail.

2.2 Design requirements

Intent of requirements: to provide a functional, strategic network of fire trails which permits access for firefighting vehicles used in NSW in order to support fire management and bush firefighting.

2.2.1 Category 1 Fire Trails

The following performance criteria and acceptable solutions are considered industry best practice and apply to Category 1 Fire Trails:

Table 1: Category 1 Fire Trail requirements

REQUIREMENT	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
Width	The width of the trail provides for safe, reliable and unobstructed passage by a Category 1 firefighting vehicle within acceptable operational limits.	- The trafficable surface has a width of 4 metres except for short constrictions to 3.5 metres for no more than 30 metres in length where an obstruction cannot be reasonably avoided or removed. - Curves have a minimum inner radius of 6 metres. The minimum distance between inner and outer curves is 6 metres.
Capacity	The construction and formation of the trail is trafficable under all weather conditions (other than due to flood, storm surge or snowfall) for a Category 1 firefighting vehicle.	- Trail surfaces and crossing structures are capable of carrying vehicles with a gross vehicle mass of 15 tonnes and an axle load of 9 tonnes.

REQUIREMENT	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
Grade and crossfall	The vertical profile of the trail provides for traction and safe working angle within the physical operational capability of a Category 1 firefighting vehicle. *Note: This includes design that does not impede the undercarriage of a vehicle.*	› The maximum grade of a trail is not more than 15 degrees. › The crossfall of the trail surface is not more than 6 degrees. › Drainage structures, feature crossings, or other significant changes in the grade of the trail shall be in accordance with the *NSW RFS Fire Trail Design, Construction and Maintenance Manual*.
Clearance	A cleared corridor is provided around the trail which permits the unobstructed passage of a Category 1 firefighting vehicle and for a working corridor either side of the vehicle to enable firefighters to exit from, and access equipment in, the vehicle.	› A minimum vertical clearance of 4 metres is provided above the surface of the trafficable surface clear of obstructions.
Passing	The trail provides for two Category 1 firefighting vehicles to pass at appropriate intervals so as to avoid unacceptable delays in operations.	› Capacity for passing is provided every 250 metres comprising: › A widened trafficable surface of at least 6 metres for a length of at least 20 metres; or › A 6 metre wide and 8 metre long area clear of the trafficable surface with a minimum inner curve radius of 6 metres and minimum outer radius of 12 metres; or › A turnaround as provided for in this table.
Turnarounds	The trail provides for a turning manoeuvre for a Category 1 firefighting vehicle to return in the direction from which it came at appropriate intervals and at the termination of a trail.	› A turning area is provided at the termination of a trail and every 500 metres and is achieved by: › An area clear of the trafficable surface 6 metres wide and 8 metres deep, with a minimum inner curve radius of 6 metres and outer minimum radius of 12 metres; or › A turning circle of minimum 22 metre diameter. › A T-junction with each terminating end of the junction being at least 10 metres in length from the intersection of the roads and the inner radius of that intersection being at least 6 metres › A fire trail or road intersection.
Drainage	The fire trail is drained effectively to manage rainfall runoff to prevent damage to the trafficable surface.	› Drainage of the trail is designed and constructed in accordance with the *NSW RFS Fire Trail Design, Construction and Maintenance Manual*.

2.22 Category 7 Fire Trails

The following performance criteria and acceptable solutions are considered industry best practice and apply to Category 7 Fire Trails:

