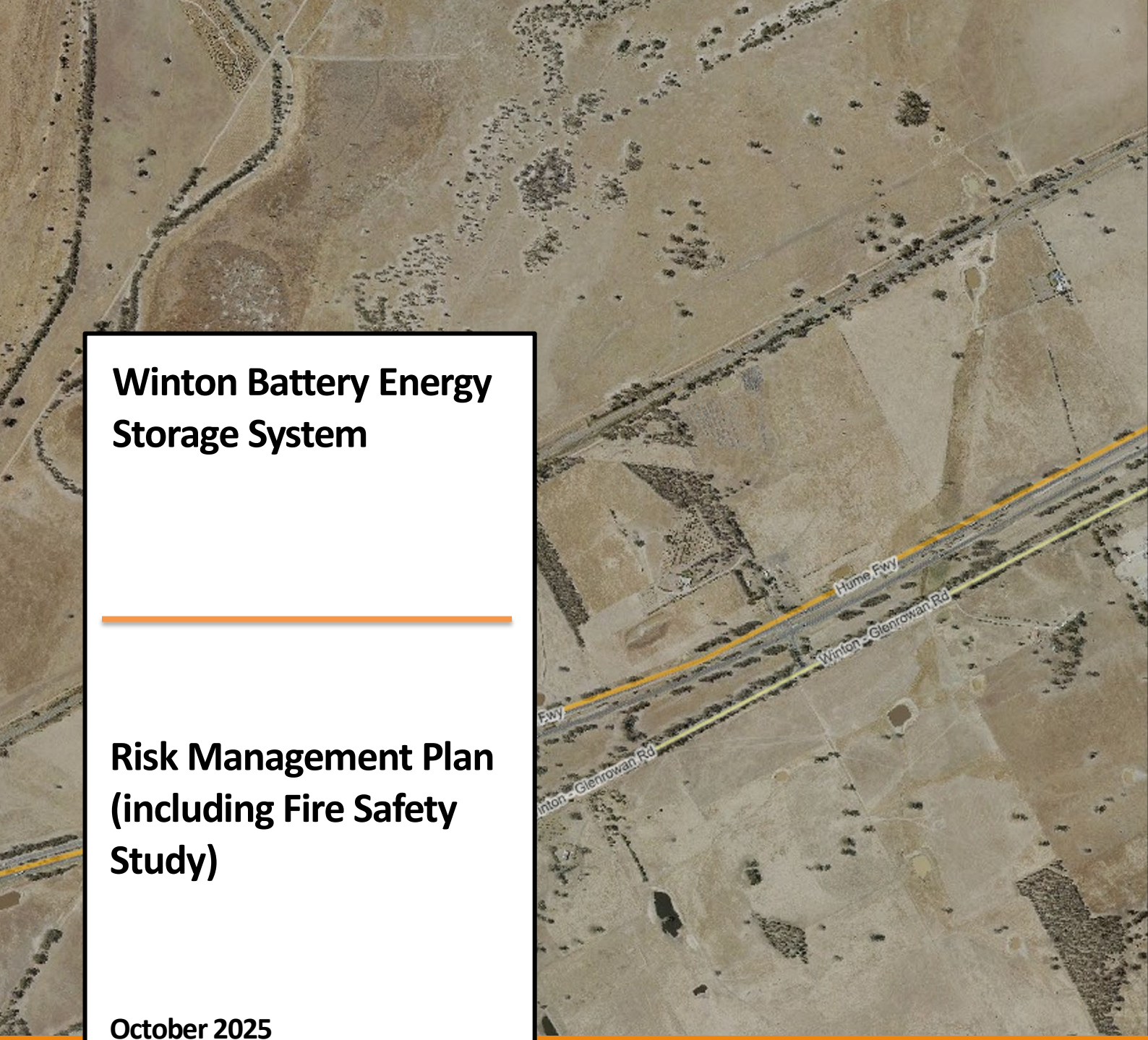



# Winton Battery Energy Storage System

# Risk Management Plan (including Fire Safety Study)

**October 2025**



FIRE RISK Consultants

*Front cover – Winton BESS site and surrounding area (Vicmap Basemaps)*

## Document history

| Revision | Date | Description | By | Review | Approved |
|---|---|---|---|---|---|
| V1 | 27/01/2025 | Initial draft following analysis of supplied information | M Potter & FRC Project Team | FRC Review Team | G Taylor Managing Director |
| V1.1 | 18/04/2025 | Minor amendments following layout changes. | M Potter & FRC Project Team | FRC Review Team | G Taylor Managing Director |
| V1.2 | 26/10/2025 | Minor amendments and update to latest guidelines. | M Potter & FRC Project Team | FRC Review Team | G Taylor Managing Director |



**Fire Risk Consultants**
**PO Box 12, Glengarry VIC 3854**
**0487 790 287**
**www.fireriskconsultants.com.au**



**Disclaimer and Information Statement**

*This report is issued by Fire Risk Consultants Pty Ltd and the information in this report is current as at the date of publication. Any Bushfire Emergency Plan or Bushfire Response Plan is current only at the date of issue as it is up to you to maintain the Australian Standard AS3959:2018 (or equivalent) and AS3745:2018 (or equivalent) for the property and/or building. Failure to maintain the property and/or building to these standards may compromise an insurance policy if currently covering any of your assets or those of any third party that may be consequentially affected due such failure. If not insured, and if you are seeking insurance, this report may not influence the decision of any insurer not to offer cover. To the extent permitted by law, Fire Risk Consultants Pty Ltd will not be held liable for any claims, demands, costs or expenses for any personal injury, property damage or death arising out of failure by you to maintain the property and/or building to AS3959:2018 (or equivalent) and AS3745:2018 (or equivalent).*

*The information and/or the recommendations contained in this report have been compiled and based on the information, records, data and any other sources of information supplied by you. Whilst we have exercised all due care and skill in compiling the report, you should confirm the accuracy and reliability of the information and material we have relied upon in producing the report. The information contained in the report is confidential and you should only read, disclose, re-transmit, copy, distribute or act in reliance on the information as you are authorised to do so. This report may also contain information, systems or data which is the property of Fire Risk Consultants Pty Ltd and Fire Risk Consultants Pty Ltd has in no way waived or altered in any way its ownership right, or provided consent for use by the report recipient, unless expressly provided in the report.*

*Any fire safety work, including but not limited to planned burning, back burning and/or fire suppression, on any property or building is specifically excluded from this report.*

*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 Introduction



Fire Risk Consultants has been engaged to develop a Risk Management Plan (RMP) for the proposed Winton Battery Energy Storage System (BESS) (the Project).

The project is located at 6 Bowers Road, Winton Victoria. The project is the Hume Freeway and Lee Road, between the townships of Winton and Glenrowan, Victoria. The site is located within the Benalla Local Government Area (LGA). The site is near multiple existing electrical facilities, including:

- Glenrowan Terminal Station,
- Winton Solar Farm,
- Mokoan Solar Farm,
- Glenrowan West Solar Farm,
- North Solar Farm, and
- Winton Lochard Energy Solar and Hydrogen Facility.



The proposal comprises a utility-scale BESS and associated infrastructure. The capacity of the development will be approximately 120MW.

The Project is in an area that has historically been used for agricultural purposes. The northern side of the property is located within the Farming Zone (FZ) and the southern side is located within the Transport Zone under the Benalla Planning Scheme.

This RMP has been prepared in accordance with the *Design Guidelines and Model Requirements: Renewable Energy Facilities v4.4 (2023, updated June 2025)* (CFA Guidelines) and has been developed to support a planning permit application.

This report has been prepared following an assessment of the site and analysis of supplied information in relation to the design, construction, commissioning and operation of the proposed Project.

As the Project is at the planning application stage, the selection of a battery supplier has not been finalised. This is normal practice at this stage of a project, with the final design and supplier being confirmed and assessed as part of an update to this RMP (and other documentation) prior to the construction of the Project. Section 5.3 of the CFA Guidelines outlines the information required to support the development of an RMP. How this RMP addresses these requirements is outlined in Table 1.

**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 6.2 of the CFA Guidelines:** | |

| CFA Guideline – RMP requirement | How this RMP addresses the requirement? |
|---|---|
| **The location of the battery energy storage system on-site and in the landscape.** | Chapter 4.2 |
| **Emergency vehicle access to and within the facility that:**<br>• **Includes site access points of a number suitable to the size and hazard of the facility (a minimum of two).**<br>• **Provides access to battery energy storage systems, substations and fire service infrastructure.** | Chapter 4.1 |
| **Firefighting water supply for the facility.** | Chapter 4.1 |
| **A fire break width of 10m or greater, based on radiant heat flux (output) as an ignition source:**<br>• **Around the perimeter of the facility.**<br>• **Between any landscape buffer/vegetation screening and battery energy storage systems (and related infrastructure).** | Chapter 4.1 |
| **The separation distance, based on radiant heat flux (output) as an ignition source, between:**<br>• **Adjacent battery containers/enclosures.**<br>• **Battery containers/enclosures and related battery infrastructure, buildings/structures, and vegetation.** | Chapter 3.2.2, 3.2.2 and 4.1 |
| **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).** | Chapter 4.4.6 |
| **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.** | Chapter 5.5.3 |
| **d) Be peer-reviewed by a suitably qualified, independent third party.** | The Project is not proposing variations to the CFA Guidelines and therefore a |

| CFA Guideline – RMP requirement | How this RMP addresses the requirement? |
|---|---|
| | 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. |

As per the CFA Guidelines, 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 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.

In summary, the following sections of 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 and NFPA 855 provides an outline of the types of fire hazards associated with renewable energy developments. This report also analyses previous fire history (Chapter 5.3) and includes the assessment of risk resulting from these fire events and other information that is supplied by the developer and battery manufacturer (Chapter 4.4.5). |
| **Fire prevention strategies and measures** | The outcome of the assessment of risk and the assessment of the design against the CFA Guideline and NFPA 855 has resulted in a range of fire prevention strategies and measures.<br>These strategies and measures will be included within the Fire Management Plan and include 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.<br>The specific installation measures are outlined in Chapter 4.2. |

| Section 2 summary | Response |
|---|---|
| **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. |
| **Containment of contaminated firefighting water** | The CFA Guideline provides the requirement to contain firefighting water 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.<br>This includes the provision of fire extinguishers, warning signs, road access minimum requirements, staff training, induction programs and emergency management planning. |

# 2 Project Overview

## 2.1 Site development

The Project is proposed to have a nominal installed capacity of 120MW. The site area is approximately 33.6ha, with the development located in the northeastern corner of the property, adjacent to Lee Road. The final size and footprint location of the Project is highly dependent on the selected BESS model.

The final location of infrastructure will be determined through the detailed design once a BESS supplier has been selected, and generally in accordance with commitments made within the planning permit application (including this RMP).

The site has historically been used for cattle grazing in a mostly agricultural area. The site will maintain access from Bowers Road and Lee Road. While at the time of this assessment, the primary site access is still to be determined, it is anticipated that firefighters will primarily attempt to access the property from Lee Road. Emergency services will have the ability to assess the situation and determine which access route is most appropriate.

The perimeter of the BESS and other infrastructure on site will likely be provided with screening vegetation. The screening vegetation will be at least 10m from the BESS Units. The BESS will be provided with a perimeter road. The combination of the perimeter road and fire break provides increased setbacks between the vegetation and the development.

