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Willatook Wind Farm

**Fire Risk Management
Plan**

July 2026

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Cover photo – View of the typical landscape surrounding the proposed Willatook Wind Farm (Fire Risk Consultants)

Document history and date

Revision	Date	Description	By	Review	Approved
V1 - DRAFT	25/8/2022	Initial draft following assessment of available information and site visit.	M Potter & FRC Project Team	FRC Peer Review Team	G Taylor Managing Director
V2	23/9/2022	Final following client feedback.	M Potter & FRC Project Team	FRC Peer Review Team	G Taylor Managing Director
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V4.1	21/4/2026	Updated following client feedback.	FRC Project Team	FRC Peer Review Team	G Taylor Managing Director
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*Where the term “**Bushfire prevention and mitigation related activities**” (or words to that effect) are used, this is to be defined as the clearance of vegetation in accordance with the Victorian State Government guidelines, including clearing and maintenance of existing fire breaks and/or fire access for fire fighters under electricity pylons and properties that have been constructed to Australian Standard AS3959 and/or the National Construction Code.*

Contents

1	Executive Summary.....	4
2	Introduction	5
3	Project Overview.....	8
3.1	Battery Energy Storage Systems	10
3.2	Wind Turbines.....	11
3.3	Transmission Line.....	11
4	Existing conditions assessment.....	13
4.1	Site description and location	13
4.2	Risk indicators	16
5	Risk assessment process	25
5.1	Clause 13.02 – Bushfire planning assessment	25
5.2	Analysis against CFA Guideline	31
6	Risk Assessment	46
6.1	Introduction	46
6.2	Context.....	47
6.3	Analysis of fire risk	47
6.4	Risk identification.....	47
6.5	Risk analysis	48
7	Conclusion.....	59
	Appendix A – Site photos.....	61
	Appendix B – Water tank locations	72

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1 Executive Summary

The Willatook Wind Farm proposes to develop up to 52 Wind Turbine generators, a Battery Energy Storage facility (BESS) and supporting infrastructure located between Orford and Hawkesdale in south west Victoria.

The Willatook Wind Farm Project in south-west Victoria has progressed through a comprehensive environmental assessment under the *Environment Effects Act 1978* (Vic), with the associated Environment Effects Statement (EES). Following public exhibition (in July-August 2022) and an Independent Panel Hearing/Inquiry (in Oct-Nov 2022), Minister for Planning issued her Assessment of the EES (in July 2023). The project was recommended for approval provided there were key modifications to the project relating to turbine free areas around habitat for the Brolga and Southern Bent-wing Bat.

Since the conclusion of the EES process, the Victorian Government developed new biodiversity policy specifically relating to onshore wind energy publishing the *Handbook for the Development of Renewable Energy in Victoria – Guidance to Avoid, Minimise, Mitigate and Compensate for Impacts on Threatened Bird and Bat Species* (DEECA 2025). In response, the project proponent has refined the wind farm layout and reduced the overall project scale to align with the Minister's recommendations, and applying the new Handbook. This removed 7 proposed wind turbine generators and shifted several others to align with the new project design. There were also changes to the proposed track, cable and quarry designs.

To assess the risk of fire in relation to the development, this Risk Management Plan (RMP) has been developed to consider fire risk associated with bushfire and a fire starting within the proposed infrastructure. This RMP follows the guidance provided by CFA in their *Design Guidelines and Model Requirements: Renewable Energy Facilities 2023*. It also includes the assessment of bushfire risk in accordance with Clause 13.02-1S of the Moyne Planning Scheme.

The assessment of bushfire risk has identified a landscape that has experienced large bushfires in the past. Whilst the direct area of the proposed wind farm has not been impacted, there is no doubt that bushfires can occur under elevated fire danger conditions in this landscape. The assessment of bushfire risk in this report has resulted in the recommendations for a range of mitigation treatments that align with the CFA Guideline.

This report contains an assessment of fire risk within the Wind Energy Facility (WEF) including the wind turbine nacelle, the substation, office compound and the BESS, and identifies the low risk associated with these types of development. This low risk in addition to the mitigation treatments outlined within the CFA Guideline, ensures a high level of fire safety in a WEF and BESS.

The outcome of the risk assessment has recommended a range of mitigations to manage fire risk including:

- Installation of 10 static water supply tanks of a minimum of 45,000 litres for each accessway from a road, spread across the development and 576,000 litres divided between two tanks at the BESS area that complies with AS2419.1.
- Provision of fire breaks around the base of the wind turbines, BESS, substation and the operations and maintenance area.
- Installation of smoke detection and fire suppression systems within the nacelle.
- Provision of access roads including overtaking bays for the development.
- Ongoing maintenance programs for the life of the project in accordance with the relevant Standards or manufacturer specifications.

The outcome of the risk assessment has indicated that development can occur in this landscape and not increase the risk of fire to surrounding communities, farming assets and other infrastructure.

2 Introduction

Fire Risk Consultants have been engaged by Willatook Wind Farm Pty Ltd to develop a RMP for the proposed Willatook Wind Farm located between Orford and Hawkesdale in south west Victoria. The Willatook Wind Farm development consists of 52 wind turbines generators, a BESS and associated infrastructure including an on-site quarry, access tracks, underground cabling, a substation and transmission powerline within the site to connect with the existing Tarrone Terminal Station.

The proposed Willatook Wind Farm and BESS is located in the Moyne Shire in south-western Victoria, approximately 20 kilometres north of Port Fairy and 30 kilometres north west of Warrnambool. The project will have the capacity to produce enough electricity to power up to 200,000 homes.

The Willatook Wind Farm Project in south-west Victoria has progressed through a comprehensive environmental assessment under the *Environment Effects Act 1978* (Vic), with the associated Environment Effects Statement (EES). Following public exhibition (in July-August 2022) and an Independent Panel Hearing/Inquiry (in Oct-Nov 2022), Minister for Planning issued her Assessment of the EES (in July 2023). The project was recommended for approval provided there were key modifications to the project relating to turbine free areas around habitat for the Brolga and Southern Bent-wing Bat.

Since the conclusion of the EES process, the Victorian Government developed new biodiversity policy specifically relating to onshore wind energy publishing the *Handbook for the Development of Renewable Energy in Victoria – Guidance to Avoid, Minimise, Mitigate and Compensate for Impacts on Threatened Bird and Bat Species* (DEECA 2025). In response, the project proponent has refined the wind farm layout and reduced the overall project scale to align with the Minister’s recommendations, and applying the new Handbook. This removed 7 proposed wind turbine generators and shifted several others to align with the new project design. There were also changes to the proposed track, cable and quarry designs.

This RMP is required to achieve compliance with the CFA Guideline - *Design Guidelines and Model Requirements: Renewable Energy Facilities 2023 (v4.4)* (CFA Guideline). The CFA Guideline outlines the purpose and need for a Risk Management Plan (RMP). The client has engaged with CFA prior to the preparation of this plan, and CFA engagement will again occur once the plan has been approved by the project design team. The RMP has been developed to provide sufficient information for CFA to make an informed decision on fire risk related matters. It is expected that the Planning Permit will require a Fire Management Plan (FMP) and Emergency Management Plan (EMP) in accordance with the requirements of the CFA Guidelines.

The RMP has been prepared following an assessment of the site and analysis of supplied information from the client in relation to the design, commissioning and operation of a Wind Energy Facility. As per the CFA Guideline, this report also aligns with NSW Planning’s *Hazardous Industry Planning Advisory Paper 2: Fire Safety Study Guidelines (2011)*. The various requirements outlined within the Advisory Paper have been included within this report where it relates to the proposal. The RMP outlines how these requirements have been addressed in Table 1.

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Table 1 - CFA Guidelines requirements

CFA Guideline – RMP requirement	How this RMP addresses the requirement?
a) Describe the risks and hazards at the facility to and from the battery energy storage system and related infrastructure.	Chapter 3 and 4.
b) Specify and justify, in accordance with Section 4.2 of the CFA Guidelines:	
The location of the battery energy storage system on-site and in the landscape.	Figure 1 and Figure 2
Emergency vehicle access to and within the facility that: - Includes site access points of a number suitable to the size and hazard of the facility (a minimum of two). - Provides access to battery energy storage systems, substations and fire service infrastructure.	Table 7. Section 4.2 – Facility Design
Firefighting water supply for the facility.	Table 7. Section 4.2.2 – Firefighting Water Supply
A fire break width of 10m or greater, based on radiant heat flux (output) as an ignition source: - Around the perimeter of the facility. - Between any landscape buffer/vegetation screening and battery energy storage systems (and related infrastructure).	Table 7. Section 4.2.5 – Fire Breaks
The separation distance, based on radiant heat flux (output) as an ignition source, between: - Adjacent battery containers/enclosures. - Battery containers/enclosures and related battery infrastructure, buildings/structures, and vegetation.	Table 7. Section 4.2.6 – Design Specific to the Facility Type
All other controls for the management of on and off-site hazards and risks at the facility (including all proposed battery energy storage system safety and protective systems).	Table 7. Section 4.2.6 – Design Specific to the Facility Type and Chapter 6.5.3.
c) Provide an evidence-based determination of the effectiveness of the risk controls against the identified hazards, including justification for the omission of any battery safety and protective system/s.	Table 7. Section 4.2.6 – Design Specific to the Facility Type and Chapter 6.5.3.
d) Be peer-reviewed by a suitably qualified, independent third party.	The Project is not proposing variations to the CFA Guidelines and therefore a peer review has not been considered as necessary.
e) Form the basis for the design of the facility.	The outcomes of the assessment against the CFA Guideline and the risk assessment within Chapter 5 have influenced the design of the Project.

Where the CFA Guideline provides specific requirements relating to matters that are outlined within the Fire Safety Study Guidelines, the CFA Guideline information has been utilised.

Table 2 summarises how the Fire Safety Study Guidelines have been covered within this report.

Table 2 - Response to NSW Fire Safety Study Guideline

Section 2 summary	Response
Identification of fire hazards and the consequences of possible fire incidents	The CFA Guideline provides an outline of the types of fire hazards associated with renewable energy developments. This report also analyses previous fire history (Section 4.2.5) and includes the assessment of risk resulting from these fire events and other information that is supplied by the developer.
Fire prevention strategies and measures	The outcome of the risk assessment and design assessment against the CFA Guideline has resulted in a range of fire prevention strategies and measures. These strategies and measures will be included in the Fire Management Plan, along with their design and maintenance standards.
Analysis of the requirements for fire detection and protection and identification of the specific measures to be implemented	The CFA Guideline provides specific fire detection and protection requirements including the installation of a fire hydrant system, detection and suppression systems and bushfire protection measures.
Calculation of firefighting water supply and demand	The CFA Guideline provides clear requirements to design and install the fire hydrant system to AS2419 – open yard protection requirements. This includes the development of a firefighting water supply and demand requirement for the BESS area.
Containment of contaminated firefighting water	The CFA Guideline provides the requirement to contain firefighting water at the BESS to enable testing to occur before it is allowed to either enter the stormwater drainage system or needs to be sent to a disposal location.
First aid fire protection requirements.	The CFA Guideline imposes certain requirements along with the obligation on the operator to meet the occupational health and safety requirements imposed by various legislation. This includes the provision of fire extinguishers, warning signs, road access minimum requirements, staff training, induction programs and emergency management planning.

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3 Project Overview

This development includes a WEF and a BESS with a proposed capacity to supply up to 200,000 tonnes. The proposed project's main features are:

Feature	Description
Location	The project is located within the Moyne Shire approximately 3 kilometres northeast of Orford and 10 kilometres southwest of Hawkesdale. The project site is situated to the south of Woolsthorpe-Heywood Road between Hamilton-Port Fairy Road to the west and Penshurst-Warrnambool Road to the east.
Setting	The main land use with the project site is agricultural (predominantly sheep and cattle grazing). Native vegetation is largely restricted to roadside reserves and highly modified isolated occurrences along waterways, gullies and stony knolls, which would largely be avoided.
Landowners	15 landowners with project infrastructure on their land.
Wind turbines	Up to 52 with a maximum tip height of 254 metres, maximum rotor diameter up to 175 metres and minimum tip height of 60 metres. Wind turbine blade length of up to 86.5 metres.
Construction period	Approximately 36 months
Electrical reticulation	Approximately 98 kilometres of underground 33 kV electricity cable with fibre-optic cabling connecting the wind turbines to the on-site substation.
On-site substation	The on-site substation would consist of a series of electrical transformers, switchgear, circuit breakers, a control room and switch room, amenity facilities, including a toilet, and fire services. The on-site substation would be connected to the Tarrone Terminal Station via an overhead transmission 300m in length. Single yard with footprint of up to 70 metres by 220 metres.
Permanent met masts	Up to four permanent meteorological masts are proposed, accessed via a single lane track.
Operations and maintenance facility	An operations and maintenance facility would be located adjacent to the on-site substation and provide office, storage, and maintenance facilities. Nominally 70 metres by 220 metres.
Access tracks	Approximately 70 kilometres in length. The final access tracks would be 6 metres wide.
Battery Energy Storage System (BESS)	An on-site battery energy storage facility with a capacity of 200 MW / 400 MWh is proposed to be located adjacent to the on-site substation. The BESS would consist of a series of 20-foot containerised batteries with transformers, high voltage AC (HVAC) coolers and other electrical plant. The BESS would be sited on a hardstand area of up to two hectares (nominally 250 metres x 200 metres).
Transport	Transport of wind turbines and ancillary components (e.g., BESS and substation infrastructure) would primarily be from Portland and via the regional road network.
Site access and access roads	5 project site access points are proposed from the Woolsthorpe-Heywood Road and Tarrone North Road. Riordan's Road and Old Dunmore Road to connect internal access tracks.

Feature	Description
	Access tracks would have a final width of six metres, and a minimum 30m turning radius. The construction footprint of accessways would be 20 metres wide.
Development footprint	The project site encompasses an area of approximately 3,651 hectares of private and public land. The construction footprint is estimated to be 246.7 hectares of which 5.42 hectares is native vegetation. The operational footprint is estimated to be 127.5 hectares, which represents 3.5% of the project site.
Raw materials / quarry	The project is estimated to require approximately 300,000 cubic metres of quarried aggregate for roads, hardstands, and foundations. This would either be sourced from an on-site quarry or existing commercial quarries, the closest being Tarrone Quarry located approximately 3 kilometres to the southeast of the project site.
Temporary components	A temporary construction compound would be located within the project site and include office facilities, amenities, and car parking. Three concrete batching plants would be established to supply concrete for the wind turbine foundations, the on-site substation, and the BESS. Four laydown hardstand areas would also be established for the storage of wind turbine components and other equipment
Life	30 years following a period of up to 3.5 - 4 years of pre-development and construction activities. Pre-development would include detailed design and early works, where permitted.
Decommissioning	Within 12 months of wind turbines permanently ceasing to generate electricity, the wind farm would be decommissioned. This would include removing all above ground equipment, restoration of all areas associated with the project, unless otherwise useful to the ongoing management of the land, and post-decommissioning revegetation with pasture or crop.

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3.1 Battery Energy Storage Systems

Whilst the selection of a battery supplier has not been finalised, there are numerous consistencies in the design, construction and installation of the Battery Units. This is mainly driven by the requirement to comply with International and Australian codes and standards. In relation to managing fire risk, the following standards and codes will be complied with:

- UL9540A Standard for Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems
- UL9540 Energy Storage Systems and Equipment
- NFPA 855 Standard for the Installation of Stationary Energy Storage Systems.

The Battery Unit will likely be assembled offsite within the factory and arrive with a small charge and largely a plug-in type of arrangement. The product will be fitted with a range of systems that manage the Battery Units and receive and respond to various alerts, these are outlined in Table 3.