Table 2: Category 7 Fire Trail requirements

REQUIREMENT	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
Width	The width of the trail provides for safe, reliable and unobstructed passage by a Category 7 firefighting vehicle within acceptable operational limits.	› The trafficable surface has a width of 3.5 metres except for short constrictions to 3 metres for no more than 30 metres in length where an obstruction cannot be reasonably avoided or removed. › Curves have a minimum inner radius of 5 metres. The minimum distance between inner and outer curves is 5 metres.
Capacity	The construction and formation of the trail is trafficable under all weather conditions (other than due to flood, storm surge or snowfall) for a Category 7 firefighting vehicle.	› Trail surfaces and crossing structures are capable of carrying vehicles with a gross vehicle mass of 8 tonnes and an axle load of 6 tonnes.
Grade and crossfall	The vertical profile of the trail provides for traction and safe working angle within the physical operational capability of a Category 7 firefighting vehicle. *Note: This includes design that does not impede the undercarriage of a vehicle.*	› The maximum grade of a trail is not more than 15 degrees. › The crossfall of the carriageway is not more than 6 degrees. › Drainage structures, feature crossings, or other significant changes in the grade of the trail shall be in accordance with the *NSW RFS Fire Trail Design, Construction and Maintenance Manual*.
Clearance	A cleared corridor is provided around the trail which permits the unobstructed passage of a Category 7 firefighting vehicle and for a working corridor either side of the vehicle to enable firefighters to exit from, and access equipment in, the vehicle.	› A minimum vertical clearance of 3.5 metres is provided above the surface of the trafficable surface clear of obstructions.

REQUIREMENT	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
Passing	The trail provides for two Category 7 firefighting vehicles to pass at appropriate intervals so as to avoid unacceptable delays in operations.	› Capacity for passing bays are provided every 250 metres comprising: › A widened trafficable surface of at least 5.5 metres for a length of at least 15 metres; or, › A 5.5 metre wide and 6 metre long area clear of the trafficable surface with a minimum inner curve radius of 5 metres and minimum outer radius of 10 metres.
Turnarounds	The trail provides for a turning manoeuvre for a Category 7 firefighting vehicle to return in the direction from which it came at appropriate intervals and at the termination of a trail.	› A turning area is provided at the termination of a trail and every 500 metres and is achieved by: › An area clear of the trafficable surface 5.5 metres wide and 6 metres deep, with a minimum inner curve radius of 5 metres and outer minimum radius of 10 metres; or › Turning circle of minimum 17 metre diameter.
Drainage	The fire trail is drained effectively to manage rainfall runoff to prevent damage to the trafficable surface.	› Drainage of the trail is designed and constructed in accordance with the *NSW RFS Fire Trail Design, Construction and Maintenance Manual*.

2.2.3 Category 9 Fire Trails

The following performance criteria and acceptable solutions requirements are considered industry best practice and apply to Category 9 Fire Trails:

Table 3: Category 9 Fire Trail requirements

REQUIREMENT	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
Width	The width of the trail provides for safe, reliable and unobstructed passage by a Category 9 firefighting vehicle within acceptable operational limits.	› The trafficable surface has a width of 3 metres except for short constrictions to 2.5 metres for no more than 30 metres in length where an obstruction cannot be reasonably avoided or removed. › Curves have a minimum inner radius of 5 metres. The minimum distance between inner and outer curves is 5 metres.
Capacity	The construction and formation of the trail is trafficable under all weather conditions (other than due to flood, storm surge or snowfall) for a Category 9 firefighting vehicle.	› Trail surfaces and crossing structures are capable of carrying vehicles with a gross vehicle mass of 4 tonnes and an axle load of 2 tonnes.
Grade and crossfall	The vertical profile of the trail provides for traction and safe working angle within the physical operational capability of a Category 9 firefighting vehicle. *Note: This includes design that does not impede the undercarriage of a vehicle.*	› The maximum grade of a trail is not more than 15 degrees. › The crossfall of the trail surface is not more than 6 degrees. › Drainage structures, feature crossings, or other significant changes in the grade of the trail shall be in accordance with the *NSW RFS Fire Trail Design, Construction and Maintenance Manual*.
Clearance	A cleared corridor is provided around the trail which permits the unobstructed passage of a Category 9 firefighting vehicle and for a working corridor either side of the vehicle to enable firefighters to exit from, and access equipment in, the vehicle.	› A minimum vertical clearance of 3 metres is provided above the surface of the trafficable surface clear of obstructions.