The site will also be subdivided as part of the development.

The current proposed indicative concept plan layout is illustrated in Figure 1.

The assessment contained within this report has assessed the design to ensure it meets the CFA Guideline requirements.

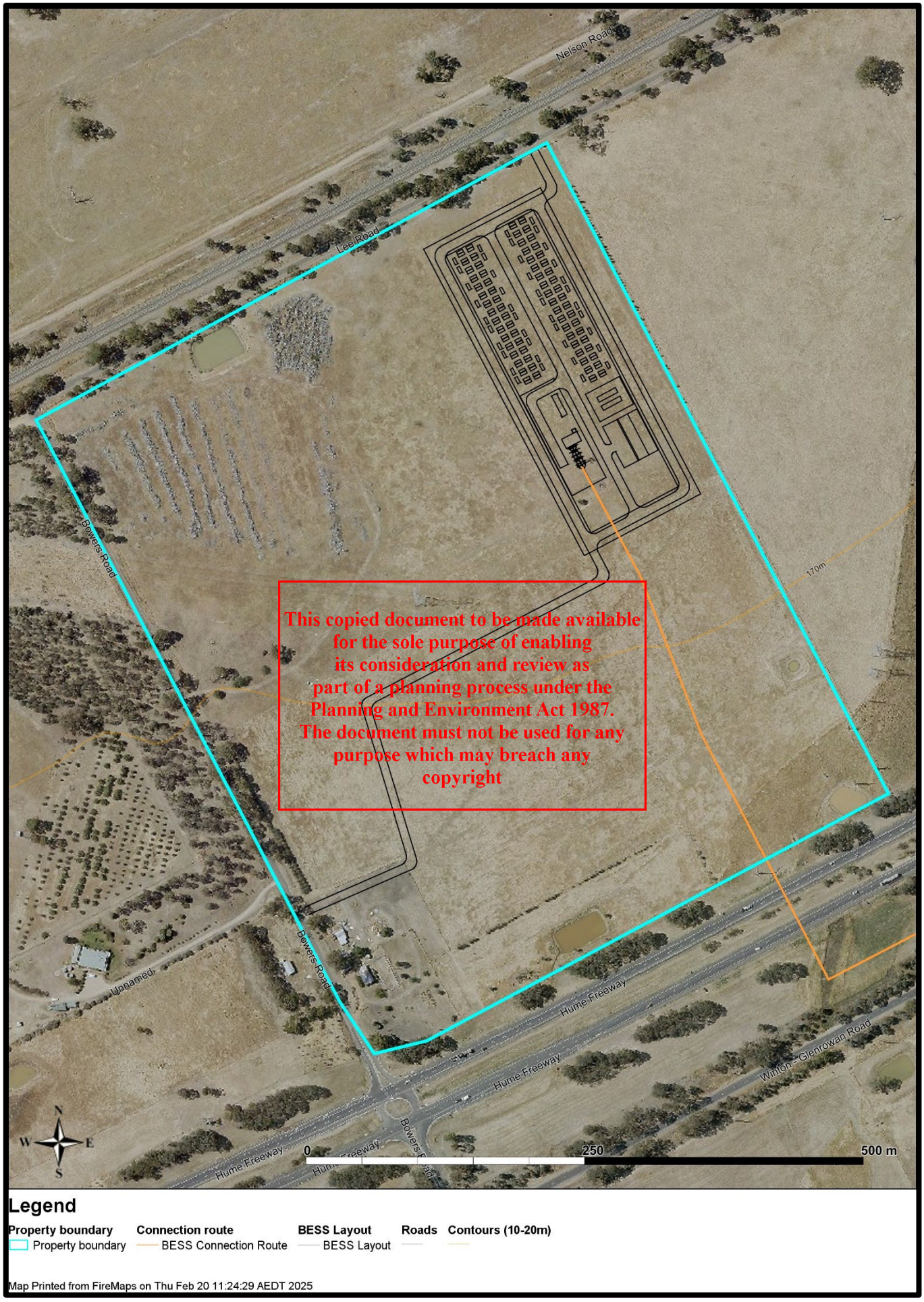





Figure 1 - Indicative Project Layout

## 2.2 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 2 - 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.<br><br>Should any parameter exceed a permissible value, the BMS will disconnect the affected Battery Units and send an alarm to the monitoring centre.<br><br>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. |

| Fire Safety System | Description |
|---|---|
| **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.<br><br>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.<br><br>Most Battery Units are a minimum of IP55 rating, and this is classified as:<br>• Ingress of dust is not entirely prevented, but it must not enter in sufficient quantity to interfere with the safe operation of the equipment.<br>• Water projected by a nozzle (6.3 mm) against enclosure from any direction shall have no harmful effects.<br><br>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.<br><br>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 Existing conditions assessment

## 3.1 Site description and location

The site is located at 6 Bowers Road, Winton, approximately 4.8 km east of Winton and 10.6 km west of Glenrowan. The site will maintain access from both Bowers Road and Lee Road.

The proposed BESS is positioned approximately 0.8 km northwest of the existing Glenrowan Terminal Station, on land that is currently used for agricultural grazing purposes. The property and immediate surrounding land are mostly clear of vegetation, except for grasses. Isolated trees or groups of trees are present along roads and neighbouring properties. The property adjacent to the west of the subject site has some forested vegetation, however, this vegetation is more than 350m from the BESS footprint.

There are multiple waterbodies in the surrounding landscape, including private dams and the Winton Wetlands.

Multiple renewable energy projects have been developed in the surrounding landscape, including:

- Winton Solar Farm,
- Mokoan Solar Farm,
- Glenrowan West Solar Farm,
- North Solar Farm, and
- Winton Lochard Energy Solar and Hydrogen Facility.



The project site is within the Bushfire Prone Area (BPA). The closest Bushfire Management Overlay (BMO) is located 2 km to the south and is associated with a small area of forested vegetation on private land.

There are some minor slopes in the surrounding landscape, but the site is effectively flat.

## 3.2 Risk indicators

In support of the risk assessment required by the CFA Guideline, the following information has been obtained and informs the analysis of risk. This information supports the assessment contained within Chapter 4.4. This information relates to the potential bushfire risk and the fire risk relating to a BESS installation.

### 3.2.1 Bushfire Management Overlay and Bushfire Prone Area

The BMO and BPA are legislative controls within the State of Victoria that are included within the planning and building systems. The BMO recognises areas that are deemed to be extreme risk with the BPA declared for areas that are subject to, or likely to be subject to bushfires.

The project site is located wholly located within the BPA and more than 2 km from the BMO. Figure 3 indicates the location of the BMO in relation to the site. Furthermore, as the property is within the BPA, this triggers an assessment against Clause 13.02-1S of the Planning Scheme.




**Figure 2 - The Project site and the surrounding landscape**

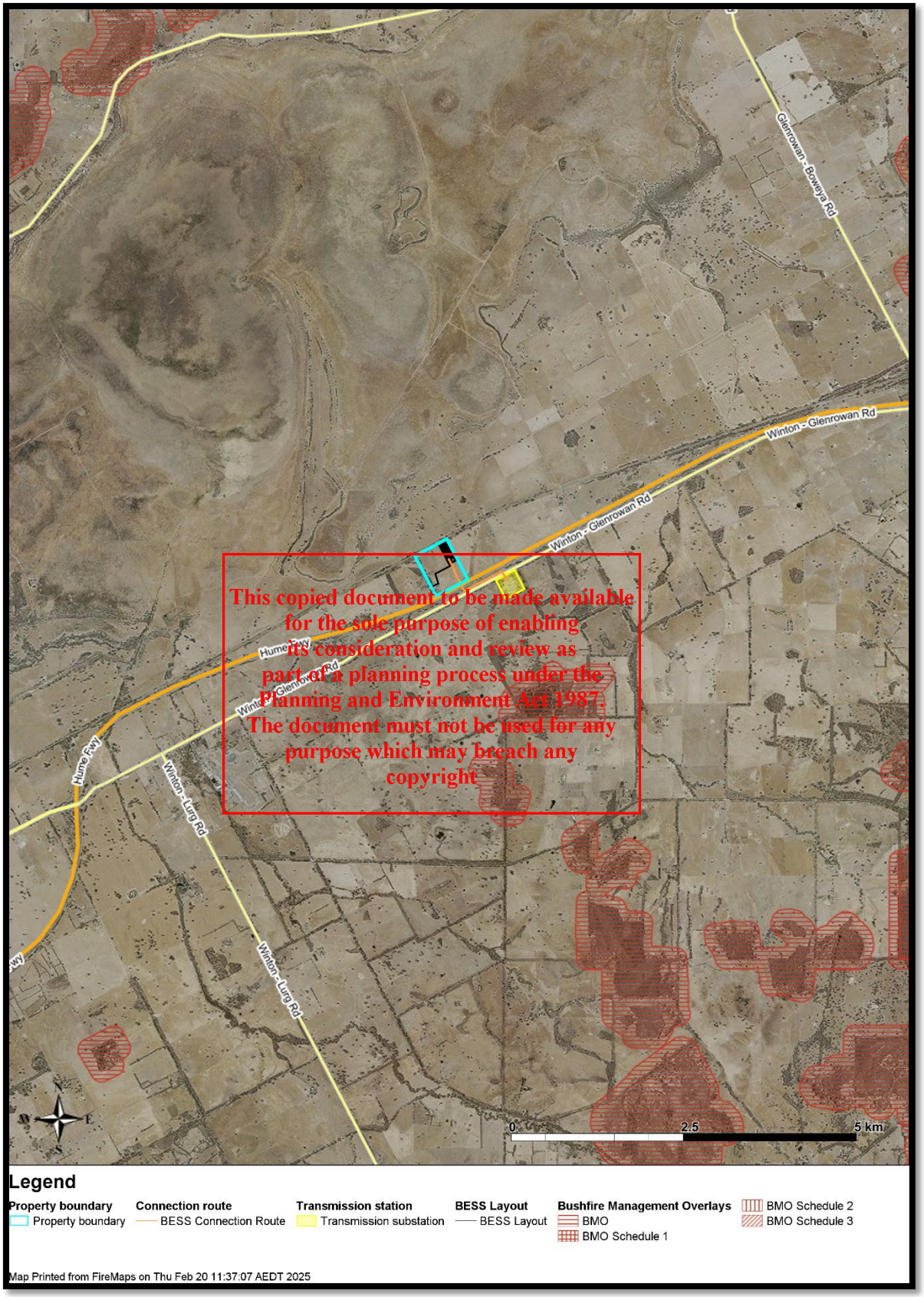





**Figure 3 – BMO in relation to the site**

### 3.2.2 Bushfire history

The available data does not indicate any bushfire impact on the Project site; however, it does indicate some bushfire activity in the surrounding landscape (Figure 4).

The largest bushfire to have impacted the surrounding landscape is the historical 1952 Lurg Fire. This fire was estimated to have burnt 36,608ha across mostly agricultural land, resulting in multiple fatalities[1].

Another bushfire occurred to the north of the property, however, this bushfire was only recorded to have impacted 759ha in 2010. This fire moved fast through the North Winton and Lake Mokoan area[2].