The equipment will be supplied with a range of manuals that address installation, maintenance and safety. The manuals will outline the outcomes of the various tests including UL9540A that demonstrates that the design of the system meets the requirements of UL9540.

Table 3 outlines the typical fire safety systems that are likely to be installed within the Battery Units:

Table 3 - Overview of fire safety systems

Fire Safety System	Description
Battery Management System (BMS)	The BMS constantly monitors cell and pack level voltage, temperature, State of Charge (SOC), and other parameters to ensure early detection of pre fault conditions, and immediate detection of fault events. Should any parameter exceed a permissible value, the BMS will disconnect the affected Battery Units and send an alarm to the monitoring centre. The BMS can be regularly updated as new technologies or learnings are introduced into the software
Detection and suppression systems	The Battery Units will be fitted with smoke, heat and gas detectors and an aerosol suppression system to detect and suppress fires. These systems will be connected to a Fire Indicator Panel located within a central area and will also be monitored through the Supervisory Control and Data Acquisition (SCADA) system.
Site Controller and Monitoring (SCADA)	Beyond the built-in safeguards of the BMS described above, the Battery Units will have 24/7 remote monitoring, diagnostics, and troubleshooting capabilities, without the need to have a technician on site. Customers and first responders will benefit from immediate support from trained technicians via the monitoring centre. Additionally, the facility will have a local SCADA system.
Emergency system shutdown	In the event of an emergency on site, the Battery Units can be shut down locally, or remotely. A system shutdown will result in electrical isolation of the battery strings and cessation of battery charging or discharging.
IP Rating	The IP (Ingress Protection) rating varies for each manufacturer, but it will likely be elevated in that it will prevent ember ingress into the Battery Units. The IP rating is defined by the international standard EN 60529 (British Standard BS EN 60529:1992). The first digit relates to the ability for solids to enter the enclosure and the second digit indicates the ability for liquids to enter the enclosure.

Fire Safety System	Description
	Most Battery Units are a minimum of IP55 rating, and this is classified as: • Ingress of dust is not entirely prevented, but it must not enter in sufficient quantity to interfere with the safe operation of the equipment. • Water projected by a nozzle (6.3 mm) against enclosure from any direction shall have no harmful effects. In the unlikely event of a bushfire in the surrounding vegetation that develops embers, the IP rating will likely reduce the ability for embers to enter the Battery Unit.
Explosion prevention	The chosen Battery Unit will comply with Clause 9.6.5.1.5 of NFPA 855. This clause permits compliance with either NFPA 68 or NFPA 69. The explosion prevention system that is provided will be designed to direct overpressure, and any other explosive events or flammable gases, away from the Battery Unit.

3.2 Wind Turbines

As with the BESS development, the selection of the turbine manufacturer will not occur until the project has planning approval. However, the types of risk and the mitigation of these risks is generally consistent.

The turbine is one element of the equipment required to support the generation of electricity. The key components include:

- Nacelle
- Turbine (located within the Nacelle)
- Tower

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As with any electrically charged equipment, they can be a fire hazard, and the two key areas are the Nacelle and the Substation areas. The nacelle, housing the generator, gearbox, and electrical components, is the most fire prone section of a wind turbine due to its enclosed structure, high electrical loads, and presence of lubricants that may be flammable. The base of the turbine and nearby electrical substations contain transformers, switchgear, and power electronics that may be a hazard.

The typical fire mitigation systems installed within this type of infrastructure includes:

- Gaseous fire suppression system
- Smoke detection systems
- Use of low flammability oils within the Nacelle.

In addition to the mitigation systems, a wind turbine must comply with a variety of Australian and International Standards including AS3000:2018 – Wiring Rules.

3.3 Transmission Line

An approximately 300m Transmission Line is being constructed to enable electricity transmission from the Wind Farm to the National Electricity Grid via the Terminal Station and BESS. The Transmission Lines are travelling through a grassland dominated environments. The assessment of fire risk can be considered at both the construction phase and then the operational phase of the Project.

The level of equipment use and personnel presence during the construction phase is substantially higher than during the operational phase following commissioning. As a result, the fire risk is elevated

whenever people, vehicles, machinery and construction activities are introduced into a bushfire prone environment.

Bushfire risk assessments are often strongly influenced by the presence of people, the types of equipment in use and the infrastructure. During construction, both personnel and machinery are consistently interacting with the surrounding environment undertaking activities that may act as ignition sources. These activities can include driving vehicles, operating powered equipment, and engaging in behaviours that, if not carefully managed, could result in an ignition (i.e. smoking).

Managing ignition risk during construction is therefore focused on ensuring that site-based behaviours and activities are safe and unlikely to cause a fire. Typical controls include equipment test-and-tag programs, restricting smoking to designated fuel-free areas, implementing a hot-works permit system, and limiting vehicle access on vegetated surfaces during the fire danger period.

Once the project transitions into the operational phase, the need for regular personnel presence within the easement decreases significantly. Activity is generally limited to inspections and occasional maintenance. Modern technologies such as remote monitoring further reduce the need for on-site access, thereby lowering the overall fire risk.

In relation to the operation of the transmission line infrastructure, there is no history of Transmission Lines starting fires¹. They are regarded as having the lowest bushfire risk of all powerline infrastructure. A submission to the NSW Government Standing Committee on State Development Inquiry on the Feasibility of undergrounding the transmission infrastructure for renewable energy projects (Parliament NSW, 2023), Transgrid reported they could not find a record of a bushfire being started in Australia by a Transgrid transmission line operating at over 66kV. This is supported by the Climate Change in Australia Case Study that states that failures associated with transmission networks represent less than 1% of outages.

CFA indicate that the fire ignition risk for transmission lines relates to the construction period². The CFA indicates the presence of the Bushfire Mitigation Plan for the Electricity Transmission Network that is required by the Electricity Safety Act (1998).

The responsibility to ensure that the Bushfire Mitigation Plan is maintained and effective is assigned to Energy Safe Victoria (www.esv.vic.gov.au). Any new transmission line infrastructure is required to comply with the legislative requirements and ensure a Bushfire Mitigation Plan is in place and approved by Energy Safe Victoria.

In summary, the main risk associated with the construction and operation of a transmission line is during the construction phase. Once the infrastructure moves into the operations phase, the combined maintenance regime, proactive inspection programs and the technology solutions reduces the risk to an acceptable level.

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¹ <https://www.energyco.nsw.gov.au/sites/default/files/2024-09/energyco-fact-sheet-bushfire-risk-september-2024.pdf#:~:text=While%20electrical%20infrastructure%20can%20present%20a%20fire%20risk%2C,of%20all%20powerline%20infrastructure%20%28transmission%20and%20distribution%20lines%29.>

² <https://www.cfa.vic.gov.au/about-us/what-we-do/fighting-fires-around-transmission-lines>

4 Existing conditions assessment

4.1 Site description and location

The Wind Energy Facility is spread over approximately 3,645 hectares and is in the Moyne Shire in south-west Victoria, approximately 20 kilometres north of Port Fairy and 30 kilometres north west of Warrnambool. The project involves the construction, commissioning and operation of 52 wind turbine generators (see Figure 1), BESS and associated infrastructure including a substation east of the development and a works/office compound. The development occurs to the north and east of Orford and to the west of Hawkesdale.

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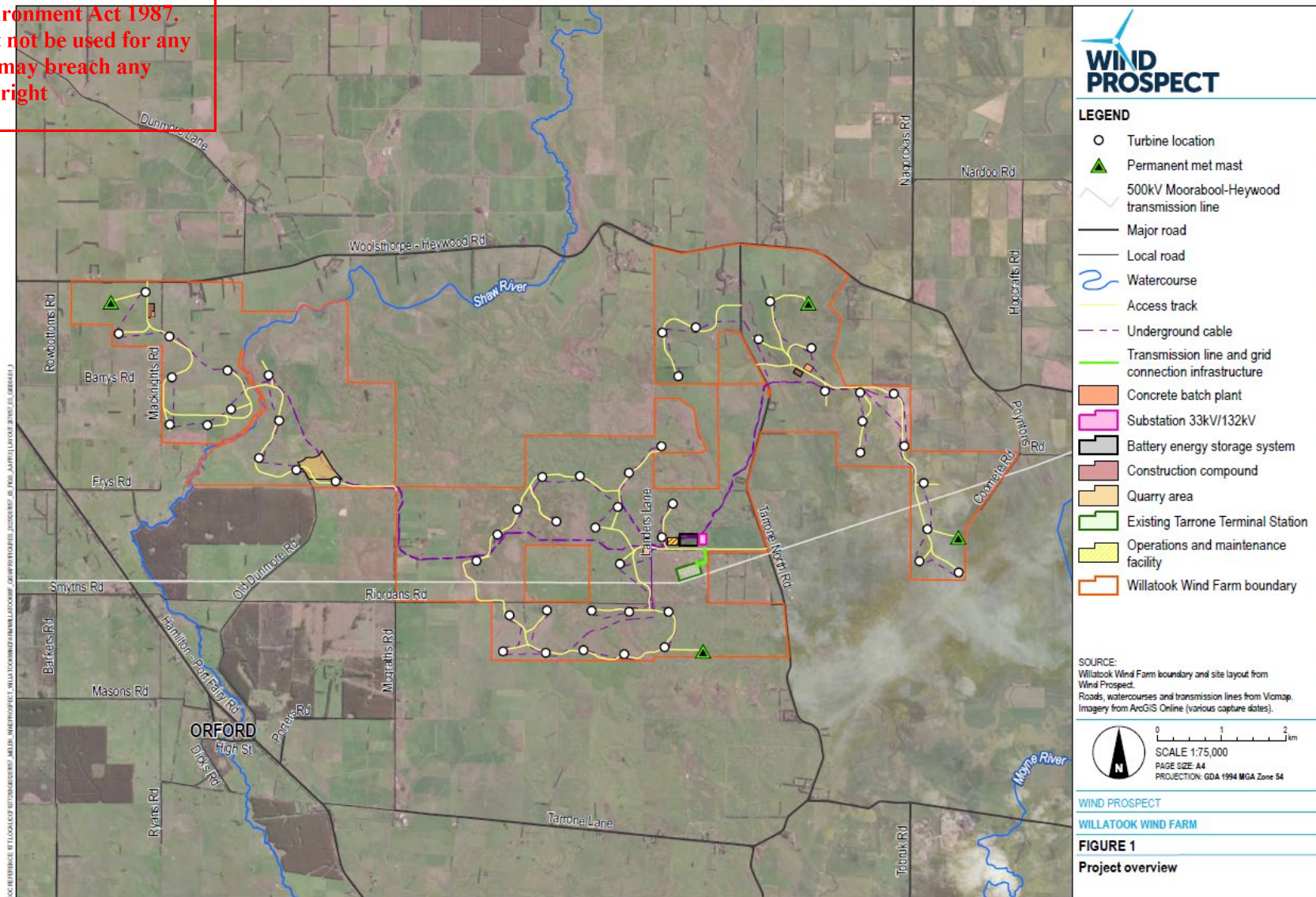


Figure 1 - Overview of the Willatook Wind Farm (sourced from Wind Prospect Pty Ltd)

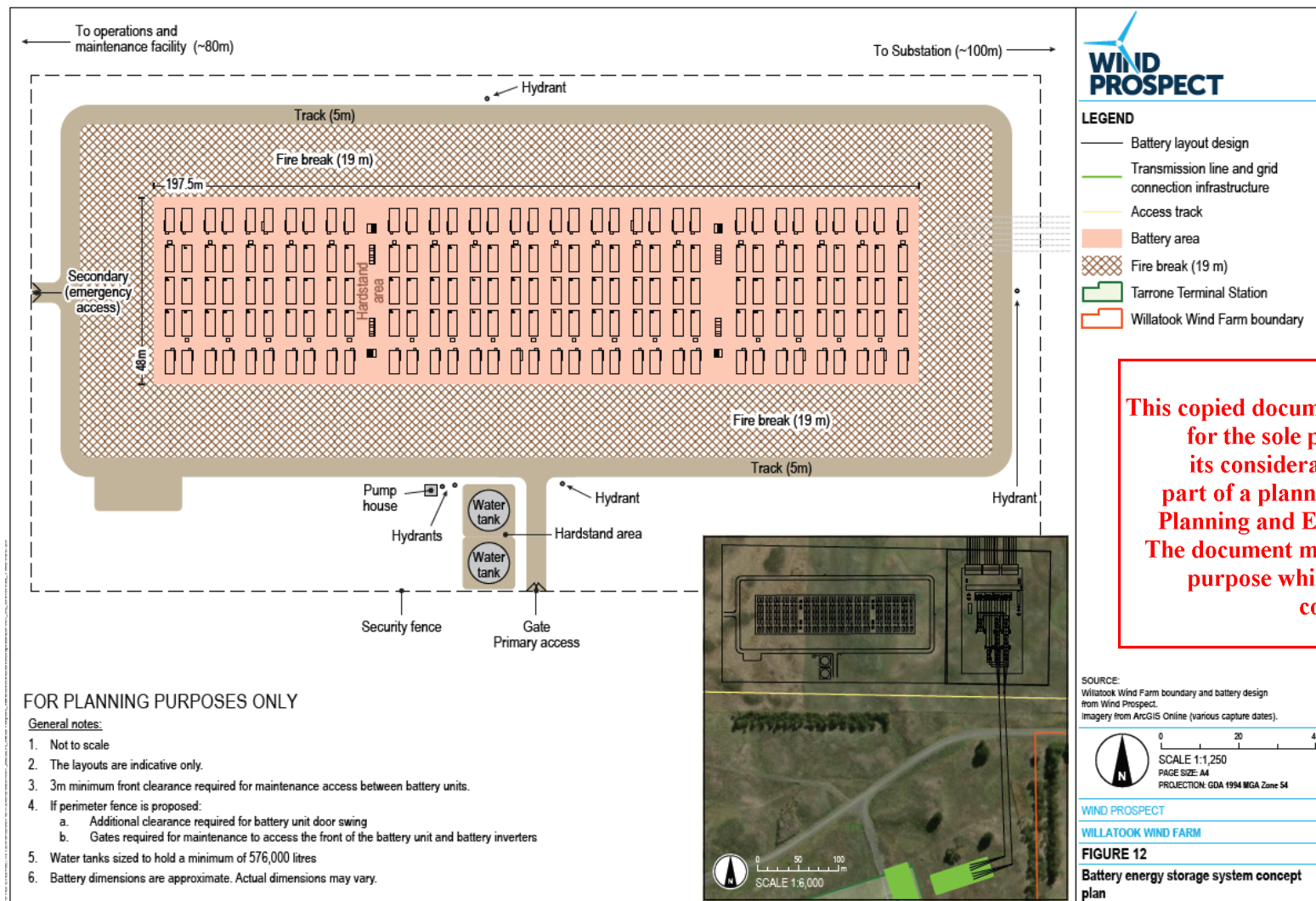


Figure 2 Overview of the Willatook Wind Farm BESS design (sourced from Wind Prospect Pty Ltd)

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4.2 Risk indicators

The following information has been obtained from a variety of publicly available sources and provides relevant information that informs the analysis of risk. This information is primarily related to the bushfire risk that exists in the surrounding area.

4.2.1 Bushfire Management Overlay

The Bushfire Management Overlay (BMO) is a Planning Scheme Overlay provided within the Moyne Planning Scheme. It is reliant on areas of a municipality being identified as at risk from bushfire.

The criteria³ to determine if a BMO should be implemented includes:

- Criteria 1: Vegetation type and size
 - Forest, woodland, scrub, shrubland, mallee and rainforest vegetation that is 4 hectares or more in size.
- Criteria 2: Ember buffer
 - A 150m buffer is applied from the edge of vegetation identified in Criteria 1.
- Criteria 3: Extreme risk inclusions
 - Areas that fire authorities have advised may be subject to extreme landscape bushfires.