REQUIREMENT	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
Passing	The trail provides for two Category 9 firefighting vehicles to pass at appropriate intervals so as to avoid unacceptable delays in operations.	› Capacity for passing bays are provided every 250 metres comprising: › A widened trafficable surface of at least 5 metres for a length of at least 15 metres; or, › A 5.5 metre wide and 6 metre long area clear of the trafficable surface with a minimum inner curve radius of 5 metres and minimum outer radius of 10 metres.
Turnarounds	The trail provides for a turning manoeuvre for a Category 9 firefighting vehicle to return in the direction from which it came at appropriate intervals and at the termination of a trail.	› A turning area is provided at the termination of a trail and every 500 metres and is achieved by: › An area clear of the trafficable surface 5.5 metres wide and 6 metres deep, with a minimum inner curve radius of 5 metres and outer minimum radius of 10 metres; or › Turning circle of minimum 16 metre diameter.
Drainage	The fire trail is drained effectively to manage rainfall runoff to prevent damage to the trafficable surface.	› Drainage of the trail is designed and constructed in accordance with the *NSW RFS Fire Trail Design, Construction and Maintenance Manual*.

2.3 Construction and maintenance requirements

Fire trails shall be constructed and maintained in accordance the *NSW RFS Fire Trail Design, Construction and Maintenance Manual* issued by the NSW RFS Commissioner.

2.4 Access requirements

Access to fire trails shall not be obstructed to ensure that the fire trail is available for use by firefighting services. Where access to a fire trail is controlled through the installation of a gate or other control mechanism, this shall not unreasonably restrict access to firefighters. Access by firefighters and their representatives shall only be undertaken for the purposes of firefighting and associatedactivities.

Inappropriate / unauthorised access is not permitted without the knowledge of the landmanager.

Any gate or control mechanism installed across a trail shall be operable by a single person without assistance or machinery, and provide a clear area for the passing of a vehicle at least the width of the trafficable surface specified in the relevant acceptable solution specified in Table 1, 2 or 3. This area for passing should be provided within 100 metres of the gate.

Where any securing arrangement to a gate or other control mechanism requires the use of the keyfor access, the land manager must provide firefighters with access such that firefighting efforts are not hampered or delayed, to the satisfaction of the NSW RFS Commissioner.

The NSW RFS Commissioner will work with major government land managers to identify suitable and efficient access control arrangements to facilitate access to the fire trail network across tenures.

It is acknowledged that fire trails may need to be closed periodically for maintenance and repair purposes. Any periods of closure should be minimised as far as reasonably practicable and local response agencies should be made aware of the closure, intended duration of closure and reopening.

2.5 Signage requirements

Standardised signs should be installed and maintained throughout the fire trail network so that fire trails are easily identified when required for firefighting activities and fire management, including in times of limited visibility. Signs will be required for all fire trails on public land, while signs to be installed on private land will be subject to agreement with the relevant private landowner.

The NSW RFS Commissioner will supply and install standard fire trail signs or approved indicative signage where appropriate for all registered fire trails. Signage will be installed in the first instance on trails where no current signage exists. Where existing signage exists that is clear and performs the required function, it will not require replacement until the sign is no longer functional, at which time it will be replaced by NSW RFS with a sign that meets this Standard.

To maintain consistency and ensure accuracy, the NSW RFS Commissioner will gather signage requirement details from each land manager through the BFMC prior to ordering signage.

2.5.1 Standard fire trail signs

A fire trail should be clearly signposted with standard signs at each entry point to the fire trail.

Fire trail signs will be a metal blade, Class 1 reflective yellow with black lettering, and include:

- NSW RFS* Logo
- Fire trail name (including 'F/T' as an abbreviation for 'fire trail');
- Latitude and longitude reference of the location of the sign in Degrees Decimal Minutes (DD) format, and;
- The vehicle carrying capacity (1, 7 or 9) in red within red circle as displayed in Appendix B.

Lettering is to be 70mm in height, and a blade is to be no longer than 1200mm. Should a fire trail name not fit on a single blade of this length, the following options are to be considered:

1. compress lettering spacing and retain 70mm height
2. reduce lettering size and print on two lines

Where a sign is to be mounted on a centre pole, blade length may be increased to 1800mm. Signs should consider the use of an anti-graffiti coating.