Other bushfires have also occurred in the surrounding landscape, however, appear to have been quickly suppressed after starting.

### 3.2.3 Vegetation management activities

Some fuel reduction activities have been conducted in the surrounding landscape to the north of the site, however, are generally limited, as shown in Figure 4. Future Planned burns detailed in the Joint Fuel Management Plan are shown in Figure 5.

The closest planned burn activity is approximately 300 metres from the site, within the Winton Wetlands. This will encompass a large burn of approximately 20.6 square kilometres. This is the only area relevant to the site that will undergo fuel management. This is largely due to the low risk that the surrounding landscape carries.



[1] https://trove.nla.gov.au/newspaper/article/204971852

[2] https://sbs.com.au/news/article/victoria-fire-threatening-homes/wh91g1lfb

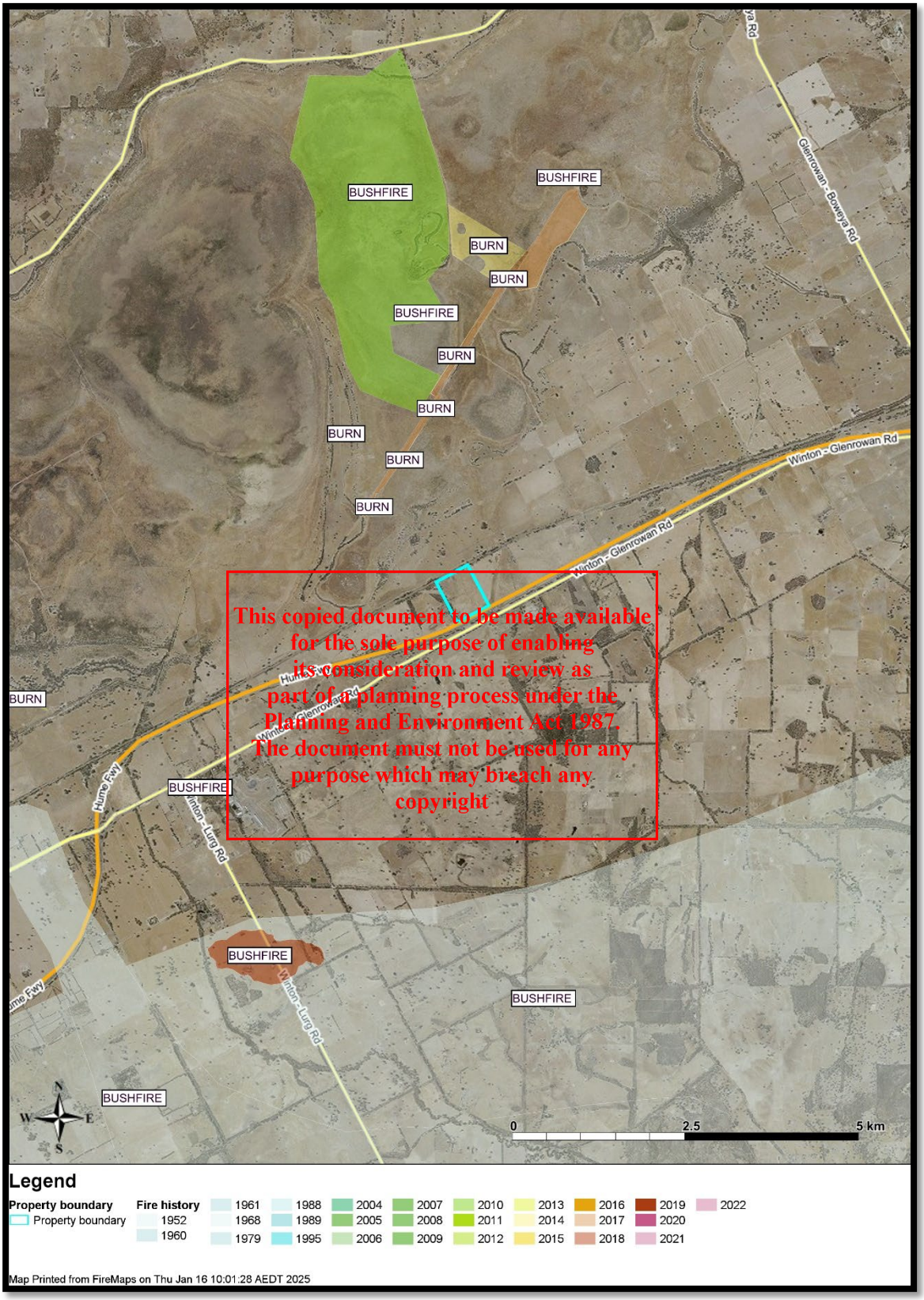





**Figure 4 - Fire history surrounding the project site.**




**Figure 5 - Joint Fuel Management Program.**

### 3.2.4 Battery Unit design fire

The BESS supplier selection process will be guided by the information contained within this RMP.

The minimum requirements include:

- The Battery Unit and its components has been tested in accordance with the UL9540A test method.
- The BESS supplier has undertaken a large-scale fire test to demonstrate that the separation between the Battery Units is sufficient.

Prior to construction, and once a BESS supplier is selected, more detailed analysis will be undertaken to ensure the outcomes of fire testing meets the requirements of the CFA Guidelines. The available data will provide a range of information including:

- The likely radiant heat impact on adjoining Battery Units from a fully involved Battery Unit fire.
- The performance of the cell, module and unit when exposed to elevated temperatures as specified within UL9540A.
- The required separation distances to prevent fire spread between Battery Units.

# 4 Risk assessment process

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

- Assessment against Clause 13.02 – 1S of the Benalla Planning Scheme (Chapter 4.1).
- Assessment against the requirements of the CFA Guidelines (including the Fire Safety Study requirements outlined within the NSW Planning Guidelines) (Chapter 4.2).
- Risk assessment that meets section 5 of the CFA Guidelines (Chapter 4.4).

The risk assessment is based on the information outlined in this report along with industry best practices and our professional expertise.

## *4.1 Clause 13.02-1S – Bushfire Planning Assessment*

Clause 13.02-1S of the Benalla Planning Scheme is utilised to support the assessment of bushfire risk. The Clause 13.02-1S policy aims to strengthen the resilience of settlements and communities and prioritise protection of human life through several objectives. However, it should be noted the Project does not introduce new settlements into the landscape. The assessment has been undertaken within the context of a BESS development.



### 4.1.1 Bushfire Hazard Assessment

Elevated bushfire risk in southeast 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.

Figure 6 and Figure 7 provide an overview of the likely bushfire scenarios within the surrounding area. There is the potential for bushfires to approach from a north westerly or south westerly direction. It is acknowledged that bushfires can approach from other directions, however, they are unlikely to be as severe as those that approach from the northwest or southwest.

Clause 13.02-1S outlines the need to assess the bushfire hazard based on:

- Landscape conditions - meaning conditions in the landscape within 20 kilometres (and potentially up to 75 kilometres) of a site
- Local conditions - meaning conditions in the area within approximately 1 kilometre of a site
- Neighbourhood conditions - meaning conditions in the area within 400 metres of a site; and
- The site for the development

Considering the landscape factors, the consideration and assessment of the bushfire hazard can be effectively achieved using a methodology that includes the site, one kilometre and 20 kilometres from the development.

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

**Table 3 - Assessment against Clause 13.02**

| Bushfire hazard type | Conditions | Likely Scenario | Considerations |
|---|---|---|---|
| **The site for the development** | Once completed, the BESS will comply with the conditions specified within the CFA Guidelines that include the management of vegetation around the Project site during the fire danger period.<br><br>During construction, there is a risk of a fire igniting and spreading through unmanaged grassland vegetation. | A bushfire starting on the property is a possibility during the construction phase of the Project.<br><br>Fires starting because of construction or operational activities have the potential to leave the property and enter adjoining areas. There is sufficient grassed areas and connectivity in some directions for a fire to spread rapidly under elevated fire danger conditions.<br><br>Management of vegetation during the construction phase will occur regularly and be maintained during the fire danger period.<br><br>Following construction, the Project will have either all vegetation removed or managed as per the requirements of the Fire Management Plan that conforms with the CFA Guidelines. | During the construction phase, if the vegetation on site is retained, it will be managed during the fire danger period.<br><br>During the fire danger period the grassed areas will be managed as per the CFA Guideline requirement.<br><br>Hot works are not to occur within 10 metres of vegetation (including grass and other plants) during the fire danger period.<br><br>When the fire danger conditions are elevated (Catastrophic Fire Danger Rating), the Emergency Management Plan will outline procedures to close the site during the construction phase and limit operations unless critical.<br><br>The access roads will be established at the commencement of the construction phase and be maintained for the life of the Project. |
| **Neighbourhood and local** | Within one kilometre of the development, the surrounding landscape is | The likely scenario is for a fire to start in the broader landscape and travel towards the site under north | The vegetation management around the BESS will limit the impact |

| Bushfire hazard type | Conditions | Likely Scenario | Considerations |
|---|---|---|---|
| **conditions (one kilometre)** | generally grassland with some groups of woody vegetation associated with roads or private properties.<br><br>Directly to the west of the site is woody vegetation associated with the neighbouring property. The total area of this vegetation on this property is approximately 9.7ha and is more than 350m from the BESS. This vegetation may allow for some ember generation to impact the subject site.<br><br>There is also the potential for a fire to start within the Winton Wetlands. Winton Wetlands generally consists of grassland with some eucalyptus vegetation. This will likely result in some ember generation as the fire moves towards the site.<br><br>There is also the potential for a bushfire to start along the surrounding road network grassland environment and spread towards the Project.<br><br>The surrounding road network provides access and egress opportunities for emergency services. | westerly or south westerly wind conditions. Under strong wind conditions a grassfire can travel quickly across the landscape. Grassfires are heavily influenced by the quantity of fuels within the paddocks and the wind strength.<br><br>Roadsides may contribute to bushfire spread when they haven't been managed prior to a bushfire commencing.<br><br>When the fire reaches the property to the west or Bill Friday Swamp, embers may be generated. | of a fire. Under reduced fire danger conditions, surrounding roads may slow or stop the fires spreading towards the development.<br><br>The vegetation management requirements will limit the chances of a bushfire starting on the site and impacting on the surrounding landscape.<br><br>The BESS area and associated infrastructure will be provided with adequate setback from unmanaged vegetation. |

| Bushfire hazard type | Conditions | Likely Scenario | Considerations |
|---|---|---|---|
| **Landscape conditions (20 kilometres)** | The landscape hazard surrounding the development mostly consists of grassland associated with agricultural land.<br><br>There are some forested areas in the broader landscape that may elevate the landscape hazard, including:<br><br>• Mount Meg Nature Conservation Reserve 9km to the northwest / North,<br><br>• Reef Hills State Park 17km to the southwest on the western side of Benalla, and<br><br>• Warby-Ovens National Park 9km to the northeast. | The likely bushfire behaviour that will result in the greatest intensity and risk to the development is typically from either the northwest or southwest. In the context of this development, the areas to the northwest and southwest are grasslands with some fragmentation introduced by roads. Forested areas are also present to the northwest and southwest; however, are considered small enough and far enough apart to limit the intensity of a bushfire travelling through this area.<br><br>To the northwest, the closest forested vegetation is located more than 9 km from the site. Embers may travel towards the site and start grassfires closer to the site. However, impacts from the grass fires can be managed through standard vegetation management on site.<br><br>To the southwest, the closest forested vegetation that is considered a landscape hazard is 17km from the site and is unlikely to result in ember attack due to the distance from the site.<br><br>The most likely fire impact is from a grassfire impacting the site from the northwest or southwest. | The protection of the Project through the provision of vegetation management arrangements will reduce bushfire intensity.<br><br>The vegetation management arrangements will be effective regardless of the fire starting locally or having travelled to the site.<br><br>The provision of multiple access roads will increase the ability for firefighters to access the areas surrounding the Project. |



### 4.1.2 Bushfire Hazard Landscape Assessment

Figure 6 and Figure 7 show the outcome of the bushfire landscape assessment. The assessment identifies the two likely scenarios that may occur in relation to the Project. Both scenarios are possible, however would be influenced by the surrounding landscape that includes varying farming

activities, roads and other landscape features. Table 4 provides a description of each of the scenarios.