Figure 3 outlines the location of the BMO in relation to this development. The BMO covers small areas of the development footprint.

The proposed development has ensured that the wind turbines, terminal station or the BESS are not located within the BMO. The BMO is in the surrounding landscape largely because of the scattered plantations that currently exist. See Appendix 1 for the site photos that indicates the typical vegetation.

The nearest WTG's to the BMO are T11 (135 metres), T13 (292 metres) and T61 (329 metres).

The fragmentation of the BMO is unlikely to support an elevated landscape risk assessment outcome. There are several landscape features that will likely slow or stop bushfires spread. These include changes in vegetation types and the surrounding road network.

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³ https://www.planning.vic.gov.au/_data/assets/pdf_file/0027/447921/Fact-sheet-Bushfire-mapping-methodology-and-criteria.pdf

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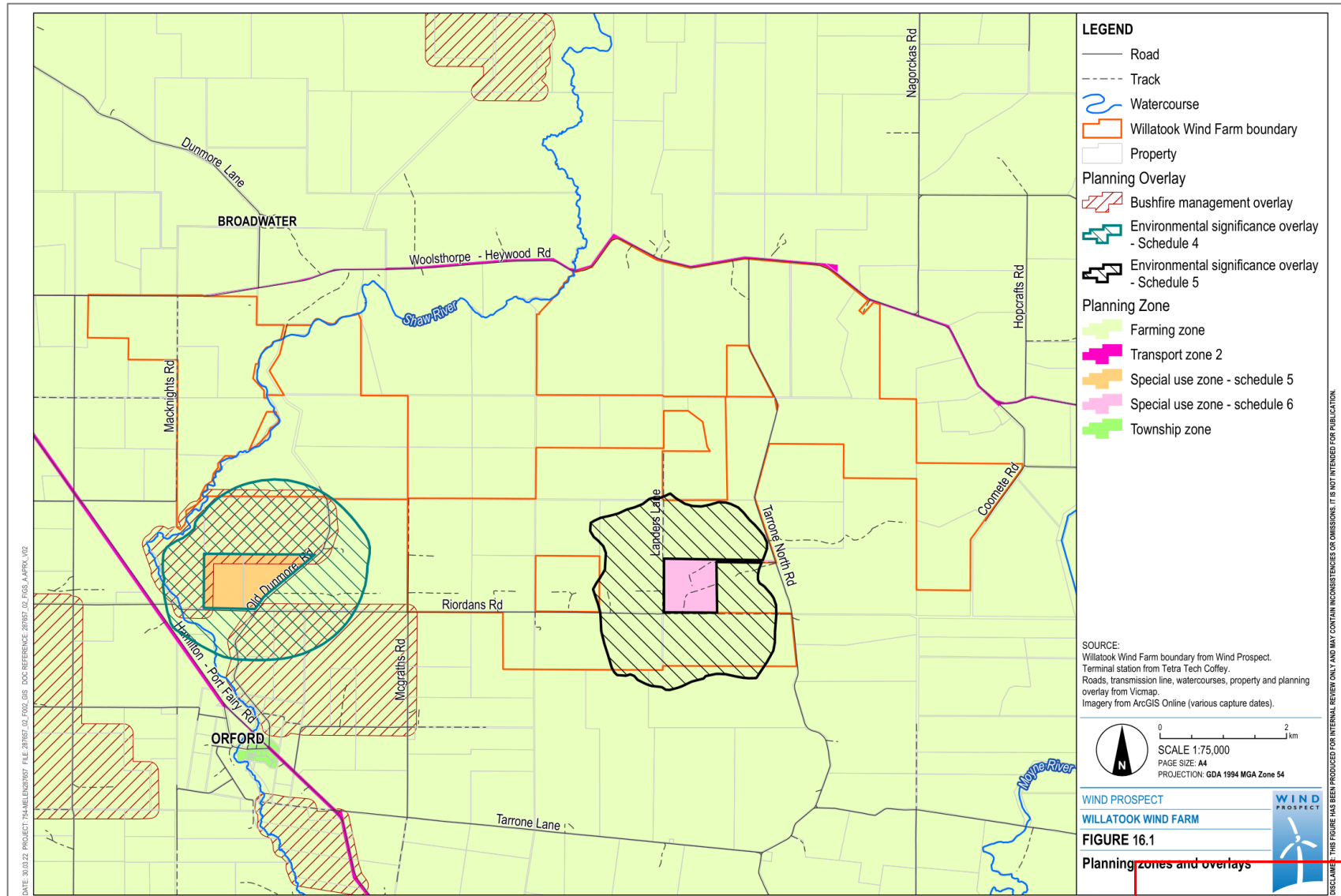


Figure 3 Location of planning controls in relation to the Proposed WEF (sourced from Wind Prospect Pty Ltd)

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4.2.2 Bushfire Prone Area

Bushfire Prone Areas (BPA) are areas that are subject to, or likely to be subject to, bushfires. The Minister for Planning has determined that specific areas are designated BPAs for the purposes of the building control system. Specific bushfire construction standards apply in designated bushfire prone areas in Victoria. The entire development is located within a Bushfire Prone Area.

These bushfire construction requirements are aimed at improving bushfire protection for residential buildings. The creation of the BPA map fulfils one of the 67 recommendations made by the Victorian Bushfires Royal Commission that occurred following the 2009 Black Saturday bushfires.

A minimum construction standard applies to new residential buildings, schools, childcare centres, hospitals, aged care facilities, industrial buildings and associated buildings in designated Bushfire Prone Areas.

Landowners are required to build to a minimum Bushfire Attack Level of 12.5 in these areas as outlined within AS3959:2018 *Building in bushfire prone areas*. The existence of the BPA will trigger the need to respond to Clause 13.02 of the Planning Scheme. Refer to Section 5.1.

4.2.3 Municipal Fire Management Plan⁴

The Moyne Municipal Fire Management Plan (MFMP) 2020 outlines the risk of fires within the municipality and outlines the treatments required to offset these risks. The MFMP was last updated and released in 2020.

The MFMP outlines that the bushfire season generally runs from December to March. The prevailing weather conditions are north westerly winds accompanied by high daytime temperatures and low relative humidity.

The MFMP indicates a level of risk for communities surrounding the proposed WEF. This includes:

Location	Consequence rating	Likelihood rating	Risk rating	Priority rating
Orford	Major	Likely	Very high	2A
Hawkesdale	Moderate	Likely	High	3A
Macarthur	Major	Likely	Very high	2A

The MFMP also outlines treatments for the localities and this includes community education, roadside vegetation management and fuel hazard management. It has been assumed that the monitoring of the implementation of the treatments is also occurring through the committee established to develop the MFMP.

The MFMP also outlines the location of strategic fire breaks. The areas mentioned within the MFMP that are in close proximity to the WEF are shown in Figure 4.

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⁴ Moyne Municipal Fire Management Plan - 2020

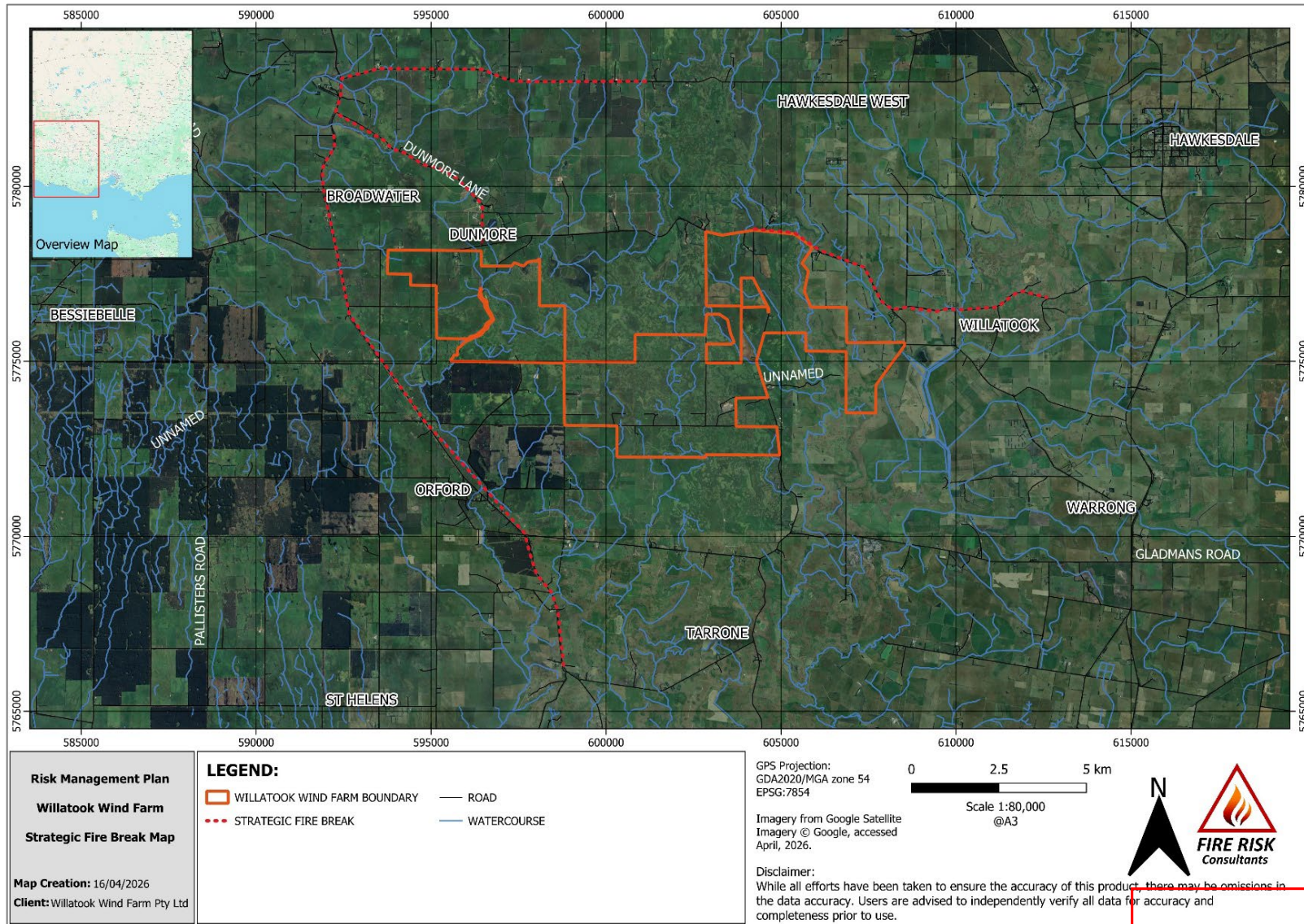


Figure 4 Strategic fire breaks surrounding the proposed WEF

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The existing strategic fire break network provides a network of fuel managed areas that may either slow or stop a bushfires spread. The likely bushfire approaches from the north western or south western zones are likely to be influenced by the presence of the strategic fire breaks.

The MFMP also outlines several treatments that are provided to address bushfire risk across the municipality. The treatments include:

- Community education programs
- Fire Danger Period advisory signs
- Neighbourhood Safer Places (Hawkesdale)
- Private property planning
- Municipal Fire Prevention Notices
- Fuel hazard reduction

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4.2.4 Safer Together assessment⁵

The Safer Together project delivered by the Victorian State Government has developed strategies for the various Regions of Victoria. The South West Bushfire Management Strategy was developed to reflect the region's unique environments and communities and includes the location for the Willatook Wind Energy Facility development. The strategy was developed through a regional planning process that was guided by the knowledge and priorities of experts, stakeholders and community members from the Region.

The Barwon South West Bushfire Management Strategy 2020 is the result of an analysis of bushfire risk across the Region. The Strategy indicates the threat of grassfires, however it does not provide any additional strategies to reduce the risk other than those already undertaken.

4.2.5 Bushfire history

An analysis of bushfire history in the area surrounding the proposed Wind Farm indicates limited bushfire activity. According to the data provided by DEECA (Figure 5), there has been no impact on these areas because of large bushfires.

The closest bushfires occurred in 2018 to the north west of Hawkesdale and to the west within the Budj Bim National Park in 2019/20.

The fire in 2018 ignited on St Patrick's Day and the complex of fires burnt through 15,000 hectares and destroyed 24 houses. The Budj Bim National Park fire was ignited by a lightning strike and eventually burnt through 6,300 hectares.

Whilst the immediate surrounding area has not been impacted by large bushfires, there is no doubt that smaller fires would occur regularly. The bushfire events outlined above are indicative of the types of bushfire behavior that can occur under elevated fire danger conditions.

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⁵ Barwon South West Bushfire Management Strategy 2020 -

https://www.safertogether.vic.gov.au/_data/assets/pdf_file/0024/493530/DELWP_BushfireManagementStrategies_2020_BarwonSouthWest_rr.pdf

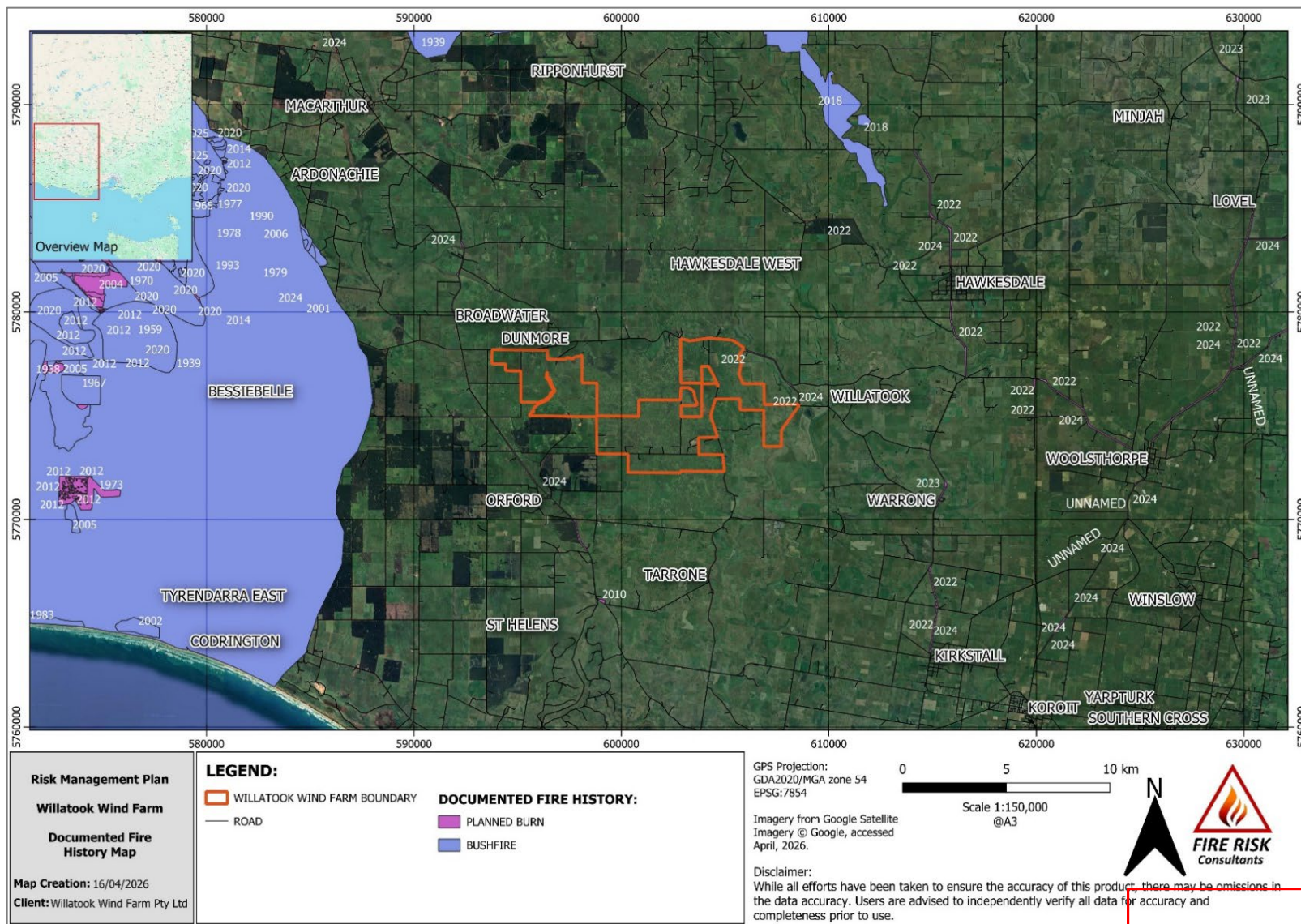


Figure 5 Bushfire history with the approximate location of the Wind Farm

4.2.6 Surrounding area

Surrounding area

Covering an area of about 5,478 km², Moyne Shire has a largely agriculturally based economy including dairy, beef, sheep and vegetable production. Quarrying, timber production and tourism industries are also present along with recently developed wind energy facilities.