An illustration of a typical standard sign for a registered fire trail is at Appendix B.

In areas where permanent signage is unsuitable such as areas of high theft or vandalism, the NSW RFS Commissioner may consider the use of temporary signage such a v-frame signage, or other design suitable for use during an incident.

**except where the sign is paid and provided by the land manager. In these circumstances, the land manager may use their logo in place of the NSW RFS.*

2.5.2 Indicative fire trail signs

In circumstances where the use of a standard fire trail sign is not considered suitable, such as on or near private property, the NSW RFS Commissioner may issue and install indicative fire trail signs.

These signs will be a metal blade, Class 1 reflective yellow, and include only the trail Vehicle Carrying Capacity (i.e. 1, 7 or 9) as shown in Appendix B. These signs should consider the use of an anti-graffiti coating.

An illustration of a typical indicative sign for a registered fire trail is at Appendix B.

2.5.3 Installation of fire trail signs on non-registered fire trails

Should a BFMC or land manager wish to install fire trail signs on non-registered fire trails, the sign should use the design in Appendix B with the following alterations:

- all lettering is to be black, including the vehicle carrying capacity
- there must be no circle around the vehicle carrying capacity.

2.5.4 No through trails

All trails with only one entry and exit point (dead ends or to hand tool lines only) must be marked as a "No Through Road". These signs to be Class 1 reflective white with black lettering 70mm in height, and are to be a single blade positioned directly under the fire trail sign.

2.5.5 Bridges

Bridges should be marked and identify load rating. These signs to be Class 1 reflective white with black lettering as per RMS standards, and are to be a single sign positioned appropriately in relation to the bridge.

2.5.6 Standard symbology and other advisory signs

In some circumstances there may be a requirement or benefit in displaying additional informationon sign posts. This may include a six (6) figure grid reference.

Standard symbology, in accordance with AFAC Standards, for features considered relevant (such as Water Points, Escape Routes and Helipads) by a BFMC may be included on a Class 1 reflective white single blade. The symbology would be consistent with the colour of the standardised AFAC symbol. An example is provided in Appendix B.

Should the fire trail have any known restrictions, a separate blade shall be provided to identify the restriction. These will be a metal blade, Class 1 reflective white with black lettering.

2.5.7 Fire trail name

Fire trails shall be appropriately named in order to minimise confusion. BFMCs and land managers are required to name the fire trail prior to registration. If already known, use accepted names when formally naming a fire trail. Fire trails should not be referred to as 'unnamed', 'no name', or 'unknown'.

Nominated names should be easy to pronounce, write and spell. Avoid duplication or the use of common names in existence elsewhere within the BFMC's local area.

2.5.8 Other signs

Other signs may be required from time to time by the NSW RFS Commissioner. These may include guide posts for culverts, or signage required to indicate the location of turn-around points or helipads.

The NSW RFS will work with the other agencies to determine additional public safety information signage to be provided as part of, or in conjunction with, fire trail signs as required.

3. Assessment and compliance

Assessments will need to be undertaken at a number of points in this process to determine whether a fire trail complies with the design and construction requirements of the Standard. Assessments shall be focussed on whether the trail complies with the design and construction standards set out in Chapter 2. Where an assessment is undertaken for the purposes of submission to the NSW RFS Commissioner, the assessment will be required to be in the form specified by the NSW RFS Commissioner.

3.1 Performance solutions

Where a performance solution is proposed, the onus is on the land manager to demonstrate compliance with relevant provisions of the Standards.

Performance solutions must be assessed according to one or more of the assessment methods:

- Evidence to support that the use of a material, form of construction, or design meets the performance criteria;
- Verification methods such as a test, inspection, calculation or other method that determines whether a performance solution complies with the relevant performance criteria;
- Comparison with the acceptable solutions using expert judgement.

Performance solutions should be developed in consultation with the relevant stakeholders such as the NSW RFS, engineers, private land owners, and the BFMC before being forwarded to the NSW RFS Commissioner for approval.