**Table 4 - Bushfire Scenarios**

| Scenario | Description |
|---|---|
| **Northwest – Scenario A** | A bushfire originating in the forested landscape to the northwest would face challenges in reaching the project site. It would need to traverse approximately 8 kilometres of grassland and managed roads areas before reaching BESS. Winton Wetlands, although not always inundated, may provide separation from the landscape hazard in wetter periods.<br><br>While the fire might continue to burn through the grassland environments to the northwest, it would be slowed or halted at the roadsides or the Winton Wetlands. However, under elevated fire danger conditions, embers generated from the forested areas could ignite grassfires near the site.<br><br>At the local level, elevated fire danger conditions and the presence of the Winton Wetlands could contribute to ember generation, potentially igniting spot fires ahead of the main fire front. However, the road network and cleared areas associated with built infrastructure in the surrounding grasslands are likely to influence fire behaviour, potentially slowing its progress if a grass fire ignites near the site.<br><br>Under lower fire danger conditions, these landscape features, including Lee Road, Nelson Road, Herman Road and other fuel reduced areas, would further lessen or stop the bushfire risk to the BESS.<br><br>Potential local bushfire ignition sources from the northwest include vehicles along roadsides, farming machinery, or arson. In the forested area farther to the northwest, lightning strikes could also cause bushfires. |
| **Southwest – Scenario B** | A bushfire originating from the forested area associated with Reef Hills State Park would be able to burn across approximately 6.5km of forested vegetation. However, there is approximately 17km of grassland vegetation and landscape barriers, such as roads, rivers, and managed properties between State Park and the BESS, which would assist in controlling a fire that moves through this area.<br><br>If a fire travelled to or started in the neighbouring property, the presence of woody vegetation would likely increase the chance of ember attack on the site or embers that start smaller grass fires around the area. Standard vegetation management activities and BESS Ingress Protection are likely to offset the impact of ember attack on and around the site.<br><br>Under lower fire danger conditions, these landscape features, including Bowers Road, Hume Freeway, and other fuel reduced areas, would further lessen or stop the bushfire risk to the BESS. |

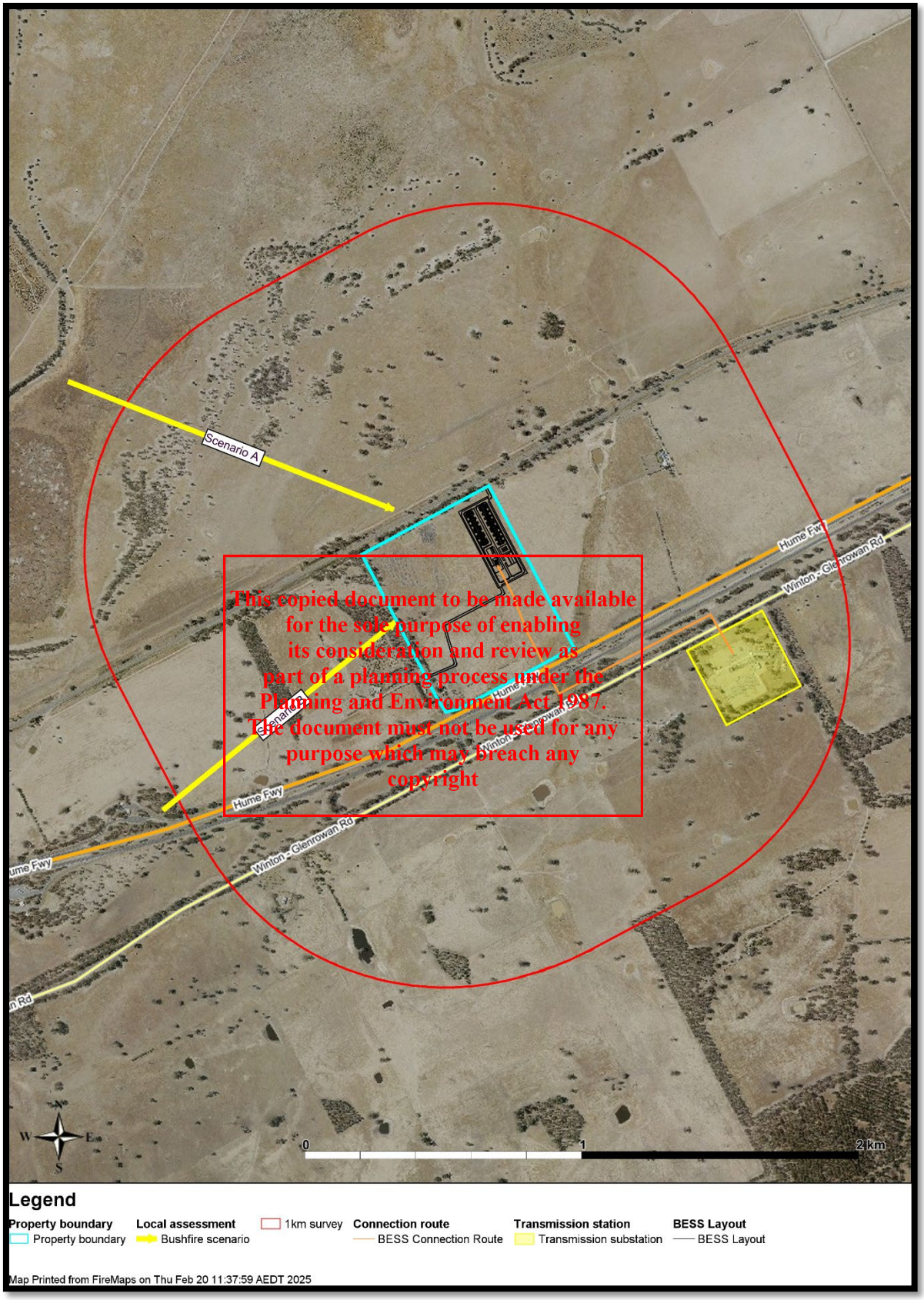





**Figure 6 - One kilometre landscape bushfire risk assessment**

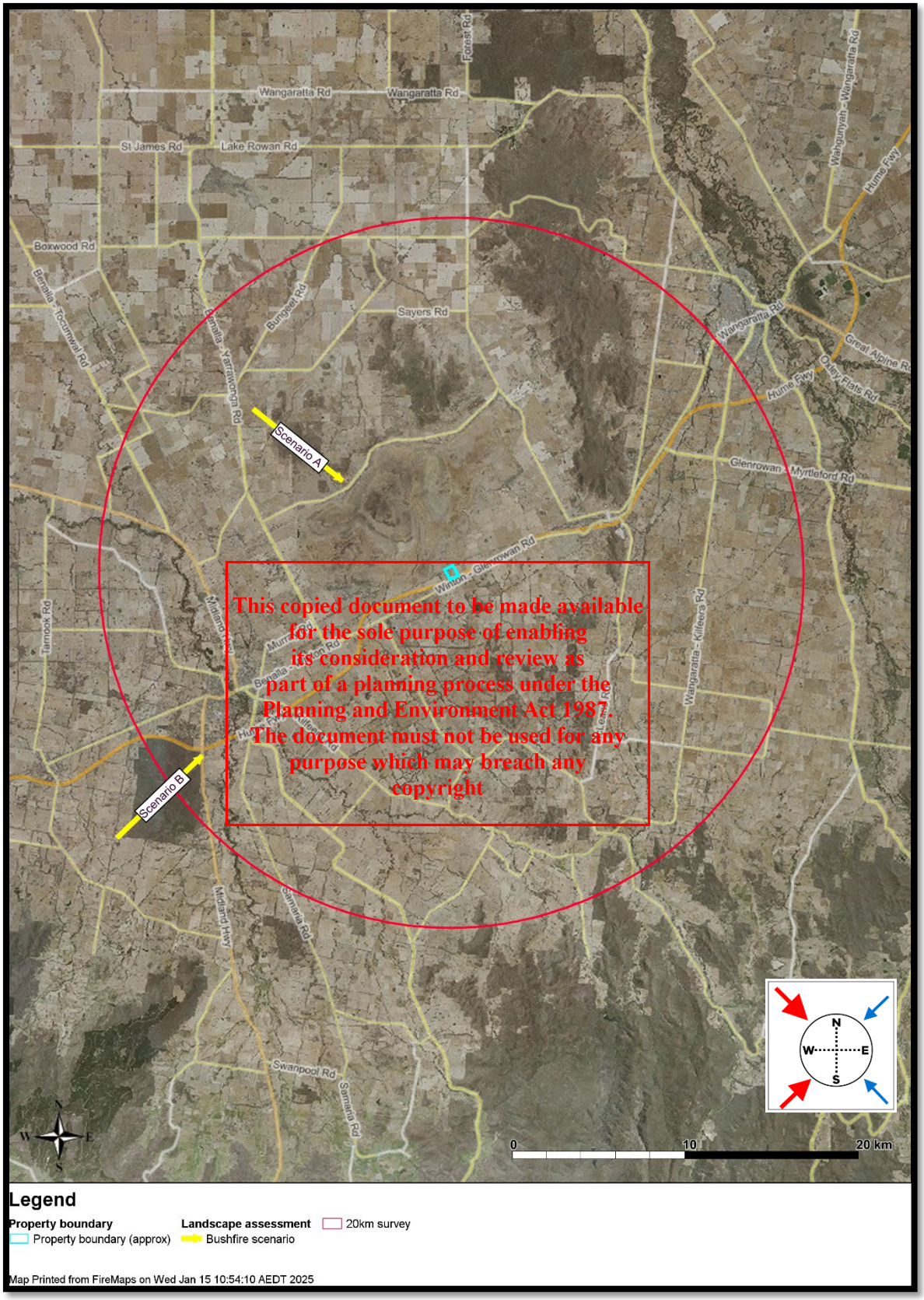





**Figure 7 - 20-kilometre landscape Bushfire Risk Assessment**

**Table 5 - 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 likely only have people onsite during the construction phase and when undertaking maintenance during the operations phase. | ✓ |
| **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 Project will likely result in areas that will achieve a BAL Low rating. In addition, multiple travel options are available away from the site to areas that are considered safer.<br><br>The direction the bushfire is approaching will influence the decision as to which direction to leave the Project site. This will be addressed within the Emergency Management Plan that is developed for the Project. There are multiple locations in the surrounding landscape that will provide BAL LOW areas. | ✓ |
| **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 Project 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:<br>• Asset Protection Zone (an area where vegetation is either managed or removed) surrounding the BESS footprint and other ancillary infrastructure areas.<br>• An access road to be developed around the BESS footprint and maintained for the life of the Project.<br>• Provision of firefighting water 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 Guidelines ensure that there is no net increase in risk to existing and future residents.<br><br>The site for the Project has been chosen to ensure adequate separation from existing dwellings or other infrastructure is achieved. | ✓ |

| Settlement planning objectives | Project response | Achieved (✓ or ×) |
|---|---|---|
| | The placement of the BESS location ensures the Battery Units are a reasonable distance from nearby roads to ensure egress routes are not disturbed. | |
| **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 grassfires to approach from the northwest and southwest aspects.<br><br>This Project will not change the current expected bushfire behaviour in the landscape. | ✓ |
| **Assessing alternative low risk locations for settlement growth on a regional, municipal, settlement, local and neighbourhood basis.** | As outlined previously, a BESS project is not a settlement.<br><br>The CFA Guidelines requirements ensure 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 Project does not involve any strategic planning document, local planning policy, or planning scheme amendment. | ✓ |



### 4.1.3 Assessment against Clause 13.02-1S summary

The assessment against Clause 13.02-1S has identified that the development is within an area where bushfires are possible, but unlikely to directly impact the site. The bushfire risk is minorly influenced by the forested areas to the northwest and southwest. However, the impact to the site is most likely going to be from grassfires that start in the local area or spread from the landscape.