Figure 6 Plantations in the surrounding landscape

The area surrounding the development site is largely associated with primary production, in particular stock grazing. This results in a highly fragmented landscape during the summer months where large areas can be 'eaten out' with other locations having elevated fuel loads, retained for grazing stock to feed on.

To the south and west of the development site are large areas of plantations. There are small areas of plantations to the south of the development on the east side of Hamilton – Port Fairy Road. To the west of Hamilton – Port Fairy Road there are several areas where plantations dominate the landscape.

It is likely for bushfires to be influenced by the weather and availability of fuels more so than topography.

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Figure 7 Tarrone Terminal Station with the surrounding landscape

Project site

The project site is cleared land primarily used for stock grazing. The project site also contains stone fences (dry stone walls) with heritage value, access tracks and agricultural infrastructure such as sheds along with family homes and workers accommodation.

There are 15 properties that will host the WEF and BESS infrastructure with land parcels of varying size. There are eight dwellings and a further four dilapidated dwellings that are within the project site, all owned by the host landowners.

The development site is already provided with road access through a network of municipal and public roads. There are also several privately maintained access tracks and driveways. As outlined in Section 4.2.3, there are a number of municipal and State roads that are listed within the MFMP as fire breaks and it can be expected that the vegetation is maintained for parts or all of the roadsides, depending on their criticality.

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5 Risk assessment process

To effectively assess the fire risk associated with the proposal, this report is structured to assess risk using the following frameworks:

- Clause 13.02 – Bushfire Planning – Moyne Planning Scheme⁶
- Assessment against the requirements of the CFA Guideline *Design Guidelines and Model Requirements: Renewable Energy Facilities 2022*
- Risk assessment that meets section 5 of the CFA Guidelines.

The risk assessment provides the opportunity to bring the information gained from the above processes or information together and if required, make any additional recommendations. All recommendations are aimed at reducing the risk to an acceptable level.

5.1 Clause 13.02 – Bushfire planning assessment

Clause 13.02⁷ of the Moyne Planning Scheme plans to strengthen the resilience of settlements and communities and prioritise protection of human life through several objectives. However, it should be noted the Proposal does not introduce new settlements into the landscape. The assessment has been undertaken within the context of a Wind Energy Facility and BESS.

5.1.1 Bushfire hazard assessment

Elevated bushfire behaviour in south east Australia is often dominated by strong and gusty north westerly winds followed by a south westerly change that normally occurs in the afternoon or early evening. These conditions have historically caused the loss of life and property and are usually associated with elevated fire danger warnings issued by the fire agencies.

Table 4 below outlines the hazard assessment relating to the proposed development. Figure 8 and Figure 9 provide an overview of the likely bushfire scenarios within the surrounding area. The assessment has identified the presence of the north west and south west likely bushfire impacts. This is supported by the MFMP.

It is acknowledged that bushfires may approach from other directions, however the treatment of the risk from these aspects will be sufficient to offset bushfire approach from any directions.

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⁷ <https://planning-schemes.app.planning.vic.gov.au/Moyne/ordinance/13.02>

Table 4 - Assessment against Clause 13.02

Bushfire hazard type	Conditions	Likely Scenario	Considerations
The site for the development	Once completed, the WEF and BESS will be required to comply with conditions as specified within the CFA Guideline that includes the management of vegetation around the base of the turbine towers during the fire danger period. During construction, there is a risk of a fire igniting and spreading through unmanaged vegetation. During the construction phase, the surrounding properties will still be used for farming activities including stock grazing.	A bushfire starting on the property is a possibility. Bushfires that are started by lightning, arson or other human caused events could burn through the WEF and threaten the surrounding properties and the BESS. The access track network and vegetation management around the base of the turbine towers will limit bushfire spread under elevated fire danger conditions. The Plantation areas may generate increased bushfire behaviour. This is not likely to increase radiant heat levels near the turbine towers. During construction, any work that is occurring near unmanaged grassland has the potential to start a bushfire and leave the property.	During the construction phase of the WEF and BESS, where possible, all vegetation within 100 metres of works areas is to be managed during the fire danger period with all grassland less than 100mm in height. When the fire danger conditions are elevated (Catastrophic), the Emergency Management Plan will outline procedures to close the site during the construction phase and limit maintenance operations unless critical. The CFA Guideline requires the provision of vegetation management surrounding the base of the turbine towers. The access roads will be established during the construction phase and maintained for the life of the project.
Neighbourhood (400 metres) and local conditions (one kilometre)	Within one kilometre of the development, the surrounding landscape is predominantly grassland that is used for agricultural purposes with areas of plantation to the west of the development. The surrounding road network provides access and egress opportunities for emergency services and in some cases, these are maintained as fire breaks.	Under strong wind conditions a bushfire can travel quickly across the landscape. Grassfires are heavily influenced by the quantity of fuels within the paddocks and the wind strength. Roadsides will contribute to bushfire spread due to the unmanaged fuels and the presence of trees that will likely generate short distance embers attack.	The provision of access roads and vegetation management around the base of the turbine towers will limit the impact of a fire on development. The managed areas will also significantly limit the chances of a bushfire starting at the towers and BESS.

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Bushfire hazard type	Conditions	Likely Scenario	Considerations
Landscape conditions (10 kilometres)	The landscape surrounding the development site consists of primarily grassland. There are areas of Plantations and Public Land that may contribute to the development of embers. The landscape to the north west is dominated by agricultural land with the landscape to the south west influenced by the presence of Plantations.	The likely bushfire behaviour which will result in the greatest intensity and risk to the development will be from the south west. This is consistent with historical bushfires in the surrounding landscape. The most destructive grassfire in this area under elevated bushfire conditions will be where the northwesterly wind influence is present through the day followed by a south westerly wind change. The presence of the surrounding road network and the high level of vegetation fragmentation will influence bushfire behaviour.	The protection of the turbine towers from bushfire spread and to prevent a fire spreading from the base of the turbine tower is required by the CFA Guideline. The provision of access roads will increase the ability for firefighters to access the areas surrounding the wind turbines. The CFA Guideline requires the BESS to be protected from the effects of a bushfire and provides conditions to achieve this.

5.1.2 Bushfire Hazard Landscape Assessment

Figure 8 and Figure 9 outline the outcome of the bushfire hazard landscape assessment. The assessment identifies the two likely scenarios that may occur in relation to the Wind Energy Facility. Both scenarios are consistent in that the likely bushfire impact on the development is from either the north west or south west. Table 5 provides a description of each of the scenarios contained within Figure 8 and Figure 9.

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Table 5 - Bushfire scenarios

Scenario	Description
A	A bushfire that approaches from the north west is likely to be under elevated bushfire conditions. Traditionally a north westerly wind influence is associated with elevated fire danger days. The bushfire will be influenced by the availability of fuel and due to the surrounding landscape being dominated by farming activities, the available bushfire fuels are likely to be highly fragmented. Other landscape features including the surrounding road network with some of these managed as fire breaks will also provide opportunities to slow or stop bushfires spreading in the local area. It is likely for the new track network to provide additional areas where bushfire spread may be interrupted depending on the fire danger conditions.
B	A bushfire that approaches under a south westerly wind influence usually occurs after a north westerly wind has been influencing the weather conditions. The wind change can occur after a bushfire has been burning for some time under the north westerly influence. Depending on the location of the bushfire, the entire western and southern side of the Wind Energy Facility can come under threat at the same time. As the bushfire travels through the Plantations, it will likely generate embers that will land on or around the development and start new fires ahead of the bushfire front. The fragmented vegetation that is associated with farming activities will influence bushfire behaviour. The road network will also contribute to slowing or stopping the bushfire spreading.

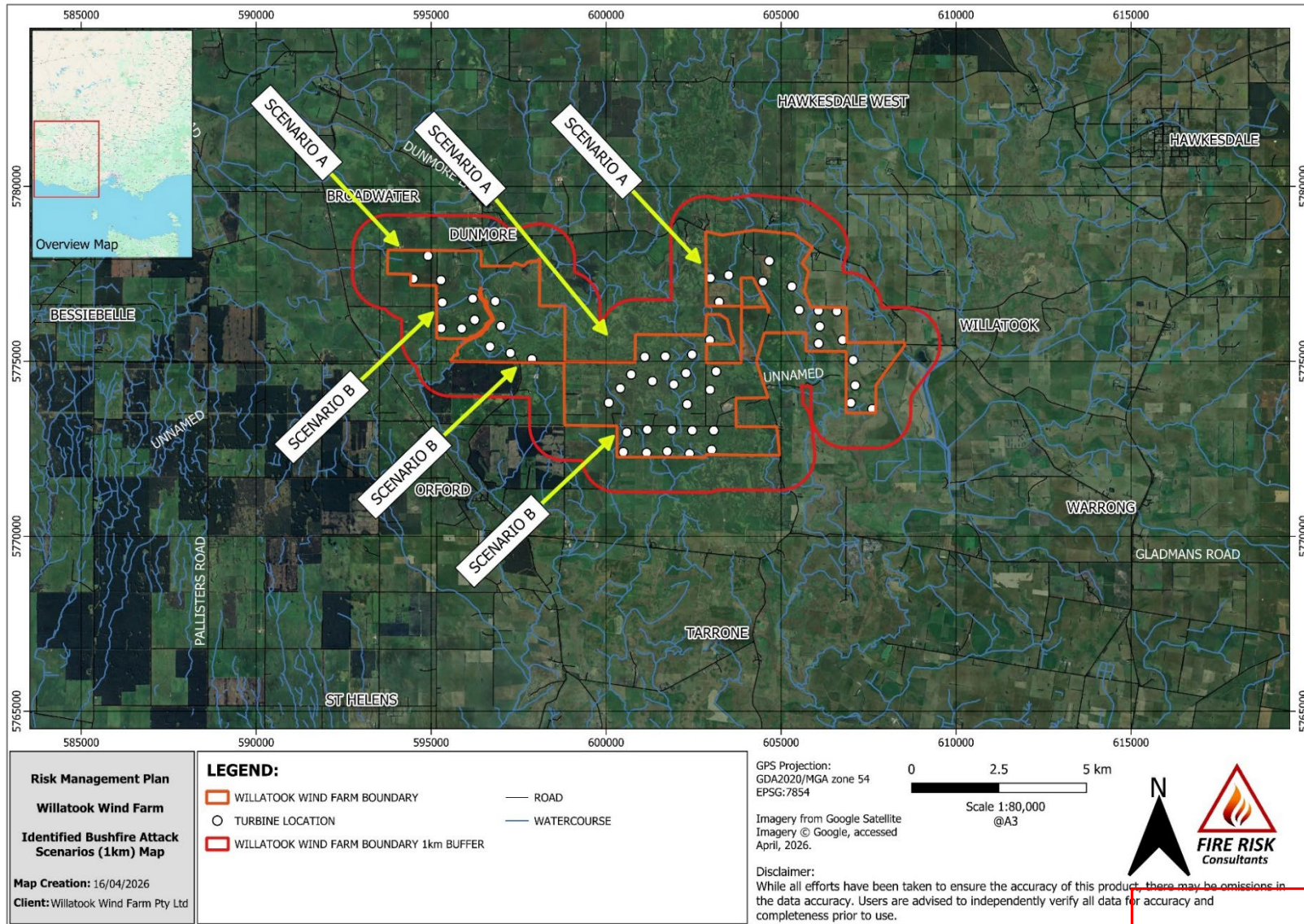


Figure 8 One kilometre landscape assessment

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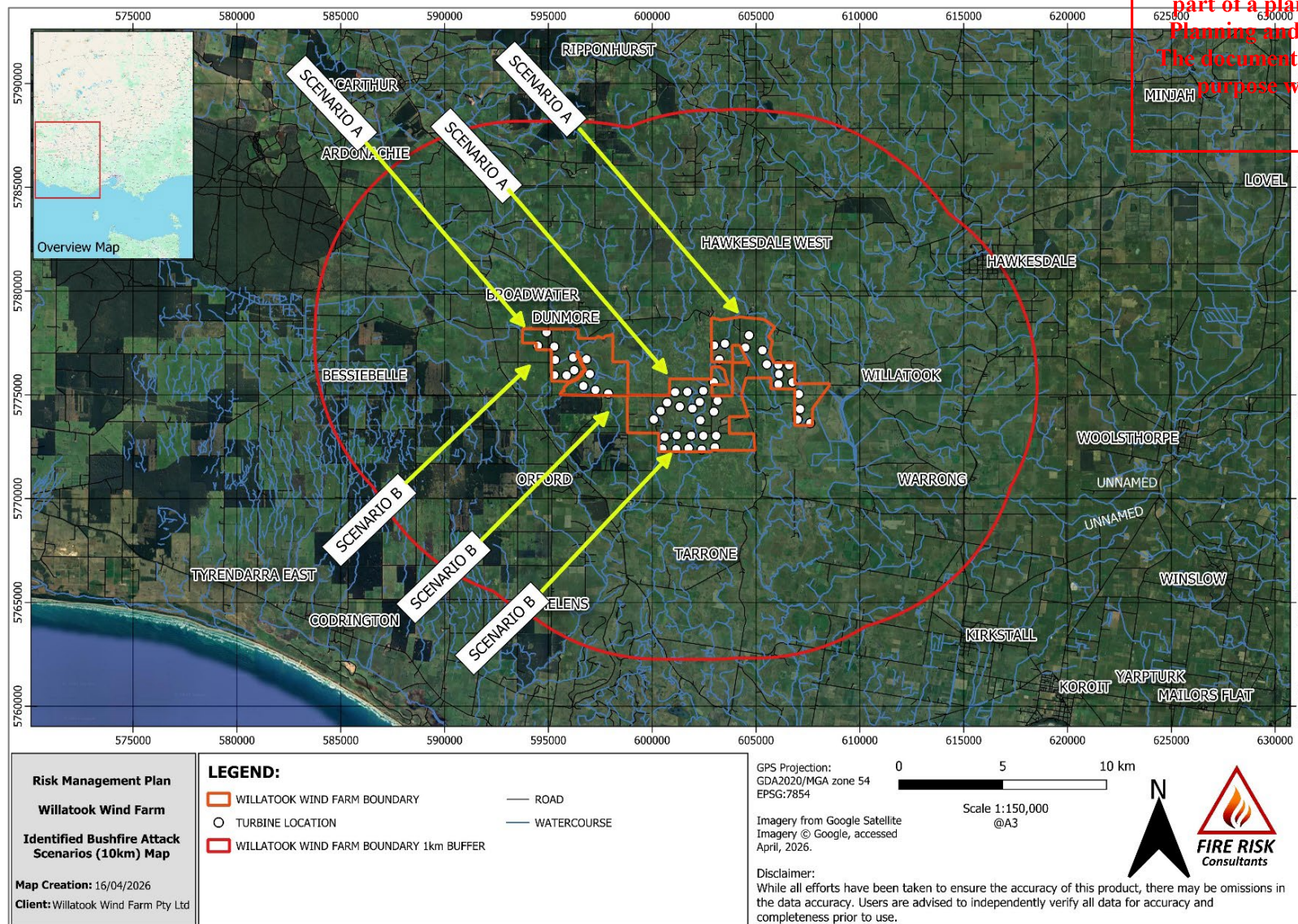


Figure 9 10 kilometre landscape assessment

Clause 13.02 Settlement Objectives are primarily related to settlement development of which it could be argued that a Wind Energy Facility and BESS does not meet these definitions. Regardless, an assessment of the project has been undertaken against the Settlement Objectives to allow for a detailed consideration of the project against the Clause 13.02 Policy.