3.2 Annual assessment

A public land manager shall provide to the NSW RFS Commissioner annually a statement as to the condition of each designated and registered fire trail on its land, and whether or not each of those trails meet the Standards. The statement must be made in the form as specified by the NSW RFS Commissioner.

Where a fire trail is located on private land, assessment arrangements will be determined and set out in the agreement entered into between the NSW RFS Commissioner and the landowner.

The NSW RFS may undertake inspections of fire trails on both public and private land additional to the annual assessment requirement.

An annual assessment of all other fire trails in a FAFT plan should be undertaken by the responsible agency and provided to the BFMC.

4. Planning

4.1 Fire Access and Fire Trail plan requirements

In order to provide a consistent approach to fire trail planning across NSW, the Act requires BFMCs to prepare a draft FAFT plan for their area. This must be prepared in accordance with requirements set out in these Standards and reviewed and approved by the BFCC.

The FAFT plan will supplement existing fire planning activities undertaken at the local level, such as bush fire risk management planning, and identify the appropriate means of accessing land to prevent, fight, manage or contain bush fires. The process will consider a wide range of factors that will review the adequacy of the access system for firefighting to provide access for the protection of life and property in an area.

A FAFT plan shall:

- Be prepared in accordance with instructions and be in a form specified by the NSW RFS Commissioner;
- Include all trails that form the fire trail network as envisaged in the Standards, along with other access ways; and
- Be prepared with a planning horizon of 5 years.

A FAFT plan shall comprise:

- A map showing:
  - A base layer containing all existing vehicular tracks, trails and roads;
  - The identified fire trail network comprising:
    - All strategic fire trails;
    - All tactical fire trails; and
    - Other fire access ways, such as existing roads, tracks and trails that may be of use for fire management, but do not form part of the fire trail network.
- A schedule of the identified fire trails that constitute the fire trail network detailing:
  - Name
  - Identifier
  - Category (strategic or tactical)
  - Status (registered, designated etc.)
  - Vehicle Carrying Capacity (VCC)
  - Proposed fire trails
  - Current fire trail condition
  - Responsible agency; and
  - Other matters as determined by the NSW RFS Commissioner.

4.2 Fire trail treatment register

A treatment register form should be used to set out a schedule of works for the construction and maintenance of fire trails that constitute the fire trail network.

A treatment register shall be prepared and submitted to the NSW RFS Commissioner for approval:

- Concurrently with the submission of a draft FAFT plan; and
- By 31 May each year.

A treatment register shall:

- Be prepared in accordance with the BFMC instructions and be in a format specified by the NSW RFS Commissioner; and
- Detail planned fire trail works for the nominal five year planning horizon of the FAFT plan to improve the network over time.

5. Document review

The *Fire Trail Standards* may be reviewed and amended by the NSW RFS Commissioner as required. A review must be undertaken before 30 June 2019.

Appendix A

Firefighting vehicle specifications

Category 1 Firefighting vehicle specifications

Length	8200 mm
Width	2400 mm
Mirror length	450mm
Height	3700 mm (including 600 mm for aerials)
Ground clearance	310 mm
Approach angle	35º
Departure angle	25º
Wheelbase	4700 mm
Turning circle – wall to wall	22m diameter
Weight	14200kg
Maximum axle loading	9,000kg

Category 7 Firefighting vehicle specifications

Length	6200mm
Width	2040mm
Mirror length	450mm
Height	3050mm (including 600 mm for aerials)
Ground clearance	230mm
Approach angle	35º
Departure angle	30º
Wheelbase	3395mm
Turning circle – wall to wall	17m diameter
Weight	7500kg
Maximum axle loading	5600kg

Category 9 Firefighting vehicle specifications

Length	5300mm
Width	1750mm
Mirror length	450mm
Height	2600 mm (including 600 mm for aerials)
Ground clearance	220mm
Approach angle	35º
Departure angle	30º
Wheelbase	3180mm
Turning circle – wall to wall	16m diameter
Weight	3700 kg
Maximum axle loading	2000kg