The Project has been designed to limit both the potential impact from grassfires impacting the site and to limit the risk of fires leaving the property and entering 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.

## 4.2 Analysis against CFA Guidelines

The CFA have developed guidelines (CFA Guidelines) that outline their requirements to address fire risk within renewable energy installations. These guidelines are anticipated to be aligned to likely conditions recommended by CFA to be included in a Planning Permit for the Project.

Table 6 outlines the model requirements from the CFA Guidelines and details how this influences the design. In addition, further analysis occurs (Chapter 4.4) that addresses the risk assessment requirements of the CFA Guidelines.

**Table 6 - Response to CFA Requirements**

| 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 Project is located in a BPA. The indicative layout and design of the Project demonstrates that it has and will be designed to prevent fires from occurring and to then limit the potential for fires to leave the property.<br>As required by the CFA Guidelines, an assessment against Clause 13.02-1S has been undertaken in Chapter 4.1. |
| 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.<br>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 | ✓ | This document is the Risk Management Plan (RMP), which (as discussed above) will be |

| Model requirement | Compliance | Comments |
|---|---|---|
| accordance with this guideline, in consultation with CFA, before development starts:<br>• Risk Management Plan<br>• Fire Management Plan<br>• Emergency Management Plan | | 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. The Risk Management Plan must: | | |
| a) Describe the infrastructure (natural and built), landscape, nature of operations and occupancy of the facility. | ✓ | Refer to Chapter 2 and 3. |
| b) Describe the risks and hazards at the facility to and from the renewable energy infrastructure (including battery energy storage systems). | ✓ | Refer to Chapter 4.4. |
| c) Specify and justify, in accordance with Section 4.2 of [the CFA 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:<br>○ Includes site access points of a number suitable to the size and hazard of the facility (a minimum of two).<br>○ Provides access to renewable energy infrastructure, substations and fire service infrastructure. | ✓ | Refer to Section 4.2.1 of this Table.<br> |

| Model requirement | Compliance | Comments |
|---|---|---|
| • 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:<br>○ Around the perimeter of the facility.<br>○ 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:<br>• Adjacent renewable energy infrastructure (e.g., between adjacent battery containers/enclosures).<br>• Battery containers/enclosures and related battery infrastructure, buildings/structures, and vegetation. | ✓ | Refer to Section 4.2.5 and 4.2.6 of this Table.<br> |
| • 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 Chapter 4.4. |

| Model requirement | Compliance | Comments |
|---|---|---|
| e) Form the basis for the design of the facility. | ✓ | The outcomes of this assessment will form the basis of the design and is outlined within the available site plan. |
| **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). | ✓ | An assessment has been undertaken against Clause 13.02-1S and is contained within this RMP (see Chapter 4.1). |
| 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 potential impact of fires that leave the property. Refer to Table 13 in Chapter 4.4 for the assessment detail. |
| c) The impact of bushfire on the infrastructure (e.g. ember attack, radiant heat impact, flame contact). | ✓ | If embers landed on or around the site, the standard safety features fitted within the Battery Units would be sufficient to prevent new fire ignition. The Battery Units IP rating (discussed in Chapter 2.2) that ensures no dust sized particles can enter will also keep embers from entering the Battery Unit.<br>The perimeter road and 10m fire break will maintain adequate separation from the grassland hazard.<br>Refer to Table 14 in Chapter 4.4 for the assessment detail. |
| 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. | ✓ | This report considers this matter in Section 4.2 and provides various strategies to reduce the impact on the surrounding areas.<br>The risk reduction strategies include: |

| Model requirement | Compliance | Comments |
|---|---|---|
| | | • Provision of setbacks from the surrounding grassland of at least 10 metres.<br>• Provision of a perimeter road around the BESS Facility.<br>• Vegetation management activities to occur across the site during the fire danger period. |
| **Section 4.2 – Facility Design** | | |
| **Section 4.2.1 – Emergency vehicle (Fire Truck) access** | | |
| a) Construction of a four (4) metre perimeter road within the perimeter fire break. | ✓ | A minimum four metre wide perimeter road will be provided around the BESS facility, as illustrated on the project indicative layout. |
| b) Roads must be of all-weather construction and capable of accommodating a vehicle of fifteen (15) tonnes (e.g. no compacted earth). | ✓ | All areas where a vehicle can park or travel across including the formed access roads will be designed and constructed to accommodate a vehicle of 15 tonnes |
| 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. | ✓ | This has been considered as part of the project indicative design and will also be included within the final design. The road widths will be a minimum of four metres wide. |
| 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. | ✓ | Significant undulation or steep slopes on site are not present. This requirement has been considered as part of the indicative design and compliance can be achieved. |
| e) Dips in the road should have no more than a 1 in 8 (12.5% or 7.1°) entry and exit angle. | ✓ | There are no roads that will require assessment of dips. |

| Model requirement | Compliance | Comments |
|---|---|---|
| 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 are more than 6m in width. Any access tracks with a width of less than 6m will need to incorporate passing bays every 600m. These will be included on final plans (if required). |
| 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 current indicative design of the BESS footprint provides at least two access/egress roads to the facility. The access roads from Lee Road and Bowers Road provide connections to internal roads that provide access to all areas of the BESS Facility.<br>The provision of access from both Lee Road and Bowers Road will allow for emergency services to assess the situation and choose a favourable access method based on conditions. |
| h) Provision of at least two (2) but preferably more access points to each part of the facility.<br>The number of access points must be informed through a risk management process, in consultation with the CFA. | ✓ | See discussion above. The BESS footprint is provided with access from Bowers Road and Lee Road.<br>The location of these access/egress points have been located based on previous feedback from CFA. |
| **Section 4.2.2 Firefighting Water Supply** | | |
| a) Water access points must be clearly identifiable and unobstructed to ensure efficient access. | ✓ | The fire hydrant system will be located and marked to enable efficient access for firefighters. |
| b) Static water storage tank installations must comply with *AS 2419.1-2021: Fire hydrant installations – System design, installation and commissioning.* | ✓ | The fire hydrant system will comply with this requirement. |

| Model requirement | Compliance | Comments |
|---|---|---|
| c) The static water storage tank(s) must be an above-ground water tank constructed of concrete or steel. | ✓ | Static water tank(s) will be located adjacent to the primary accessway in an above-ground tank constructed of concrete or steel.<br>This will be shown on the final plan. |
| d) The static water storage tank(s) must be capable of being completely refilled automatically or manually within 24 hours. | ✓ | The static water storage tank(s) will be capable of being manually filled within 24 hours of them being used. This process will be contained within the FMP. |
| 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.). | ✓ | There is ample space on site to comply with this requirement, see the figure in Chapter 2.1. The final design will position all static water storage tanks more than 10m from site infrastructure. |
| f) The hard-suction point must be provided, with a 150mm full bore isolation valve (Figure 1) equipped with a Storz connection, sized to comply with the required suction hydraulic performance.<br>*Adapters that may be required to match the connection are: 125mm, 100mm, 90mm, 75mm, 65mm Storz tree adapters (Figure 2) with a matching blank end cap to be provided.* | ✓ | The fire hydrant system will comply with this requirement.<br> |
| 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 fire hydrant system will comply with this requirement. |
| 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 fire hydrant system will comply with this requirement. |

| Model requirement | Compliance | Comments |
|---|---|---|
| i) The road access and hardstand must be kept clear at all times. | ✓ | As illustrated by the indicative layout, and described above, the project will include appropriate access roads.<br>During operations, due to the low number of staff and contractors that will be on the site, the potential for road access and hardstand areas to be blocked is highly unlikely.<br>The Emergency Management Plan during the construction and operations phases, will include a requirement that if a fire has started requiring fire brigade to respond, and where it is safe to do so, all vehicles will be removed from the site. |
| j) The hard-suction point must be protected from mechanical damage (e.g. bollards) where necessary. | ✓ | The fire hydrant system will comply with this requirement. |
| k) Where the access road has one entrance, a ten (10) metre radius turning circle must be provided at the tank. | ✓ | There are no access roads that will require a turning circle to be provided. |
| l) An external water level indicator must be provided to the tank and be visible from the hardstand area. | ✓ | The fire hydrant system will comply with this requirement. |
| m) Signage indicating 'FIRE WATER' and the tank capacity must be fixed to each tank. | ✓ | The fire hydrant system will comply with this requirement. |
| n) Signage must be provided at the front entrance to the facility, indicating the direction to the static water tank. | ✓ | The fire hydrant system will comply with this requirement. |
| **Battery Energy Storage Systems** | | |
| 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 protection system as per Model Requirement (1a) under 'Centralised Battery Energy Storage Systems' *[Not applicable to this Project]*. | | |

| Model requirement | Compliance | Comments |
|---|---|---|
| b) Where no reticulated water is available, a fire hydrant system that complies with AS 2419.1-2021 must be provided. | | |
| i. The fire water supply must be of a quantity no less than 288,000L or as per the provisions of AS 2419.1-2021: 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. | ✓ | A fire hydrant system that meets the requirements of AS2419.1:2021 will be provided.<br>A fire water supply of 576,000 litres will be provided. The tank locations will be shown on the final plans, located adjacent to the primary accessway. |
| 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).<br>(E.g., For battery installations with an aggregate area of over 27,000m2, 4 (four) hydrant outlets are required to operate at 10L/s for four hours, which equates to a minimum static fire water supply of 576kL.) | ✓ | The aggregate area of the BESS footprint and yard area in the current design exceeds 27,000m$^2$, which results in the need to provide 40l/s performance from the fire hydrant system. |
| 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. | ✓ | The fire hydrant design will ensure this requirement is met. |
| 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). | ✓ | A Water tank location will be located more than 10m from any infrastructure. The final design will comply with this requirement. |
| v. The fire water supply must be reasonably adjacent to the battery energy storage system and shall be accessible without undue danger in | ✓ | The fire water tanks will be located at the primary accessway to the BESS. This will be included on final plans. |