Table 6 - Response to Clause 13.02 - Settlement Objectives

Settlement planning objectives	Project response	Achieved (✓ or ✗)
Directing population growth and development to low risk locations, being those locations assessed as having a radiant heat flux of less than 12.5 kilowatts/square metre under AS 3959-2009 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2009).	This project does not promote population growth and will only have people onsite during the construction phase and when undertaking maintenance during the operations phase. During operations, it is expected that there will be a limited number of people on-site. The design has ensured that there will not be any turbine towers or any part of the BESS or terminal station within the Bushfire Management Overlay.	✓
Ensuring the availability of, and safe access to, areas assessed as a BAL-LOW rating under AS 3959-2009 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2009) where human life can be better protected from the effects of bushfire.	The development will result in areas that will achieve a Bushfire Attack Level (BAL) Low rating when assessed against AS3959. This will include the BESS and works areas. Depending on the location of a bushfire, there are several travel routes available to leave the area and travel to an area deemed to be BAL LOW. These locations would include Hawkesdale, Port Fairy and Macarthur. This will be addressed within the Emergency Management Plan that will be developed for the Wind Energy Facility and BESS.	✓
Ensuring the bushfire risk to existing and future residents, property and community infrastructure will not increase as a result of future land use and development.	The Wind Energy Facility and BESS will be provided with a range of protection measures that will ensure the bushfire risk to existing and future surrounding properties will not increase. These measures include: • Asset Protection Zone surrounding the base of each Turbine Tower, the BESS area and other works areas. • A fire detection (smoke/heat) and suppression (gas) system will be installed located specifically within the high risk electrical cabinets in the wind turbine nacelle, with the details/design of this system to be determined in consultation with CFA. • BESS design considerate of fire risk and provided with suitable monitoring systems with the aim of preventing fires. • Access road network to be developed and maintained to allow for access to each of the towers. • Provision of static water supplies to support firefighting operations.	✓
Achieving no net increase in risk to existing and future residents, property and community infrastructure, through the implementation of bushfire protection measures and where possible reducing bushfire risk overall.	The fire protection measures required by the CFA Guideline ensures that there is no net increase in risk to existing and future residents. The site for the Wind Energy Facility and BESS has been chosen to ensure separation from existing dwellings is achieved.	✓

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Assessing and addressing the bushfire hazard posed to the settlement and the likely bushfire behaviour it will produce at a landscape, settlement, local, neighbourhood and site scale, including the potential for neighbourhood-scale destruction.	The bushfire risk has been assessed at the landscape level. This has identified the potential for long bushfire runs to occur from the north west and south west aspects. This development will not change the current expected bushfire behaviour in the landscape, it will likely reduce the risk in the surrounding areas due to the addition of an access track network and management around the base of the turbines, BESS and other works areas.	✓
Assessing alternative low risk locations for settlement growth on a regional, municipal, settlement, local and neighbourhood basis.	The development of Wind Energy Facilities and BESS is required to occur in remote locations. This area has been chosen due to the low number of dwellings in the surrounding landscape. The CFA Guideline requirements is ensuring the management of risk is occurring based on the landscape bushfire risk.	✓
Not approving any strategic planning document, local planning policy, or planning scheme amendment that will result in the introduction or intensification of development in an area that has, or will on completion have, more than a BAL-12.5 rating under AS 3959-2009 Construction of Buildings in Bushfire-Prone Areas (Standards Australia, 2009).	The development will achieve a less than BAL 12.5 rating when assessed against AS3959 through the provision of Asset Protection Zones around the infrastructure.	✓

5.1.3 Assessment against Clause 13.02 summary

The assessment against Clause 13.02 has identified that the development is within an area where the landscape bushfire risk is influenced by the potential for grassfires and fires in plantation areas to the west of the development. However, the proposal has been designed to limit both the potential impact on the Wind Energy Facility and the BESS and the potential for fires to leave the property and enter the surrounding landscape. As the development is required to achieve the requirements outlined within the CFA Guidelines as a minimum, this will ensure that the settlement planning objectives are achieved.

5.2 Analysis against CFA Guideline

CFA has produced Guidelines that outline their requirements to address fire risk within renewable energy installations. Section 5 of the Guideline outlines the process to analyse risk to enable the identification of hazards that may or can cause fires.

The CFA Guideline also specifies model requirements for renewable energy installations. Prior to the risk assessment being undertaken, it is important to assess the Wind Energy Facility and BESS project against these requirements. This will increase the effectiveness of the risk assessment.

Table 7 identifies the model requirements from CFA's Guideline and how this project addresses the specific areas.

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Table 7 -Response to CFA Guideline

Model requirement	Compliance	Comments
Section 2 – consulting with CFA		
a) Where located within a Bushfire Prone Area, bushfire risk is addressed according to the Victoria Planning Provisions, Clause 13.02-1S (Bushfire Planning), through bushfire hazard identification and assessment (including a bushfire hazard site and landscape assessment). This assessment must include risks to the proposed technologies from the landscape (bushfire/grassfire).	✓	The property is within a BPA with the BMO in the surrounding landscape. This RMP includes an assessment against Clause 13.02 within Section 5.1. The assessment has identified the potential for bushfires to approach the development from either the northwest or southwest.
b) Address risks from proposed technologies through a comprehensive risk management process, documented in a Risk Management Plan.	✓	This RMP includes an analysis of risk to demonstrate the mitigation solutions are sufficient to manage the fire risk.
c) Indicate where the exact specifications of elements within the renewable energy facility will be determined during the detailed design phase, such as solar panel and wind turbine model/manufacturer and battery chemistry.	✓	This RMP considers the indicative layout and design and identifies further design solutions to manage the fire risk. The RMP will be updated prior to construction, in accordance with any anticipated Planning Permit conditions, and for the final BESS supplier and project layout. Additionally, informed by the RMP, a Fire Management Plan and Emergency Management Plan will also be developed.
d) Explicitly state that the following documentation will be prepared in accordance with this guideline, in consultation with CFA, before development starts: Risk Management Plan Fire Management Plan Emergency Management Plan	✓	This document is the Risk Management Plan (RMP), which (as discussed above) will be updated prior to construction. The outcomes of this assessment will inform the preparation of a Fire Management Plan and Emergency Management Plan.
Section 3 – Risk Management Plan		
A Risk Management Plan must be developed for all renewable energy facilities.	✓	This Risk Management Plan has been prepared for the proposed Willatook Wind Farm and BESS.
The Risk Management Plan must:		
a) Describe the infrastructure (natural and built), landscape, nature of operations and occupancy of the facility.	✓	Refer to Section 3.
b) Describe the risks and hazards at the facility to and from the renewable energy	✓	Refer to Section 6.

Model requirement	Compliance	Comments
infrastructure (including battery energy storage systems).		
c) Specify and justify, in accordance with Section 4.2 of this guideline:		
The location of the facility in the landscape, and the proposed infrastructure on-site.	✓	Refer to Section 4.1 of this Table.
- Emergency vehicle access to and within the facility that: - Includes site access points of a number suitable to the size and hazard of the facility (a minimum of two). - Provides access to renewable energy infrastructure, substations and fire service infrastructure.	✓	Refer to Section 4.2.1 of this Table.
Firefighting water supply for the facility.	✓	Refer to Section 4.2.2 of this Table.
- A fire break width of 10m or greater, based on radiant heat flux (output) as an ignition source: - Around the perimeter of the facility. - Between any landscape buffer/vegetation screening and infrastructure.	✓	Refer to Section 4.2.5 of this Table.
- The separation distance, based on radiant heat flux (output) as an ignition source, between: - Adjacent renewable energy infrastructure (e.g., between adjacent battery containers/enclosures). - Battery containers/enclosures and related battery infrastructure, buildings/structures, and vegetation.	✓	Refer to Section 4.2.5 and 4.2.6 of this Table.
All other controls for the management of on and off-site hazards and risks at the facility (including all proposed battery energy storage system safety and protective systems).	✓	Refer to Section 4.2 of this Table.
d) Provide an evidence-based determination of the effectiveness of the risk controls against the identified hazards, including justification for the omission of any battery safety and protective system/s.	✓	Refer to Section 4.2 of this Table.
e) Form the basis for the design of the facility.	✓	The outcomes of the assessment against Clause 13.02-1S, the CFA Guidelines and the risk assessment contained within Section 6 have been used to form the basis of the design. The design will be further improved following the more detailed assessment once the

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Model requirement	Compliance	Comments
		manufacturers details have been determined post the planning consent being issued.
Section 4- Facility Location and Design		
Section 4.1 – Facility Location		
Planning applications for all renewable energy facilities proposed in high-risk environments must address the following:		
a) An assessment against policy at Clause 13.02-1S (Bushfire Planning) where the facility is located in a Bushfire Prone Area (BPA).	✓	This RMP includes an assessment against Clause 13.02 within Chapter 5.1. The assessment has identified the potential for bushfires to approach the development from either the north west or south west.
b) The impact of any ignitions arising from the infrastructure (solar panels, wind turbines, battery energy storage systems, electrical infrastructure) on nearby communities, infrastructure and assets.	✓	This report considers the impact and the likelihood of fires that leave the property. The Clause 13.02 assessment has considered this and has also been addressed within the risk assessment in Section 6.
c) The impact of bushfire on the infrastructure (e.g. ember attack, radiant heat impact, flame contact).	✓	This report considers the impact of bushfire on the infrastructure. The Clause 13.02 assessment considered this and has also been addressed within Section 6.
d) Assessment of whether the proposal will lead to an increase in risk to adjacent land and how the proposal will reduce risks at the site to an acceptable level.	✓	The Clause 13.02 assessment has considered this and determined that there will be no increase in bushfire risk because of the development. The requirements including managing vegetation around the base of the turbine towers and BESS area, detection and suppression systems installed within the wind turbine nacelle and provision of access roads supports the management of bushfire risk.
Section 4.2 – Facility Design		
Section 4.2.1 – Emergency vehicle (Fire Truck) access		
All facilities		
a) Construction of a four (4) metre perimeter road within the perimeter fire break.	✓	A four metre wide perimeter road will be constructed around the BESS development and located within the fire break. The wind turbines will be developed on hardstand. This will allow firefighters to park adjacent to the wind turbine and conduct operations around the perimeter of the wind turbine.
b) Roads must be of all-weather construction and capable of	✓	All access roads will be all weather construction and be capable to accommodate a minimum of

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Model requirement	Compliance	Comments
accommodating a vehicle of fifteen (15) tonnes (e.g. no compacted earth).		15 tonnes. The access roads will not be compacted earth.
c) Constructed roads should be a minimum of four (4) metres in trafficable width with a four (4) metre vertical clearance for the width of the formed road surface. Ensure any fencing along access routes allows for width of fire vehicles.	✓	The access roads constructed for the Wind Farm, BESS and Terminal Station developments will be a minimum of four metres in trafficable width with four metres of vertical clearance for the width of the road surface.
d) The average grade should be no more than 1 in 7 (14.4% or 8.1°) with a maximum of no more than 1 in 5 (20% or 11.3°) for no more than fifty (50) metres.	✓	The internal access track network has been designed to avoid steep slopes. Where required, the average grade will be no more than 1 in 7 (14.4% or 8.1°) with a maximum of no more than 1 in 5 (20% or 11.3°) for no more than fifty (50) metres.
e) Dips in the road should have no more than a 1 in 8 (12.5% or 7.1°) entry and exit angle.	✓	Where there are dips, the road should have no more than a 1 in 8 (12.5% or 7.1°) entry and exit angle.
f) Roads must incorporate passing bays at least every 600 metres, which must be at least twenty (20) metres long and have a minimum trafficable width of six (6) metres. At least one passing bay must be incorporated where roads are less than 600 metres long.	✓	The access / perimeter roads will exceed distances of 600m long and will need to incorporate passing bays every 600m. These will be included on final plans.
g) Road networks must enable responding emergency services to access all areas of the facility, including fire service infrastructure, buildings, battery energy storage systems and related infrastructure, substations and grid connection areas.	✓	The proposed access roads will provide direct access to the base of all wind turbines, BESS area and Terminal Stations.
h) Provision of at least two (2) but preferably more access points to each part of the facility. The number of access points must be informed through a risk management process, in consultation with CFA.	✓	As the development is a Wind Energy Facility, there are numerous access points located throughout the development. The BESS will be provided with dual access/egress points.
Wind Energy Facilities		
Constructed roads developed during the construction phase of facilities must be maintained post-commissioning and throughout the operational life of the facility, to allow access to each turbine for maintenance and emergency management purposes. The number and location of vehicle access points must be determined in consultation with CFA.	✓	There are approximately 65 access roads that will be developed for the construction phase will be retained throughout the life of the project. This will provide access for maintenance activities along with emergency vehicle access if required.

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Model requirement	Compliance	Comments
Battery Energy Storage Systems		
At least two access points are to be provided into each section where battery energy storage systems are located. The number and location of vehicle access points must be determined in consultation with CFA.	✓	The BESS area will be provided with two access points, and the final selection will be completed in consultation with CFA.
Section 4.2.2 Firefighting Water Supply		
All Facilities		
a) Water access points must be clearly identifiable and unobstructed to ensure efficient access. ADVERTISED PLAN	✓	Static water supplies for the Wind Energy Facility and BESS will be located where possible at the property entrances or at other strategic locations around the site. The final location of static water supplies will be determined through detailed analysis and in consultation with CFA. See Appendix B – Water tank locations for the preliminary WEF tank locations.
b) Static water storage tank installations must comply with AS 2419.1-2021: Fire hydrant installations – System design, installation and commissioning.	✓	The static water supply will be located within tanks that comply with AS2419.1:2021.
c) The static water storage tank(s) must be an above-ground water tank constructed of concrete or steel.	✓	The static water tanks will be above ground.
d) The static water storage tank(s) must be capable of being completely refilled automatically or manually within 24 hours.	✓	Site management will have an arrangement with a local water carrier to ensure static water supplies are refilled within 24 hours. This will be addressed within the Emergency Management Plan.
e) The static water storage tanks must be located at vehicle access points to the facility and must be positioned at least ten (10) metres from any infrastructure (solar panels, wind turbines, battery energy storage systems, etc.).	✓	Static water tanks will be located at the entrances to the access roads constructed for the wind turbine development. They will be located at least 10 metres from all infrastructure. A review of the layout in Figure 1 identifies the need for 10 static water tanks for the wind turbine development. Preliminary tank locations for the WEF is shown in Appendix B – Water tank locations.
f) The hard-suction point must be provided, with a 150mm full bore isolation valve equipped with a Storz connection, sized to comply with the required suction hydraulic performance. Adapters that may be required to match the connection are: 125mm, 100mm, 90mm,	✓	The static water tanks will be provided with a hard suction point and adapters that will allow for the typical firefighting appliances to access the water supplies.