Appendix B

“Certified” Fire Trail Signage

PRIMARY FIRE TRAIL DIRECTIONAL SIGN
SINGLE END-MOUNTED POST

- 200mm wide blade with Chevron
- Class 1 yellow reflective with black lettering
- Red circle and vehicle carrying capacity. Circle to be 125mm in diameter
- 70mm Lettering
- Where two lines are required, lettering height may be 60mm
- Max length 900mm
- Lat/ Long (DD format) lettering size to suit – single line
- Logo to be 115mm high

BI-DIRECTIONAL SIGN CENTRE–
MOUNTED POST

- 200mm wide blade with chevron at each end
- Class 1 yellow reflective with black lettering
- Red circle and vehicle carrying capacity. Red circle to be 125mm in diameter at either end
- 70mm Lettering
- Where two lines are required, lettering height may be 60mm
- Max length 1200mm
- Lat/ Long (DD format) lettering size to suit -single line

INDICATIVE FIRE TRAIL SIGN
FOR USE ON OR NEAR PRIVATE PROPERTY

- 200mm wide blade with chevron
- Class 1 yellow reflective with black lettering
- Red circle and vehicle carrying capacity. Red circle to be 125mm in diameter

“Advisory” Fire Trail Signage

AFAC SYMBOLOGY AND OTHER ADVISORY SIGNS

Attached under yellow blade

- 200mm wide blade with Chevron
- Attached under yellow blade
- 200mm blade with square end
- 70mm Lettering
- Reflective white background
- Black lettering
- AFAC symbology to be 125mm high
- Only AFAC Standard Bush Fire Symbology is to be used

AFAC BUSH FIRE SYMBOLOGY

Helipad

Staging Area

Refuge

Water Point Helicopter

Water Point

Escape Route

“Tactical” Fire Trail Signage

PRIMARY FIRE TRAIL DIRECTIONAL SIGN
SINGLE END-MOUNTED POST

- 200mm wide blade with Chevron
- Class 1 yellow reflective with black lettering
- Cat number lettering to be 90mm
- 70mm Lettering
- Where two lines are required, lettering height may be 60mm
- Max length 900mm
- Lat/ Long (DD format) lettering size to suit on single line
- Logo to be 115mm high

BI-DIRECTIONAL SIGN
CENTRE MOUNTED POST

- 200mm wide blade with chevron at each end
- Class 1 yellow reflective with black lettering
- Red circle and vehicle carrying capacity. Red circle to be 125mm in diameter at either end
- 70mm Lettering
- Where two lines are required, lettering height may be 60mm
- Max length 1200mm
- Lat/ Long (DD format) lettering size to suit on single line

NSW RURAL FIRE SERVICE

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APPENDIX D CONFIRMED LOCATION OF THE WIND TURBINES, PALING YARDS WINDFARM, MARCH 2021

CONFIRMED LOCATION OF THE WIND TURBINES, PALING YARDS WINDFARM, MARCH 2021

WTG_ID	X (GDA94 Zone 55)	Y (GDA94 Zone 55)	Lat	Long
A3	741739	6174961	-34.538687	149.634113
A4	742142	6174888	-34.53925	149.638521
A5	742545	6174793	-34.540011	149.642935
A8	742006	6174474	-34.543011	149.637158
A9	742420.0007	6174374.999	-34.543806	149.641693
A10	742170	6174002	-34.547225	149.639078
A12	742829	6173258	-34.553772	149.646465
A13	743466	6173101	-34.555035	149.653446
A15	744163.0133	6173538.023	-34.550933	149.660909
A16	743023	6172812	-34.557744	149.648705
A17	743874	6172823	-34.557443	149.657968
A20	743049	6172311	-34.562251	149.649131
A21	743818	6172439	-34.560916	149.657468
A22	743683	6172072	-34.564254	149.656103
A24	742983	6171924	-34.565753	149.648523
A25	743624.253	6171703.395	-34.567588	149.655569

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