| Model requirement | Compliance | Comments |
|---|---|---|
| an emergency. (E.g., Fire water tanks are to be located closer to the site entrance than the battery energy storage system). | | |
| **Section 4.2.3 Fire Detection and Suppression Equipment** | | |
| 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. | ✓ | The buildings will comply with the National Construction Code where required. |
| 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.<br>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. | ✓ | Fire extinguishers will be provided across the site. This requirement will be further reinforced within the Fire Management Plan. |
| d) In all vehicles and heavy equipment, each vehicle must carry at least a nine (9)-litre water stored-pressure fire extinguisher with a minimum rating of 3A, or other firefighting equipment as a minimum when on-site during the Fire Danger Period. | ✓ | This requirement will be specified within the Fire Management Plan. |
| **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. | ✓ | Vegetation within the project site will be managed during the fire danger period. A 10m firebreak will be provided from screening vegetation, as well as a 10m firebreak around property infrastructure.<br>The BESS footprint surfaces will be covered with concrete or other non-combustible |

| Model requirement | Compliance | Comments |
|---|---|---|
| | | surface products. The BESS will also have a road running between the two BESS units, as well as a perimeter road around the compound. |
| b) The perimeter of control rooms, electricity compounds, substations and all other buildings onsite.<br>*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.* | ✓ | All buildings within the BESS Facility will be provided with a minimum firebreak of 10m around the perimeter of the building. |
| **Battery Energy Storage Systems** | | |
| A fire break must be established and maintained around battery energy storage systems and related infrastructure. | ✓ | This will be included within the final design, as illustrated by the indicative layout and design.<br>Requirements to maintain this fire break will be included in the Fire Management Plan. |
| **Section 4.2.6 – Design Specific to Facility Type** | | |
| **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:<br>• Other battery containers/enclosures.<br>• On-site buildings.<br>• Substations.<br>• The site boundary.<br>• Any other site buildings.<br>• Vegetation.<br>*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 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.<br>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: |

| Model requirement | Compliance | Comments |
|---|---|---|
| *the potential for ignition of these site elements.* | | *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.*<br><br>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.<br><br>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.<br><br>*Fire breaks must be non-combustible, constructed of concrete, mineral earth or 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.* | ✓ | The separation from vegetation being provided around the BESS and associated infrastructure be at least 10m. The fire breaks will be a non-combustible surface and provide for the protection of the infrastructure, the ability to be utilised by firefighting vehicles. |
| c) A layout of site infrastructure that:<br><br>i. Considers the safety of emergency responders.<br>ii. Minimises the potential for grassfire and/or bushfire to impact the battery energy storage system.<br>iii. Minimises the potential for fires in battery | ✓ | The indicative design has been developed to provide emergency responders with options to travel through BESS area once they have entered the BESS footprint.<br><br>The indicative design includes access points to the BESS footprint from the south (from the west) and northern sides of the BESS to provide responding firefighters with options to access the site. |

| Model requirement | Compliance | Comments |
|---|---|---|
| containers/enclosures to impact on-site and offsite infrastructure. | | The provision of a perimeter road around the BESS footprint and individual roads between the BESS units will ensure firefighters will have the ability to access all areas around the BESS.<br>The indicative layout is considerate of the potential for fires and how they may spread through a BESS project site. |
| 2) Battery energy storage systems must be: | | |
| a) Located so as to be reasonably adjacent to a site vehicle entrance (suitable for emergency vehicles). | ✓ | The Project site is easily accessed from Lee Road or Bowers Road but maintains sufficient setbacks to ensure hazards are not introduced to road users or surrounding houses. |
| 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.) | ✓<br>✓ | The site entrance from Bowers Road is located to the west of the site and considered upwind of the most likely wind direction (northwest or southwest).<br>Access to the site is also available from Lee Road, if wind conditions are not favourable from Bowers Road.<br>Fire water will be provided from the primary site entrance, and a hydrant system will be installed to ensure fire water is available regardless of wind direction. |
| 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.<br>This is outlined in Chapter 2.2. |
| 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 | ✓ | The Battery Units are designed to eliminate the ingress of dust, spiders and other insects. This will also prevent any embers from fires in |

| Model requirement | Compliance | Comments |
|---|---|---|
| penetrating battery containers/enclosures. | | the surrounding area to enter the Battery Unit.<br>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 is provided that allows access to BESS units along with perimeter access around the battery storage area.<br>The indicative design and the final design will address this requirement. |
| g) Installed on a non-combustible surface such as concrete. | ✓ | The BESS and substation infrastructure are being 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 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 will be included in the final plan. |

| Model requirement | Compliance | Comments |
|---|---|---|
| | | The stormwater retention area will be able to capture a minimum of 576,000 litres of fire water.<br><br>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. |
| **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 both the construction and operations phases. |
| **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 for both the construction and operations phase. |
| **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. | ✓ | Appropriate procedures will be incorporated within the Fire Management Plan and Emergency Management Plan that addresses the bushfire risk. This will be informed by an update to this RMP once a BESS supplier has been finalised. |
| **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. |

| Model requirement | Compliance | Comments |
|---|---|---|
| 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 and Emergency 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 | ✓ | The site will be monitored by a SCADA system that is remotely monitored. All alerts will be received at a central monitoring centre and a procedure will be in place to determine the most effective response which may include the following:<br>• Deploy a technician to the site.<br>• Call 000 and request emergency service assistance. |
| **6.2.5 – Maintenance** | | |
| 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 will be outlined within the Fire Management Plan. |
| **Section 7 – Emergency Planning** | | |
| 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 construction commencing. |
| **Section 8 – Provision of emergency information** | | |

| Model requirement | Compliance | Comments |
|---|---|---|
| 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 provided at the main entrance in a container that is protected from weather. |

## 4.3 Treatment summary

Following the assessment against the CFA Guidelines the following treatments will be provided to manage the risk of fires. The Fire Management Plan will outline the detailed requirements for the provision and maintenance of fire management treatments. The below list is a summary of the requirements:

1. Access to the site to include full perimeter access to the BESS area, including appropriate widths and load limits from access gates.
2. Perimeter firebreak of 10 metres from screening vegetation, as well as a 10m firebreak around property infrastructure.
3. Provision of a static water supply (576,000 litres) made of concrete or steel and located at the primary accessway and no more than 10 metres from the infrastructure.
4. Fire hydrant system that complies with AS2419.1, and booster assembly and pumps that enables appropriate pressures at the fire hydrant.
5. Minimum fire water retention of 576,000 litres.
6. Fire Management Plan as per the requirements of the CFA Guidelines.
7. Emergency Management Plan as per the requirements of the CFA Guidelines.
8. Emergency Information Book and Emergency Information Containers located at the primary access entrance.



## 4.4 Risk Assessment

This risk assessment has been developed to meet the requirements of Section 5 of the CFA Guidelines.

### 4.4.1 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 1 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.

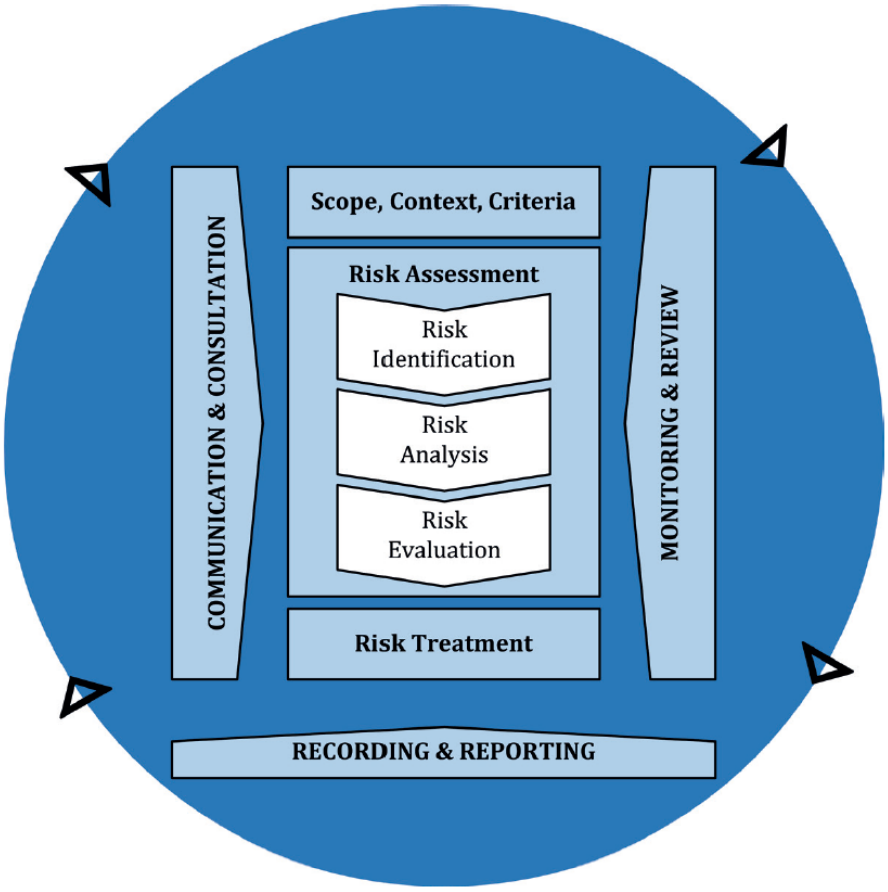



**Figure 8 - Overview of AS/NZS ISO 31000-2018 risk management process**

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.

### 4.4.2 Context

The assessment of fire risk is a key requirement to accompany an application for a planning permit for a BESS project. The CFA Guidelines outlines the types of hazards that may need to be considered in relation to BESS infrastructure at the design, construction and operational phases.

### 4.4.3 Analysis of fire risk

BESS infrastructure is largely acknowledged as having limited potential to cause fires largely due to the high standards of safety set by the Australian and International standards and guidelines. Fires have occurred previously and where possible these have been considered during the assessment of risk outlined this report. The occurrence of fires in large scale battery packs is not common. Fires have occurred and these are usually contained to a single battery pack. The range of sensors that are fitted to the systems will in most cases enable the early shut down that will prevent thermal runaway from occurring.

This assessment of risk considers the key stages of the Project being the construction and operations phase.



**Assessment of fire risk during construction (including commissioning)**

The construction phase includes various stages including site establishment works, installation of underground infrastructure, construction of hardstands and footings and the installation of the Battery Units and other ancillary infrastructure. This stage also includes the commissioning of the Battery Units and other systems (including fire protection systems). This stage also ensures the relevant connectivity is installed to ensure that all alerts and system messages are transmitted to an appropriate monitoring location.

A 2021 fire that occurred at the Victorian Big Battery[3] during its commissioning on the outskirts of Geelong has been assessed and reports are available that outline what occurred and how system manufacturers and installers should consider this information. This fire occurred during the commissioning phase of the particular Battery Unit. In summary, the isolation of the Battery Unit whilst it contained a charge was considered an incorrect process[4].