Model requirement	Compliance	Comments
75mm, 65mm Storz tree adapters with a matching blank end cap to be provided.		
g) The hard-suction point must be positioned within four (4) metres to a hardstand area and provide a clear access for emergency services personnel.	✓	The hard suction points will be accessible by firefighting appliances.
h) An all-weather road access and hardstand must be provided to the hard-suction point. The hardstand must be maintained to a minimum of 15 tonne GVM, eight (8) metres long and six (6) metres wide or to the satisfaction of the CFA.	✓	The tanks will be provided with access to allow firefighting appliances to access the hard suction point.
i) The road access and hardstand must be kept clear at all times.	✓	This requirement will be specified within site procedures and the Emergency Management Plan.
j) The hard-suction point must be protected from mechanical damage (e.g. bollards) where necessary.	✓	Bollards will be provided to protect the static water tanks outlets from mechanical damage.
k) Where the access road has one entrance, an eight (8) metre radius turning circle must be provided at the tank.	✓	Turning provisions will be provided at the base of each wind turbine that will enable firefighting appliances to safely turn around.
l) An external water level indicator must be provided to the tank and be visible from the hardstand area.	✓	This has been included within the design.
m) Signage indicating 'FIRE WATER' and the tank capacity must be fixed to each tank.	✓	This has been included within the design.
n) Signage must be provided at each vehicle entrance to the facility, indicating the direction to the nearest static water tank (s).	✓	Signage will be provided at all property entrances that show the location of the closest static water supply to that location.
Wind Energy Facilities		
a) The fire protection system for wind energy facilities must incorporate at least one static fire water storage tank of at least 45,000L effective capacity at each site entrance.	✓	A 45,000 litre static water tank will be provided at the start of each road that comes off a public road. An assessment indicates the need for 9 x 45,000L at the point where access roads meet the public roads.
b) Additional static fire water storage tanks of at least 45,000L effective capacity must also be incorporated in facility design. The number and location of tanks is to be determined through a comprehensive risk management process (Risk Management Plan), in consultation with CFA.	✓	There have been no additional static water tanks identified for the WEF area. The static water supply identified above is deemed sufficient given the landscape risk.

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Model requirement	Compliance	Comments
c) Nacelles must be equipped with automatic fire detection, alarm and fire suppression systems. ADVERTISED PLAN	✓	A fire detection (smoke/heat) and suppression (gas) system will be installed within the high risk electrical cabinets in the nacelle, with the details/design of this system to be determined during consultation with CFA. The systems will be monitored 24/7 by the monitoring system and if activated, an alert will be sent to the site operator. The Emergency Management Plan will include procedures for alerting the CFA to a fire.
Battery Energy Storage Systems (Centralised)		
1) For facilities with battery energy storage systems, the fire protection system must include as a minimum:		
a) Where reticulated water is available, a fire hydrant system that meets the requirements of AS2419.1-2021: Fire hydrant installations, Section 3.9: Open Yard Protection, and Table 2.2.5(D): Number of Fire Hydrant Outlets Required to Flow Simultaneously - Open Yards. Except, that fire hydrants must be provided and located so that every part of the battery energy storage system is within reach of a 10m hose stream issuing from a nozzle at the end of a 60m length of hose connected to a fire hydrant outlet.	✓	Not applicable. No reticulated water is available for the site. This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright
b) Where no reticulated water is available, a fire hydrant system that complies with AS 2419.1-2021 must be provided.		
b) Where no reticulated water is available, a fire water supply in static storage tanks, where:	✓	Static water supplies in storage tanks will be provided.
i. The fire water supply must be of a quantity no less than 288,000L or as per the provisions of AS2419.1-2021: Fire hydrant installations, Table 2.2.5(D) for open yards flowing for a period of no less than four hours at 20L/s, whichever is the greater.	✓	The BESS layout is being determined, and the provision of water supplies will be in accordance with the provisions of AS2419.1. The aggregate area of the BESS is estimated to be 50,000m² and will be required to provide 576,000L.
ii. The quantity of static fire water storage is to be calculated from the number of hydrants required to flow from AS 2419.1-2021: Fire hydrant installations, Table 2.2.5(D). (E.g., For battery installations with an aggregate area of over 27,000m², 4 hydrant outlets are required to operate at 10L/s for four hours, which equates to a minimum static water supply of 576kL.)	✓	The BESS area will be provided with water supplies that conform with AS2419.1. The aggregate area of the BESS is estimated to be 50,000m² and will provide 4 hydrant outlets capable of operating at 10L/s for at least four hours.

Model requirement	Compliance	Comments
iii. Fire hydrants must be provided and located so that every part of the battery energy storage system is within reach of a 10m hose stream issuing from a nozzle at the end of a 60m length of hose connected to a fire hydrant outlet.	✓	Fire hydrants will be located around the site to enable appropriate hydrant coverage for the facility.
iv. The fire water supply must be located at vehicle entrances to the facility, at least 10m from any infrastructure (electrical substations, inverters, battery energy storage systems, buildings).	✓	The water supply will be at least 10 metres from any infrastructure.
v. The fire water supply must be reasonably adjacent to the battery energy storage system and shall be accessible without undue danger in an emergency. (E.g., Fire water tanks are to be located closer to the site entrance than the battery energy storage system).	✓	The static water supply and booster assembly will be located adjacent to the main entrance to the BESS area.
vi. The fire water supply must comply with AS2419.1-2021: Fire hydrant installations, Section 5: Water storage tanks.	✓	The water supply will comply with the requirements outlined within Section 5. This will as a minimum include: • Appropriate overflows and air gaps • Large and small bore connections • Tank contents indicator • Appropriate signage • Access opening and ladders

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Section 4.2.3 Fire Detection and Suppression Equipment

All Facilities

Suitable fire detection and suppression equipment must be provided:

a) For on-site buildings and structures, according to the requirements of the National Construction Code.	✓	All buildings will be constructed in accordance with the National Construction Code.
b) For storages of dangerous goods, according to the requirements of any Australian Standards for storing and handling of dangerous goods.	✓	The storage of dangerous goods will comply with the requirements of any Australian Standards for storage and handling of dangerous goods. This requirement will be included in the Fire Management Plan for the project.
c) For electrical installations, a minimum of two (2) suitable fire extinguishers must be provided within 3m-20m of each PCU (Power Control Unit).	✓	Fire extinguishers will be provided at each PCU.
d) In all vehicles and heavy equipment, each vehicle must carry at least a nine (9)-litre water stored-pressure fire extinguisher with	✓	All vehicles will be provided with fire extinguishers when on-site during the fire danger period.

Model requirement	Compliance	Comments
a minimum rating of 3A, or other firefighting equipment as a minimum when on-site during the Fire Danger Period.		
Section 4.2.5 – Fire Breaks		
A fire break must be established and maintained around:		
a) The perimeter of the facility, commencing from the boundary of the facility or from the vegetation screening inside the property boundary.	✓	A fire break will be provided around the base of each Wind Turbine and the BESS area.
b) The perimeter of control rooms, electricity compounds, substations and all other buildings onsite. The width of fire breaks must be a minimum of 10m, and at least the distance where radiant heat flux (output) from the vegetation does not create the potential for ignition of on-site infrastructure.	✓	The Terminal Station and all other buildings must be provided with a 10 metre fire break at the minimum. ADVERTISED PLAN
Wind Energy Facilities		
A fire break must be established and maintained around the base of wind turbines.	✓	Every tower will be provided with a 10 metre fire break around the base.
Battery Energy Storage Systems		
A fire break must be established and maintained around battery energy storage systems and related infrastructure.	✓	The BESS area will be provided with a minimum fire break of 10 metres around the perimeter of the BESS.
Section 4.2.6 – Design Specific to Facility Type		
Wind Energy Facilities		
a) Wind turbines must be located no less than 300 metres apart.	✓	The wind turbines have been located a minimum of 300 metres apart.
b) Wind turbines must be provided with automatic shut-down, and the ability to be completely disconnected from the power supply in the event of fire.	✓	This requirement has been included within the project specifications. The SCADA system will be designed to enable either onsite operators or remotely operating to shut down a single or multiple wind turbines.
c) Installed weather monitoring stations must be notified to the Civil Aviation Safety Authority (CASA) as per <i>CASA Advisory Circular AC 139.E-05 v1.1, October 2022</i> (as for all structures 110m or more above the ground).	✓	Any permanent weather masts being installed as part of the project will be marked as per the CASA requirements.

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Model requirement	Compliance	Comments
d) All guy wires and monitoring towers must be clearly marked, even where marking is not required by CASA.	✓	This will be undertaken during the construction phase.
Battery Energy Storage Systems		
1) The design of the facility must incorporate:		
a) A separation distance that prevents fire spread between battery containers/enclosures and: • Other battery containers/enclosures. • On-site buildings. • Substations. • The site boundary. • Any other site buildings. • Vegetation. Separation must be at least the distance where the radiant heat flux (output) from a battery energy storage system container/enclosure fully involved in fire does not create the potential for ignition of these site elements.	✓	The battery system as per the CFA Guideline is required to be designed with appropriate separation between the batteries and supporting infrastructure. The CFA Guideline also requires the Battery Unit to comply with UL9540 and be certified against UL9540A by an independent testing authority. The results of the UL9540A test guides the required separation distance between the various Battery Units and other infrastructure to reduce the likelihood of fire spread occurring. The layout of the Battery Units will conform with the manufacturer specifications that directly relate to the outcomes of the UL9540A test. The UL9540A standards requires the test methodology to: Determine the capability of a battery technology to undergo thermal runaway and then evaluate the fire and explosion hazard characteristics of those battery energy storage systems that have demonstrated a capacity to undergo thermal runaway. The spacing requirements are also influenced by NFPA 855 which requires the BESS manufacturer/supplier to determine the spacing requirements through appropriate testing including the use of UL9540A. Whilst the selection of a BESS supplier has not been finalised, demonstration of these spacing requirements being met will be part of an update to this RMP, and preparation of the Fire Management Plan and Emergency Management Plan, prior to the commencement of construction.
b) A fire break around the battery energy storage system and related infrastructure, of a width of no less than 10m, or greater where determined in the Risk Management Plan. Fire breaks must be non-combustible, constructed of concrete, mineral earth or	✓	Surrounding the BESS area will be a perimeter access road that is within the 10m fire break. The remainder of the vegetated areas within the BESS compound will be maintained during the fire danger period.

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Model requirement	Compliance	Comments
non-combustible mulch such as crushed rock. The width must be calculated based on the ignition source being radiant heat of surrounding vegetation, including landscaping.		
c) A layout of site infrastructure that: • i. Considers the safety of emergency responders. • ii. Minimises the potential for grassfire and/or bushfire to impact the battery energy storage system. • iii. Minimises the potential for fires in battery containers/enclosures to impact on-site and offsite infrastructure.	✓	The site layout has been designed to ensure safe and effective access for firefighters and minimises the potential for bushfires to impact on the area.
2) Battery energy storage systems must be:		
a) Located to be reasonably adjacent to a site vehicle entrance (suitable for emergency vehicles).	✓	Emergency vehicle access is available to the site.
b) Located so that the site entrance and any fire water tanks are not aligned to the prevailing wind direction (therefore least likely to be impacted by smoke in the event of fire at the battery energy storage system.)	✓	The static water supply (576,000 litres) will be located adjacent to the main entrance. This provides effective access for firefighters.
c) Provided with in-built detection and suppression systems. Where these systems are not provided, measures to effectively detect and/or suppress fires within containers must be detailed within the Risk Management Plan.	✓	The chosen BESS system will be provided with a fire safety system in consultation with CFA. This is outlined in Chapter 3.1.
d) Provided with explosion prevention via sensing and venting, or explosion mitigation through deflagration panels.	✓	The Battery Units will be provided with explosion prevention and venting systems that comply with NFPA855.
e) Provided with suitable ember protection to prevent embers from penetrating battery containers/enclosures.	✓	The Battery Units are designed to eliminate the ingress of dust, spiders and other insects. This will also prevent any embers from fires in the surrounding area to enter the Battery Unit. The chosen Battery Unit will have a suitable IP rating, and this will be included within the updated RMP.
f) Provided with suitable access roads for emergency services vehicles, to and within the site, including to battery energy storage system(s) and fire service infrastructure.	✓	Driveway access will be provided that allows access to BESS units along with perimeter access around the battery storage area. The indicative design and the final design will address this requirement.

Model requirement	Compliance	Comments
g) Installed on a non-combustible surface such as concrete.	✓	The BESS and other associated infrastructure will be installed on a non-combustible surface.
h) Provided with adequate ventilation.	✓	The Battery Units are provided with sufficient ventilation. This includes appropriate separation between and within the Battery Units. The design of ventilation systems will be in accordance with either NFPA 68 or 69 and the manufacturer's specifications.
i) Provided with impact protection to at least the equivalent of a W guardrail-type barrier, to prevent mechanical damage to battery containers/enclosures.	✓	There will be various protection systems installed, such as bollards to ensure the battery enclosures and other infrastructure are protected from damage from vehicles and other equipment. The final decision for the provision of a system to prevent mechanical damage will be based on a final assessment during detailed design.
j) Provided with enclosed wiring and buried cabling, except where required to be above-ground for grid connection.	✓	This will be included within the final design.
k) Provided with spill containment that includes provision for management of fire water runoff.	✓	The Project will include a stormwater retention area that will also be used to capture any fire water runoff from the BESS footprint that may occur during firefighting operations. This is shown on indicative concept plans and will be included on the final plan. The stormwater retention area will be able to capture a minimum of 576,000 litres of fire water. Procedures will be included within the Emergency Management Plan to inform onsite staff and firefighters on the procedure to utilise the stormwater/fire water retention area.

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Section 5– Facility Construction and Commissioning

Section 5.1.4 – Emergency Management

An Emergency Plan must be developed for the construction and commissioning phase, before development starts.	✓	An Emergency Management Plan will be developed for the construction, commissioning and operations phase.
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Section 6 – Facility Operation

Section 6.1 –Fire Management Plan

A Fire Management Plan must be developed for the facility, in consultation with CFA, before development starts.	✓	A Fire Management Plan will be developed prior to the commencement of construction of the Wind Energy Facility and BESS. This Plan will be
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Model requirement	Compliance	Comments
		provided to CFA for their consideration and feedback.
Section 6.2 1 –Fire Hazards and Risk Controls		
If your facility is at-risk of bushfire, prevention and preparedness activities must be detailed in the Fire Management Plan.	✓	The Fire Management Plan will include the requirements for the management of bushfire risk.
Section 6.2 2–Vegetation Management		
Facility operators must undertake the following measures during the Fire Danger Period:		
a) Grass must be maintained at or below 100mm in height during the declared Fire Danger Period.	✓	This requirement will be included within the Fire Management Plan for the areas surrounding the Wind Turbines, Terminal Station, and BESS.
b) Long grass and/or deep leaf litter must not be present in areas where heavy equipment will be working, during construction or operation.	✓	This requirement will be included within the Fire Management Plan.
c) Restrictions and guidance must be adhered to during the Fire Danger Period, days of high (and above) fire danger and Total Fire Ban days (refer to www.cfa.vic.gov.au).	✓	This requirement will be included within the Fire Management Plan.
Section 6.2 4–Facility and System Monitoring		
Appropriate monitoring for facility infrastructure must be provided, to ensure that any shorts, faults or equipment failures with the potential to ignite or propagate fire are rapidly identified and controlled. Any fire must be notified to 000 immediately.	✓	In addition to the detection and suppression systems, the site will be provided with a SCADA system that will monitor the day to day operations of the Wind Energy Facility and BESS. The system includes a range of sensors that will detect faults and report them to the monitoring centre. The system is preprogrammed to send alert messages and includes:
This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright		• Over temperature • Under temperature • Under voltage warning • Power off fault • Voltage and current changes. These alerts are automatically transmitted to a monitoring centre. All alerts received at the monitoring centre will be assessed for the most effective response, which may include: • Deploy a technician to the site. • Call 000 and request emergency service assistance.

Model requirement	Compliance	Comments
Section 6.2.5 – Maintenance		
All Facilities		
Inspection, maintenance and any required repair activities must be conducted for all infrastructure, equipment and vehicles at the facility. Maintenance must be in line with any relevant Australian Standards and the manufacturer's requirements.	✓	This requirement will be included within the Fire Management Plan.
Section 7 – Emergency Planning		
All Facilities		
An Emergency Plan must be developed specific to the facility, in conjunction with CFA, before development starts.	✓	An Emergency Management Plan will be developed prior to the commencement of construction of the Wind Energy Facility and BESS. This Plan will be provided to CFA for their consideration and feedback.
Section 8 – Provision of Emergency Information		
All Facilities		
An Emergency Information Book must be developed and available to emergency responders. Emergency Information Books must be located in Emergency Information Containers, provided at each vehicle entrance the facility.	✓	An Emergency Information Book will be housed within an Emergency Information Container and located at strategic sites across the development. The final location and number of Emergency Information Containers will be determined in consultation with CFA. An Emergency Information Container will also be located at the main entrance to the BESS facility.

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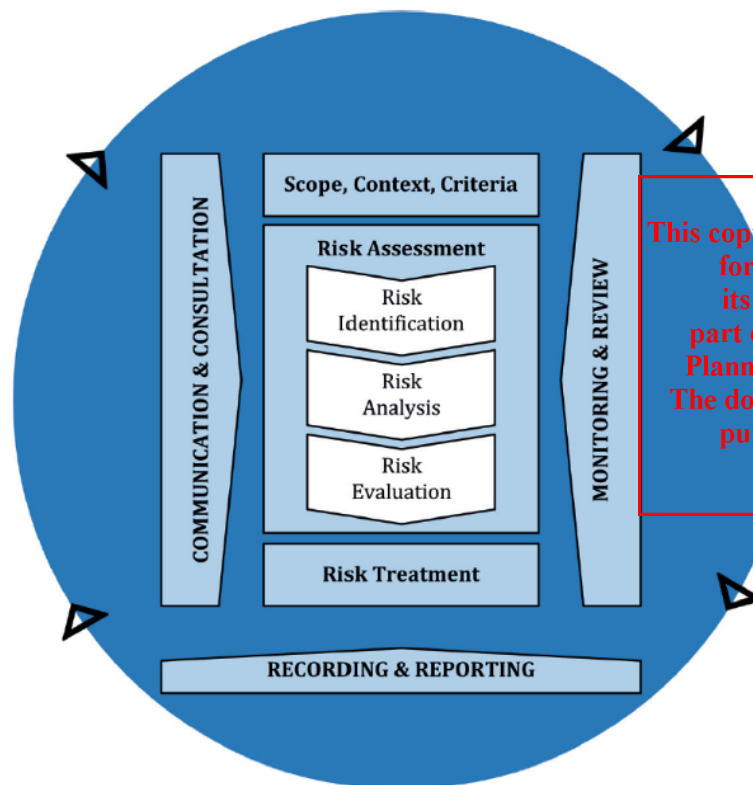
6 Risk Assessment

6.1 Introduction

The risk assessment process involves identifying, analysing, evaluating and treating the identified risks. The overall risk assessment process requires a consistent approach and follows *AS ISO 31000:2018 Risk management – Guidelines* as incorporated into the National Emergency Risk Assessment Guidelines (NERAG). Figure 10 provides an overview of the risk assessment process as outlined within *AS ISO 31000:2018 Risk management – Guidelines*.

Risk management is the process of recognising risk and developing methods to both minimise and manage the risk. This requires the development of a method to identify, prioritise, treat (deal with), control and monitor risk exposures.

A risk assessment is a function of the likelihood of an adverse event occurring and the consequence of the event. A comprehensive risk assessment will identify potential risks and consequences and therefore assist with the development of mitigation actions.



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Figure 10 Overview of AS/NZS ISO 31000-2018 risk management process

This report seeks to follow the steps outlined within the risk management guideline along with the process outlined within NERAG. The outcome of this assessment is a detailed understanding of hazards, the likelihood and consequence of a hazard becoming an emergency, and the treatments identified to manage this risk.

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6.2 Context

The assessment of fire risk is a key requirement imposed on the development by CFA through their Guidelines. The CFA Guideline outlines the types of hazards that may need to be considered in relation to Wind Energy Facilities and BESS systems at the design, construction and operations phases.

6.3 Analysis of fire risk

Wind Energy Facility and BESS infrastructure is largely acknowledged as having limited potential to cause fires. There have however been fires previously and these have been considered during the assessment of risk outlined within this report.

It is important the assessment of risk considers the various stages of the project including construction and the operations phase.

6.3.1 Assessment of fire risk during construction

The construction phase includes various stages including site works, construction of footings and the installation of the turbine towers. This stage also includes the commissioning of the technology and other systems including fire protection systems. This ensures the relevant connectivity is installed to ensure that all alerts and system messages are transmitted to an appropriate monitoring location.

The location of the development could mean that construction is occurring on elevated fire danger days. There is a risk of both causing a fire or being impacted by a fire.

6.3.2 Assessment of fire risk during operations

The operations phase follows the commissioning stage of the project, and the role of maintenance becomes critical to ensure that the system operates as it was designed, for the life of the development. The ongoing maintenance of the infrastructure and development is critical to ensure the ongoing management of fire risk.

All the system components are to be considered as critical as they all are contributing to the ongoing safe operations. The system components include monitoring connectivity, fire protection systems, vegetation management and other safety systems.

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6.4 Risk identification

Through discussions with the client, review of various documentation and the consideration of previous fire history that involved wind energy facilities, the following hazards have been identified:

Table 8 - Hazard identification and description

Hazard	Description
Electrical hazards causing a fire	Electrical faults and/or hazards can be a key cause of fire in the Wind Energy Facility and BESS infrastructure. BESS hazards including battery faults, overcharging, rapid discharge, loss of remote monitoring systems, internal short circuits and overheating. Hazards include faulty wiring and connections. An outcome of these faults can include 'thermal runaway'.
Fire causing spread to adjoining infrastructure on the property	A fire that has started in the development may spread to adjoining infrastructure or surrounding areas within the facility. Rapid escalation of the fire size and complexity can create issues for on site staff and contractors, firefighters and the community.

Fire causing off-Site impacts	Any fire on the property that can spread to adjoining properties most likely through vegetation connectivity, on bushfire risk days can start fires in the surrounding landscape that can threaten the community.
Off-Site fire impacting on the Site	A bushfire burning through the surrounding landscape can enter the property and threaten the infrastructure by potentially starting new fires.
Dangerous goods	The dangerous goods that are stored within the BESS, substation and inverters may leak and either ignite or require clean up by either on site staff, contractors or firefighters.
Fire water runoff	In the event of a fire involving the BESS, firefighters will respond and use water to either extinguish or cool the surrounding area until the infrastructure is deemed safe. The fire water may be contaminated and if not contained may create environmental issues.
Staff and firefighters	The response to a fire by staff, contractors or firefighters can be dangerous due to the various safety hazards associated with a fire in this type of infrastructure.

The above list may not be exhaustive however it is believed that it will allow the assessment of most hazards that may be encountered in a development of this type.

6.5 Risk analysis

The analysis of risk requires the consideration of the likelihood and consequence of an event occurring and measuring this against a predetermined matrix to enable the consideration of each risk both individually and collectively.

For this assessment, a 3 x 3 matrix has been developed that enables the effective consideration of risk and to enable a comparison between the outcome of the hazard assessment.

6.5.1 Likelihood

An assessment of the likelihood of a fire occurring at this development including the potential to impact on people and other infrastructure/property is a key part of the risk assessment. The following will be considered during the assessment of an event occurring:

- Potential for an unplanned fire to occur
- Potential for this ignition to develop and exhibit significant fire behaviour
- Potential for that fire to destroy assets
- Potential for people to be affected or threatened
- The potential for it to develop into a major fire.

Recommendations for mitigation actions in the area may be determined by a number of approaches depending on the level of assessed risk. Strategies to lower risk are provided to ensure the risk is managed to an acceptable level.

An assessment of likelihood considers factors such as:

- Sources of ignition
- Use of the property and/or surrounding area
- History of ignitions within similar infrastructure
- Ability to spread from the property.

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Table 9 - Likelihood table

Likelihood scale frequency	Description
Very Likely	Almost certain or will definitely occur, and /or high level of recorded incidents, or there is a strong likelihood that the event will occur.
Likely	High probability it may occur; and/or some recorded incidents.
Unlikely	It is not expected to occur, but it is not impossible.

6.5.2 Consequence

Consequence refers to the potential damage that could result from a fire occurring in relation to people and assets. In assessing the possible consequences, the assessment considers a variety of hazard, exposure and vulnerability factors including:

- The likely number of people at the facility
- The proximity of other assets
- The location of surrounding properties and the type of activities
- Response capability if an event occurred.

The consequence scale refers to the potential impacts which could occur should a fire occur.

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Table 10 - Risk assessment consequence table

Consequence scale	Description
Major	- Significant consequences that may include long term closure of the site, major damage or effect. - Loss of life and/or significant injuries that cause disability. - Major offsite impacts causing destruction of other assets or life loss.
Moderate	- Moderate loss of property with the facility operating again in the short term. - Medical treatment may be required but no fatalities or long term affects. - Localised damage that can be rectified. - Some environmental impact with short to long-term effects.
Minor	- Minor or negligible consequences or effects. - Isolated damage to property with no ongoing impact on operations. - First aid injuries with no hospitalisations required. - Impact on the environment with short term effects.

The risk rating table is used to combine likelihood and consequence to obtain a risk score. The risk score is used to aid decision making by determining which areas are at the greatest risk of a fire starting and spreading through the estate. Actions can be prioritised using this method to determine where risk mitigation works will occur.

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Table 11 - Risk rating table

RISK RATING TABLE			
	CONSEQUENCE		
	Minor	Moderate	Major
	Minor or negligible consequences or effects. Isolated damage to property with no ongoing impact on operations. First aid injuries with no hospitalisations required. Impact on the environment with short term effects.	Moderate loss of property with the facility operating again in the short term. Medical treatment may be required but no fatalities or long term affects. Localised damage that can be rectified. Some environmental impact with short to long-term effects.	Significant consequences that may include long term closure of the site, major damage or effect. Loss of life and/or significant injuries that cause disability. Major offsite impacts causing destruction of other assets or life loss.
LIKELIHOOD			
Very Likely: Almost certain or will definitely occur, and /or high level of recorded incidents, or there is a strong likelihood that the event will occur.	Medium	Very High	Extreme
Likely: High probability it may occur; and/or some recorded incidents.	Medium	High	Very High
Unlikely: It is not expected to occur, but it is not impossible.	Low	Medium	High

The outcomes of the risk assessment are used to inform the recommendations. These are aimed at providing guidance to management to reduce the fire risk at the property.

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6.5.3 Risk analysis worksheets

The following risk analysis worksheets have assessed the hazards identified in section 5.4 and result in a risk classification that correspond with strategies to lower risk if it is required.

The initial assessment of risk is based on the information that has been supplied to date. The development of additional strategies to lower risk are made as either there was no information provided that identified the treatment or further clarity is required to be considered.

Table 12 - Risk assessment - Electrical hazards causing a fire

RISK	Electrical hazards causing a fire
CAUSE	Electrical faults and/or hazards can be a cause of fire in Wind Turbines and BESS systems. Hazards may include faults, loss of remote monitoring systems, internal short circuits and overheating. The substation due to the presence of electrically charged equipment may, due to a fault or other cause catch fire. Within a BESS, faults can lead to thermal runaway which will create suppression difficulties.
LIKELIHOOD	Likely
JUSTIFICATION	There is a history of fires within Wind Energy Facilities including substations. Available data does not indicate that this is widespread. Modern wind turbine nacelles are fitted with smoke detection and suppression systems and other safety systems to either prevent a fault from occurring or to automatically commence shut down procedures if required. They will also send alerts to site operators. Fires usually occur within the Nacelle which is located at the top of the tower and is where the turbine is located. These areas are difficult to access and rely on trained technicians being available. The turbine and associated equipment will be maintained as per the manufacturer's specifications. There are examples of fires within BESS technology that indicates that when faults occur, they can escalate into challenging events including thermal runaway.
CONSEQUENCE	Moderate
JUSTIFICATION	A fire is unlikely to occur in more than one turbine due to the separation between the towers. A loss of a single turbine will not significantly impact on business operations. Due to the remoteness of the infrastructure, they will unlikely cause issues that will impact on surrounding people or property. To offset the likelihood of a fault within the BESS that creates a flammable atmosphere in and around the BESS, escalates to a fire, or a fire that affects adjacent infrastructure, the following mitigation treatments are included: • Cooling systems that maintain the temperature of the battery packs during day-to-day operations. • Safety systems that send alerts to the monitoring centre if a sensor is activated. • Barriers between each of the battery module bays within each BESS designed to reduce the possibility of thermal runaway from spreading to adjoining battery units. • Separation distances between individual battery packs and other infrastructure in accordance with manufacturer installation guidelines.