[3] https://victorianbigbattery.com.au/wp-content/uploads/2023/10/VBB-Fire-Independent-Report-of-Technical-Findings.pdf

[4] https://victorianbigbattery.com.au/wp-content/uploads/2023/06/VBB_StatementOfFindings_FINAL_28Sep2021.pdf

On 28 September 2021, Energy Safe Victoria released their Statement of Findings – Fire at the Victorian Big Battery. They outlined that the root cause was most likely:

> *a leak within the Megapack cooling system that caused a short circuit that led to a fire in an electronic component. This resulted in heating that led to a thermal runaway and fire in an adjacent battery compartment within one Megapack, which spread to an adjacent second Megapack.*

The report outlines the contributory factors, and the lessons learned to prevent a reoccurrence. Energy Safe Victoria provided approval to recommence commissioning at the Victorian Big Battery providing the measures outlined were in place. The report states that the affected Battery Units failed safely despite total loss.

The outcomes of the Victorian Big Battery fire resulted in changes to the CFA Guideline to ensure the safety of firefighters is at the forefront of design requirements.

**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 Project. 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 including monitoring connectivity, fire protection systems, vegetation management, site access controls, battery safety systems and other safety systems.

The development of an FMP will ensure the ongoing management of the fire safety systems for the life of the project.

### 4.4.4 Risk identification

Through discussions with key stakeholders, review of various documentation and the consideration of previous fire history that involved BESS infrastructure, review of the site specific constraints, and engagement with the CFA, the following hazards have been identified:

**Table 7 - Hazard identification and description**

| Hazard | Description |
|---|---|
| **Electrical hazards causing a fire** | Electrical faults and/or hazards can be a key cause of fire in BESS infrastructure. Hazards including battery faults, overcharging, rapid discharge, loss of remote monitoring systems, internal short circuits and overheating. |
| **Fire causing spread to adjoining infrastructure on the property** | A fire that has started in a single Battery Unit may spread to adjoining batteries, facilities or other infrastructure. Rapid escalation of the fire size and complexity can create issues for onsite staff and contractors, firefighters and the community. |

| | |
|---|---|
| **Fire causing offsite impacts** | Any fire on the property that is able to 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. |
| **Offsite 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. |
| **Fire water runoff** | In the event of a fire, firefighters will respond and may use water to either extinguish or cool the surrounding area until the infrastructure is deemed safe. |
| **Dangerous Goods exposure** | The dangerous goods that are stored within the BESS and associated infrastructure may leak and either ignite or require clean up by either on site staff, contractors or firefighters. |
| **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. |
| **Smoke and gas** | A fire within a Battery Unit will generate either gas or smoke that can spread throughout the site and into the neighbouring properties. |

The above list will allow the assessment of most hazards that may be encountered in a development of this type.



### 4.4.5 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 risk matrix has been developed that enables the effective consideration of risk and to enable a comparison between the outcome of the hazard assessment.

**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.

**Table 8 - Likelihood table**

| Likelihood scale frequency | Description |
|---|---|
| **Almost certain** | The event Is expected to occur in most circumstances. (75%-99%). Has occurred frequently at the location. |
| **Likely** | The event will probably occur in most circumstance (50% - 75%). Has occurred frequently in the company. |
| **Possible** | The event should occur at some time. Likely to occur sometime (25% - 50%). Has occurred many times in the industry, but not in the company. |
| **Unlikely** | The event could occur at some time. Unlikely but possible (10% - 25%). Has occurred once or twice in the industry. |
| **Rare** | The event may occur only in exceptional circumstances. Assumed it may not be experienced (0% - 10%). Unheard of in the industry. |

### 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.

**Table 9 - Risk assessment consequence table**

| Consequence scale | Description | | |
|---|---|---|---|
| | **People** | **Environment** | **Plant/Equipment** |
| **Catastrophic** | Multiple fatalities | Permanent widespread ecological damage. Toxic release off-site with detrimental effect. Likely EPA prosecution | Massive widespread equipment damage (i.e. plant/equipment write-off) ($1M +). |

| | | | |
|---|---|---|---|
| **Major** | Single fatality or permanent disability | Heavy ecological damage with costly restoration. Off-site release contained with outside assistance and little detrimental impact. | Multiple equipment replacements ($200 000 - $1M). |
| **Moderate** | Major injuries - Incapacitations or requiring time off work | Major but recoverable ecological damage. On-site release contained with outside assistance. | Equipment level replacement /repair ($50 000 - $200 000). |
| **Minor** | Significant injuries - Medical treatment, non-permanent injury | Limited but medium term damage. On-site release immediately contained | Component level replacement /repair ($10 000 - $50 000). |
| **Insignificant** | Slight injuries- First Aid Treatments (cuts/ bruises) | Short term damage. Low financial loss, negligible environmental impact | Slight Damage (< $10 000). |

The risk rating table (Table 10) 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 development. Actions can be prioritised using this method to determine where risk mitigation works will occur.

**Table 10 - Risk matrix**

| Fire Risk Consultants<br>Risk Assessment Matrix | | | | Impact Score | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 | 4 | 5 |
| | | | | Insignificant | Minor | Moderate | Major | Catastrophic |
| | | | People | Slight Injuries- First Aid Treatments (cuts/bruises) | Significant Injuries - Medical Treatment, non-permanent injury | Major Injuries - Incapacitations or requiring time off work | Single Fatality or Permanent Disability | Multiple Fatalities |
| | | | Environment | Short term damage / Low financial loss, negligible environmental impact | Limited but medium term damage / On-site release immediately contained | Major but recoverable ecological damage / On-site release contained with outside assistance | Heavy ecological damage with costly restoration / Off-site release contained with outside assistance and little detrimental impact | Permanent widespread ecological damage / Toxic release off-site with detrimental effect / Likely EPA prosecution |
| | | | Plant / Equipment | Slight Damage (< $10 000) | Component level replacement /repair ($10 000 - $50 000) | Equipment level replacement /repair ($50 000 - $200 000) | Multiple equipment replacements ($200 000 - $1M) | Massive widespread equipment damage (ie plant/equipment write-off) ($1M +) |
| Likelihood | A | Almost Certain | The event Is expected to occur in most circumstances / 75%-99% / Has occurred frequently at the location | Low (5) | Moderate (10) | Very High (18) | Extreme (23) | Extreme (25) |
| | B | Likely | The event will probably occur in most circumstance / 50% - 75% / Has occurred frequently in the company | Low (4) | Moderate (9) | Very High (17) | Very High (20) | Extreme (24) |
| | C | Possible | The event should occur at some time. Likely to occur some time / 25% - 50% / Has occurred many time in the industry, but not in the company | Low (3) | Moderate (8) | High (13) | Very High (19) | Very High (22) |
| | D | Unlikely | The event could occur at some time. Unlikely but possible / 10% - 25% / Has occurred once or twice in the industry | Low (2) | Low (7) | High (12) | High (15) | Very High (21) |
| | E | Rare | The event may occur only in exceptional circumstances. Assumed it may not be experienced / 0% - 10% / Unheard of in the industry | Low (1) | Low (6) | Moderate (11) | High (14) | High (16) |



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.

### 4.4.6 Risk analysis worksheets

The following worksheets have assessed the hazards identified in Chapter 4.4.4 and results in a risk classification along with strategies to lower risk if it is deemed required. The initial assessment of risk is based on the information that has been supplied to date.

**Table 11 - Risk assessment - Electrical hazards causing a fire.**

| | |
|---|---|
| **RISK** | Electrical hazards causing a fire |
| **CAUSE** | Electrical faults and/or hazards can be a key cause of fire in BESS infrastructure. Hazards including battery faults, overcharging, rapid discharge, loss of remote monitoring systems, internal short circuits and overheating. These events may cause off gassing or thermal runaway. |
| **LIKELIHOOD** | Possible |
| **JUSTIFICATION** | The occurrence of electrical faults and/or hazards has occurred in the past and are likely to occur again in the future. The likelihood of an electrical fault escalating into an emergency such as a fire is unlikely due to the multiple layers of controls in place including sensors, 24/7 system monitoring and maintenance programs.<br><br>There are examples of fires within BESS technology that indicates that when faults occur, they can escalate into challenging events including thermal runaway. 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 will be included:<br><br>• Cooling systems that maintain the temperature of the Battery Units during day-to-day operations.<br>• Safety system such as smoke detectors to the monitoring centre if a sensor is activated.<br>• Internal barriers within the battery enclosures designed to reduce the possibility of thermal runaway events from spreading to adjoining Battery Units.<br>• Separation distances between individual Battery Units and rows of batteries and other infrastructure in accordance with manufacture installation guidelines.<br>• The external walls of the Battery Units provide at least a 60-minute fire rating.<br>• The BESS will be installed by qualified and competent people in accordance with the manufacturer's specifications and including compliance with *UL9540 – Energy Storage System Requirements* and *NFPA 855 - Standard for the Installation of Stationary Energy Storage Systems.*<br>• The design and layout of the Battery Units are guided by the outcomes of the testing completed in accordance with UL9540A. |
| **CONSEQUENCE** | Moderate |
| **JUSTIFICATION** | The identification of a fault by the system monitoring process will result in early intervention. Intervention includes shut down, response from a technician and/or calling the fire brigade.<br><br>The CFA Guideline requires a range of controls to be implemented and maintained including:<br><br>• Non-combustible surface that will not support fire spread through vegetation accumulation. |

| | |
|---|---|
| | • SCADA monitoring system that will monitor the system performance including over charging, elevated temperatures and a range of other faults and send alerts to the monitoring centre<br>• Compliance with UL9540 and subsequently UL9540A<br>• Appropriate separation between Battery Units and other infrastructure<br>If the fire escalates and the implementation of shut down procedures does not stop the battery entering the off gassing phase and the thermal runaway phase, it is unlikely for the fire to spread beyond the Battery Unit. The potential for a fire to occur and to then spread throughout the Battery Unit is highly unlikely.<br>The implementation of the controls outlined above will support the prevention of faults from escalating into fires and if a fire does occur, limit the ability for the fire to spread into an adjoining battery enclosure.<br>The provision of a communications system between the SCADA system and the monitoring centre with built in redundancies will ensure the site is monitored 24/7 thereby ensuring early notification and receipt of alerts.<br>The site is in an area that provides access options depending on the location of the fire and the prevailing wind conditions. This ensures that firefighters can assess the conditions and select the most suitable access option. |
| **RISK RATING** | High (13) |
| **STRATEGY TO LOWER RISK** | The requirements outlined within the response to the CFA Guidelines will be sufficient to ensure the risk is managed at an acceptable level. Other strategies outlined within the response to the CFA Guidelines that will also assist with managing the risk includes:<br>• Development of an Emergency Management Plan that includes in addition to that required by CFA:<br>  ○ A system to communicate effectively between a central monitoring centre and the onsite staff and contractors.<br>  ○ Provision of 24/7 contact details for the fire brigade to contact in the event of an emergency or threat of an emergency.<br>• Developing a procedure that requires a technician to be deployed to the site when the site monitoring communications are down, or a fault has been detected that may lead to an off gassing or thermal runaway event.<br>• The SCADA system will be zoned to enable quick identification of the area of the facility that has caused an alarm.<br>• Fire hydrant systems enabling firefighters to access firefighting water immediately. |
| **RESIDUAL RISK** | Moderate (8) (Possible/Minor) |