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	The BESS will be installed by qualified and competent people in accordance with the manufacturer's specifications to relevant Australian Standards and including compliance with UL9540A – Energy Storage System Requirements. If the multiple layers of protection fail or are not able to suppress the fire, then it is highly likely for the entire nacelle to be destroyed in the fire. This is a highly unlikely scenario. The multiple layers include: • Smoke detection and fire suppression system. • Monitoring systems that detect faults. • Electrical system manufactured and installed in accordance with the relevant Standards. The consequence of a fire within a BESS has been assessed as likely only impacting on the pack where the fire originated. It is unlikely for a fire to spread to other packs.
RISK RATING	High
STRATEGY TO LOWER RISK	The requirements outlined within the response to the CFA Guideline will be sufficient to ensure the risk is maintained at a reduced level. Other requirements that will further reduce the risk include: • Development of an Emergency Management Plan that includes in addition to that required by CFA and AS3745: ○ A system to communicate effectively between the monitoring centre and the onsite staff and contractors. ○ Provision of 24/7 technical expert contact details for the fire brigade to contact in the event of an emergency or threat of an emergency. • Developing a procedure that requires a technician to be deployed to the site when the site monitoring communications are down. • The site monitoring system will indicate the early stages of a fault or emergency event and provides the ability to commence shut down procedures remotely from the site.
RESIDUAL RISK	Medium (unlikely/moderate)

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Table 13 - Risk assessment - Fire causing spread to adjoining infrastructure on the property

RISK	Fire causing spread to adjoining infrastructure on the property
CAUSE	A fire that starts within Wind Energy Facility may spread to adjoining infrastructure. A fire that has started within a component with the BESS may spread to adjoining infrastructure.
LIKELIHOOD	Unlikely
JUSTIFICATION	A fire that starts within a wind turbine nacelle may drop burning materials to the ground and depending on the weather conditions, may spread to an adjoining turbine tower or other infrastructure. Due to the separation between the infrastructure this is highly unlikely to occur. The risk of fire spreading to adjoining infrastructure within the BESS and to adjoining infrastructure with the Wind Energy Facility is unlikely due to the design of the components within the BESS, and the mitigation features incorporated into the design.
CONSEQUENCE	Minor
JUSTIFICATION	The consequence of a fire affecting adjoining areas of the development is likely to be minor due to the provision of fire breaks around the base of the turbine towers, surrounding the BESS, substation and operations and maintenance area. The existing road network along with the proposed access roads will assist with slowing or stopping fire spread between the turbine towers and other infrastructure.
RISK RATING	Low
STRATEGY TO LOWER RISK	Due to the low rating, no additional strategies are required to be implemented beyond compliance with the CFA Guideline as outlined in Section 4. These strategies include: • Development of an Emergency Management Plan • Development of a Fire Management Plan that outlines the required performance and maintenance of all fire mitigation and management initiatives. • Provision of access tracks and fire breaks around the Wind Energy Facility and BESS. • 24/7 monitoring of the system that will alert operators to any faults or events that may lead to a fire. This will result in immediate shut down of the system.
RESIDUAL RISK	Low

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Table 14 - Risk assessment - Fire causing offsite impacts

RISK	Fire causing offsite impacts
CAUSE	Any fire within the WEF and BESS may spread to adjoining properties most likely through vegetation connectivity. These types of fires would occur on elevated fire danger days during the summer months.
LIKELIHOOD	Unlikely
JUSTIFICATION	The compliance with CFA Guidelines requires a range of mitigation strategies implemented including: • Provision of a fire break surrounding the Wind Energy Facility and BESS infrastructure. • Static water supplies for firefighting purposes are scattered through the development and at the BESS. • The monitoring system provides for early notification of a fault and will have the ability to remotely shut down the site if required.
CONSEQUENCE	Minor
JUSTIFICATION	The Clause 13.02 assessment has identified the limited risk for a fire to spread from the site into the surrounding landscape. The creation of fire breaks surrounding the wind turbines, BESS, substation and operations and maintenance area will reduce the potential for a fire to leave the infrastructure. Under elevated fire danger conditions there is the potential for a fire that is caused by site operations to leave the site. This fire would have started outside the vegetation managed areas. Depending on the level of vegetation management in the surrounding landscape, the fire could spread and become uncontrollable quickly. This fire will be influenced by the various existing fire management activities including roadside vegetation management, personal property preparation, firefighting appliances and equipment and activities undertaken by agencies responsible for fire management. The consequence of this type of fire would be the same as a fire caused by other practices in the surrounding landscape. The surrounding landscape is well managed due to farming operations. This will assist with reducing the potential for bushfires to leave the site and impact on the surrounding community.
RISK RATING	Low
STRATEGY TO LOWER RISK	The site Emergency Management Plan will include a procedure for contacting the Municipal Fire Prevention Officer (MFPO) if the vegetation on adjoining properties is unmanaged and becomes a fire risk. The MFPO may, following an assessment issue a Notice requiring the vegetation to be managed. Any vegetation growth on the property will be managed and removed. During the fire danger period, additional inspections will occur to ensure that all weeds and other vegetation is removed from the fire breaks and other critical areas.
RESIDUAL RISK	Low

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Table 15 - Risk assessment - Offsite fire impacting on the site

RISK	Offsite fire impacting on the site
CAUSE	A bushfire burning through the surrounding landscape can occur and threaten the infrastructure by potentially starting new fires.
LIKELIHOOD	Unlikely
JUSTIFICATION	The Clause 13.02 assessment has identified the surrounding landscape as having the potential for supporting a bushfire. It identifies major fires that have occurred in the surrounding landscape. The municipal fire management planning process does not identify this area as having a significant impact on property survivability due to the lack of vegetation that would support large scale ember impact.
CONSEQUENCE	Minor
JUSTIFICATION	Due to the separation between the wind turbines and other infrastructure, the separation surrounding the BESS, the possibility of the development being impacted by a bushfire is reduced. The provision of fire breaks around the base of the towers, BESS area and other infrastructure will ensure a bushfire can't directly impact on the structure.
RISK RATING	Low
STRATEGY TO LOWER RISK	The provision of a firebreak and other managed areas will limit the ability for a bushfire to impact on the property. Prior to construction commencing, an Emergency Management Plan will be developed that includes the requirements for vacating the site when the fire danger is elevated during both construction and operations phases of the project. The development is monitored through a SCADA system that will enable remote operation in the event that the site needs to be closed to personnel.
RESIDUAL RISK	Low

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Table 16 - Risk assessment – Dangerous goods

RISK	Dangerous Goods
CAUSE	With reference to the Dangerous Goods (Storage and Handling) Regulations 2012, there are quantities of Dangerous Goods at the Site within various components of the Proposal. There is the potential for a leak of Dangerous Goods to occur that may cause a threat to people, the environment or be involved in a fire.
LIKELIHOOD	Unlikely
JUSTIFICATION	There will be dangerous goods associated with the BESS and the associated infrastructure. The quantities of dangerous goods will depend on the chosen supplier of the battery packs and other the types of other equipment including transformers. As a minimum the following dangerous goods will be present: • Lithium ion • Refrigerant Both products are contained within the battery packs and have their own bunding, and sensors and alert system that will send a message to the operator if a leak is occurring. The Dangerous Goods are installed within the infrastructure during the manufacturing process. This means that Dangerous Goods are contained and sealed and not readily accessible at the site. Following transportation to the Site, any infrastructure with Dangerous Goods will be inspected to ensure it has not been damaged during transportation. If infrastructure with Dangerous Goods is to be stored at Site prior to installation, it will be stored in line with manufacturer's specifications. Infrastructure will be installed in line with manufacturer's specifications (including inspection and testing). Together, these measures will prevent the likelihood of leaks outside the infrastructure footprint. The manufacturers installation specifications include the protection of the battery pack to ensure that no damage occurs during installation. The design of the BESS including the installation of bollards at high risk locations will prevent vehicles from impacting the infrastructure and potentially causing a leak.
CONSEQUENCE	Minor
JUSTIFICATION	The assessment of the dangerous goods quantities at the BESS will be confirmed following the selection of the chosen technology and will comply with the requirements of the Dangerous Goods legislation.
RISK RATING	Low
STRATEGY TO LOWER RISK	In accordance with the Dangerous Goods (Storage and Handling) Regulations (2012), the fire brigade's views must be sought if the quantities have exceeded the fire protection amounts listed in Schedule 2 as will be likely be the case for the Lithium-Ion and the insulating gas. The Emergency Management Plan will include details of the hazards associated with dangerous goods and appropriate procedures in response to this RMP, including leak management and other response arrangements to Dangerous Goods related emergencies.
RESIDUAL RISK	Low

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Table 17 - Risk assessment - Fire water runoff

RISK	Fire water runoff
CAUSE	In the event of a fire involving the BESS, firefighters will respond and use water to either extinguish or cool the surrounding area until the infrastructure is deemed safe. The CFA Guideline outlines the need to provide capacity for the management of fire water runoff for the BESS to ensure this water does not enter the environment.
LIKELIHOOD	Unlikely
JUSTIFICATION	The risk of a fire within the BESS that would result in fire water runoff is unlikely due to the design of its components, particularly the battery packs and the mitigation features incorporated into its design. This includes: • Quality components will be selected for the Proposal. Most of the infrastructure that supports the BESS is non-combustible or has low quantities of combustible materials. • The battery packs are contained within an enclosure and have several features incorporated within the design that limits the potential for fire spread between components. • The separation between the battery packs and supporting infrastructure (transformers) is in accordance with manufacturer specifications. • Battery packs will be installed on a non-combustible area that will prevent fire spreading along the ground. Due to the design features incorporated into the BESS the likelihood of a fire occurring at the BESS is low. As such, the likelihood of requiring fire water to extinguish a fire at the BESS is also low.
CONSEQUENCE	Minor
JUSTIFICATION	The BESS area will be designed to enable the collection of fire water in the event of a fire. A basin will be constructed where water will flow to and enable testing to then determine the most appropriate disposal method. The basin will ensure that the water is flowing away from firefighters and site staff to enable them to continue to monitor and undertake suppression activities if required.
RISK RATING	Low
STRATEGY TO LOWER RISK	The Emergency Management Plan will provide procedures to manage fire water runoff on the site and provide contact details for organisations that can undertake testing and disposal if required.
RESIDUAL RISK	Low

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Table 18 - Risk assessment – Staff and responding firefighters

RISK	Staff and responding firefighters
CAUSE	The response to a fire by staff, contractors or firefighters can be dangerous due to the various safety hazards associated with a fire in this type of infrastructure.
LIKELIHOOD	Likely
JUSTIFICATION	There is the potential for firefighters and/or staff and contractors to be present during an emergency event and not being familiar with the site and the infrastructure. The CFA Guideline does impose a variety of controls onto the management of the site through the Emergency Management Plan and how CFA interacts with the site if they are called to a fire.
CONSEQUENCE	Moderate
JUSTIFICATION	The provision of an Emergency Information Container that will include the Emergency Management Plan, site plans and contact details for technical specialists will ensure responding firefighters seek information prior to entering the property. The local CFA brigades will be provided the opportunity to tour the facility regularly.
RISK RATING	High
STRATEGY TO LOWER RISK	In all cases a technician will be dispatched to the site to review any faults or alerts that may if not checked, cause a fire. Any faults that are sent to the monitoring centre will be assessed and a technician deployed to make an initial assessment. The Emergency Management Plan will include a requirement to engage with the responding firefighters early to ensure they are aware that a technician is on their way and that entry to the site can wait until they arrive unless there is a life or property protection emergency. The Emergency Information Container that is required by the CFA Guidelines will provide detailed contact information for responding firefighters to seek specialist advice prior to accessing the property.
RESIDUAL RISK	Medium

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7 Conclusion

The assessment of risk for the proposed Willatook Wind Energy Facility and BESS has identified that this development can occur safely providing the requirements outlined within this RMP are implemented.

This report acknowledges the existing bushfire risk in the surrounding landscape, and it has demonstrated how the design will reduce the potential for bushfire to either enter or leave the property.

The assessment of fire history in relation to wind energy facilities and BESS's identifies limited examples of where these renewable energy developments and systems have caused fires. There is no doubt that a wind turbine can present fire risks if not designed, constructed, commissioned and operated effectively. The importance of following design requirements and committing to the ongoing maintenance of the system is critical to reduce fire risk.

The additional requirements imposed on the development by the CFA Guideline and this RMP will strengthen the management of fire risk. In addition to this, following the issue of a Planning Permit, the development of a Fire Management Plan and Emergency Management Plan that meets the requirements of the CFA Guideline will assist with managing the risk of fire.

The results of this assessment should provide confidence that the operator of the wind energy facility and BESS will introduce systems, procedures and maintenance programs to ensure fire risk is managed.

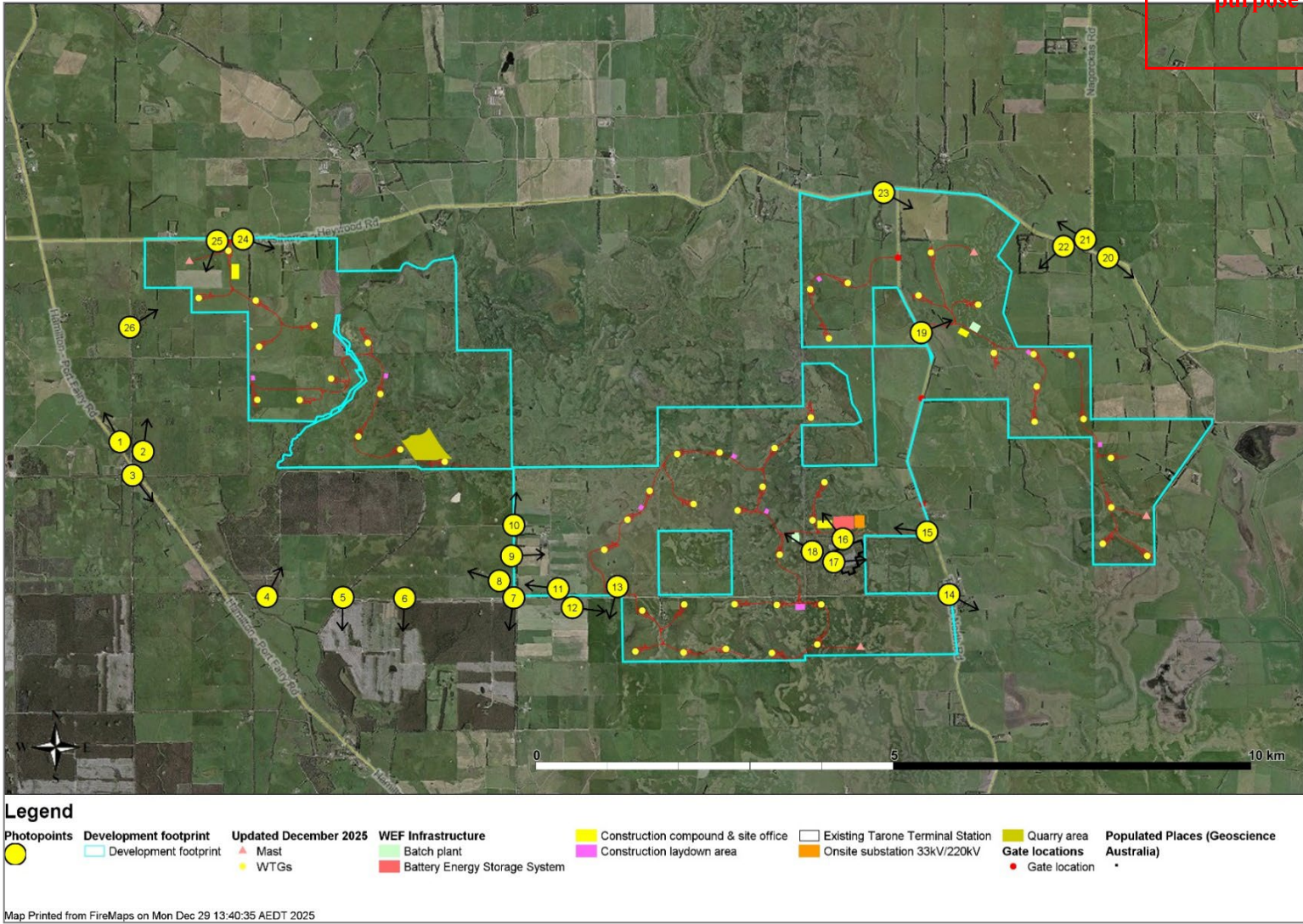
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Appendix A – Site photos



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1 Typical vegetation along Hamilton – Port Fairy Road.	
2 Typical vegetation along Rowbottoms Road.	
3 Typical roadside vegetation along parts of Hamilton – Port Fairy Road.	

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4 Looking north from Riordans Road.	
5 Looking south from Riordans Road.	
6 Looking south from Riordans Road.	

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7 Looking south along McGraths Road.	
8 Looking towards the existing Transmission Line with the grassland fuels below.	
9 Transmission Line from McGraths Road.	

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10 Looking north along McGraths Road.	
11 Looking west along Riordans Road.	
12 Looking west along Riordans Road.	

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13 Looking south from Riordans Road.	
14 Intersection of Riordans Road and Tarrone North Road.	
15 Looking west towards the proposed location of the BESS and other infrastructure.	

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16 Approximate location for the BESS.	
17 Tarrone Terminal Station.	
18 Entrance to the Tarrone Terminal Station.	

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19 Looking east from the Tarrone North Road.	
20 Intersection of the Woolsthorpe – Heywood Road and Nagorckas Road.	
21 Typical vegetation along Nagorckas Road.	

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22 Looking south from Woolsthorpe – Heywood Road.	
23 Typical landscape along Woolsthorpe – Heywood Road.	
24 Looking east along Woolsthorpe – Heywood Road.	

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25 Looking south from Woolsthorpe – Heywood Road.	
26 Typical vegetation along Rowbottoms Road.	

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Appendix B – Water tank locations