**Table 12 - 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 has started in a Battery Unit may spread to adjoining batteries, facilities or other infrastructure. Rapid escalation of the fire size and complexity can create issues for onsite staff and contractors, firefighters and the community. |
| **LIKELIHOOD** | Unlikely |
| **JUSTIFICATION** | The installed monitoring systems will send alerts to a central monitoring centre. These include sensors that are monitoring for over charging, elevated temperatures, and other faults. The day-to-day monitoring system will trigger an immediate response if alerted. The BESS system can be remotely operated, and this includes the commencement of shutdown procedures.<br><br>The battery system is provided with a detailed operating manual that outlines the likely cause of an alert and how the operators are to respond.<br><br>The site procedures will outline when a technician is required to attend the site to investigate faults or alerts. Operators within the monitoring centre will be able to access CCTV footage to enable them to gather additional information on the status of the faults at the site. Upon the system sensing a fault, the monitoring centre will determine an appropriate response which may include:<br><br>• Notifying the on-call technician to attend the site.<br>• Calling 000 and reporting the activation to the fire brigade in addition to notifying the on-call technician to attend.<br><br>The Battery Units will be made of non-combustible material and will provide a level of protection if a fire does occur inside the enclosure. If a fire occurs in an adjoining area of the site, the same enclosures will provide a level of protection. Most of the infrastructure that supports the BESS is non-combustible or has low quantities of combustible materials.<br><br>There are a small number of fire events within BESS technology where a fire has spread to an adjoining battery. The layout design incorporates spaces that will reduce the risk of fire spread occurring that is influenced by the outcomes of large scale fire testing. |
| **CONSEQUENCE** | Major |
| **JUSTIFICATION** | If a fire does spread to another battery enclosure or other infrastructure it may cause additional issues including smoke management, dangerous goods leaks, fire water runoff management and exposure to electrical hazards.<br><br>The ability for fire spread to occur is limited due to the many safety systems that are installed and maintained including sensors that generate alerts and 24/7 monitoring resulting in early detection and response.<br><br>The firefighting hydrant system and water supply will enable firefighters to protect exposures for the duration of the fire event if this is deemed required. It is noted that the BESS manufacturers response guide advises fire agencies to not attempt to extinguish a fire and to allow it to burn out.<br><br>The layout design will be in accordance with the manufacturers specifications which will ensure there is suitable separation being provided between the battery enclosures and to other infrastructure. The separation distance requirements have been determined through fire engineering analysis and small to large scale fire testing. |

| | |
|---|---|
| **RISK RATING** | High (15) |
| **STRATEGY TO LOWER RISK** | The requirements outlined within the response to the CFA Guidelines and complying with the manufacturer specifications that have been developed following UL9540A and large scale fire testing and will be sufficient to ensure the risk is managed at an acceptable level. Other strategies outlined within the response to the CFA Guidelines that will also assist with managing the risk includes:<br>• Development of Emergency Management Plan that includes in addition to that required by CFA:<br>  ○ A system to communicate effectively between the monitoring centre and the onsite staff and contractors.<br>  ○ Provision of 24/7 contact details for the fire brigade to contact in the event of an emergency or threat of an emergency.<br>• Developing a procedure that requires a technician to be deployed to the site when the site monitoring communications are down.<br>• The SCADA system will be zoned to enable quick identification of the area of the facility that has caused an alarm. |
| **RESIDUAL RISK** | High (12) (Unlikely/Moderate) |

**Table 13 - Risk assessment - Fire causing offsite impacts.**



| | |
|---|---|
| **RISK** | Fire causing offsite impacts. |
| **CAUSE** | Any fire on the property can spread to adjoining properties. This would most likely be through vegetation connectivity. If this occurs on an elevated fire danger day, the fire could spread into adjoining properties. |
| **LIKELIHOOD** | Possible |
| **JUSTIFICATION** | The likelihood of a fire occurring within the BESS footprint is outlined within Table 8 and 9. In addition to this, the compliance with CFA Guidelines also requires mitigation strategies implemented including:<br>• Non-combustible surface under the Battery Units and other infrastructure.<br>• Provision of a fire break and additional managed areas between the fire break and the boundary fence.<br>• The batteries are contained within the metal cabinets and any fire activity will likely stay within the cabinets.<br>• The requirement for a Fire Management Plan and Emergency Management Plan that will include prevention and preparedness activities that must occur annually prior to the fire danger period. These activities will include:<br>  ○ Management of vegetation on the site.<br>  ○ Evacuation exercising and training. |

| | |
|---|---|
| | • The Fire Management Plan will also provide clear direction on the maintenance of the various controls required to manage the fire risk.<br><br>In addition to the CFA Guideline, the manufacturer specifications will outline the separation requirements that must be implemented through the layout design including separation from adjoining properties. |
| **CONSEQUENCE** | Minor |
| **JUSTIFICATION** | The surrounding landscape is dominated by grasslands. With the setback distances being provided from the adjoining boundaries, there is sufficient space to limit the potential for fire spread to occur.<br><br>In the event of a fire and smoke is being generated, the Emergency Management Plan will require the site operators to immediately engage with their neighbours to inform them of the fire and the suggested actions they should take. The fire agency also has access to a system that can warn or alert the surrounding area of the fire and provide advice as to actions they can take. |
| **RISK RATING** | Moderate (8) |
| **STRATEGY TO LOWER RISK** | Any vegetation growth on the property surrounding the Project will be managed and removed, as required to maintain a 10m fire break. The details of this will be outlined within the Fire Management Plan. During the fire danger period, additional inspections will occur to ensure that all vegetation is removed from the fire break and within the project footprint.<br><br>Any on site works during construction or operations will enact standard Occupational Health and Safety policies and procedures including Hot Works, use of naked flames on the property, smoking management, induction of new staff and contractors and contractor management. The induction procedure will include a requirement to ensure people are aware of their obligations of not creating fire risks during their day-to-day activities. |
| **RESIDUAL RISK** | Low (7) (Unlikely/Minor) |



**Table 14 - Risk assessment - Offsite fire impacting on the site.**

| | |
|---|---|
| **RISK** | Offsite fire impacting on the site. |
| **CAUSE** | A fire burning in the surrounding landscape can enter the property and threaten the infrastructure by potentially starting new fires through ember attack or flame contact. |
| **LIKELIHOOD** | Unlikely |
| **JUSTIFICATION** | Due to the surrounding landscape, there is the potential for bushfires to impact the Project. Due to the setbacks, the likely bushfire impact is through embers landing on and around the property.<br><br>The site includes fire breaks and managed areas that will limit the ability for a fire to burn on the property. The Fire Management Plan will outline the management arrangements and the maintenance requirements. The ongoing removal of vegetation and other |

| | |
|---|---|
| | combustible materials in and around the BESS area will be specified within the Fire Management Plan.<br><br>The design of the battery enclosures will likely prevent fires from entering the Battery Units. The enclosures are designed to prevent dust, insects and birds from entering. The enclosures are also fitted with internal climate control systems that will result in fires likely to self-extinguish due to the cool temperatures. |
| **CONSEQUENCE** | Minor |
| **JUSTIFICATION** | The ability for a vegetation fire to generate sufficient radiant heat to impact on the Battery Units is unlikely.<br><br>The requirements to maintain and manage the onsite vegetation will ensure that fire spread onto the property will be limited.<br><br>It is highly unlikely for flame contact or radiant heat to impact on the BESS from a fire in the surrounding area. |
| **RISK RATING** | Low (7) |
| **STRATEGY TO LOWER RISK** | Within the Emergency Management Plan ensure the following is included:<br>• When elevated fire danger conditions are forecast, ensure all vegetation maintenance activities have occurred.<br>• If a fire is occurring in the surrounding landscape, engage with CFA to ascertain any actions that should be undertaken to protect the BESS infrastructure. |
| **RESIDUAL RISK** | Low (6) (Rare/Minor) |



**Table 15 - 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. There is the potential for a Dangerous Goods leak to occur that may cause a threat to people, the environment or be involved in a fire. |
| **LIKELIHOOD** | Unlikely |
| **JUSTIFICATION** | Dangerous Goods are located within the Battery Units and the transformers. The Dangerous Goods are largely installed within the components/equipment during the manufacturing process which means that they are contained and sealed and not readily accessible at the site.<br><br>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 to ensure its integrity. 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 BESS Site. |

| | |
|---|---|
| | The design of the BESS including the installation of impact protection devices, such as bollards, around the perimeter of the BESS will prevent vehicles from impacting the infrastructure and potentially causing a leak.<br><br>The products classified as a Dangerous Good located within the Project will be listed within the Site's Dangerous Goods register and the site operators will be aware of the locations and quantities of Dangerous Goods.<br><br>Maintenance programs will be enacted to ensure all infrastructure that contains Dangerous Goods within the Project will be maintained in accordance with the manufacturer's specifications and the relevant Australian Standards. This will include checking for physical and electrical faults that could result in leaks.<br><br>Due to the manufacturing and installation procedures, the potential for a Dangerous Good incident to occur is unlikely. |
| **CONSEQUENCE** | Moderate |
| **JUSTIFICATION** | The assessment of the dangerous goods quantities at the BESS identified infrastructure with quantities of dangerous goods that will likely exceed the Schedule 2 requirements as outlined within the Victoria Dangerous Goods legislation.<br><br>The largest quantity of Dangerous Goods will be the Lithium Ion (Class 9). Other Dangerous Goods may include refrigerant and oils. These will be assessed when the final design has been endorsed.<br><br>The Dangerous Goods referred above, are stored in separate components within the Battery Units, or in separate infrastructure. It is therefore unlikely for the total quantities of Dangerous Goods on the site to be involved in an incident at the Site at the same time.<br><br>There are other goods that may be utilised and stored on the site, but it would be expected that these would be in small quantities. |
| **RISK RATING** | High (12) |
| **STRATEGY TO LOWER RISK** | In accordance with the Dangerous Goods (Storage and Handling) Regulations (2021), the CFA's views must be sought if the quantities have exceeded the fire protection amounts listed in Schedule 2 as is the case for the Lithium-Ion. The CFA will be aware of the presence of Dangerous Goods in relation to the Proposal. Further consultation with CFA to confirm the outcomes of this assessment will occur prior to construction and will be ongoing throughout the life of the Project.<br><br>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** | Moderate (11) (Rare/Moderate) |

**Table 16 - Risk assessment - Fire water runoff**

| | |
|---|---|
| **RISK** | Fire water runoff |
| **CAUSE** | In the event of a fire, firefighters will respond and may use water to either extinguish or cool the surrounding area until the infrastructure is deemed safe. If the fire water comes into contact with burning materials or smoke, it may become contaminated. |
| **LIKELIHOOD** | Unlikely |
| **JUSTIFICATION** | As outlined in previous assessments, the risk of a large fire is very low and unlikely. This is due to the separation between various areas of the Project and the extensive use of non-combustible materials. The infrastructure is monitored 24/7 and will alert technicians and if required, the fire brigade to the site early.<br><br>If a fire occurs, it will likely be contained to a single battery container. Firefighting water can be used to cool the adjoining areas and will be considered largely clean as it has not been exposed to fire or smoke.<br><br>BESS manufacturers advice is to not attempt to extinguish the Battery Unit that is on fire. The safest and most effective firefighting strategy is to let the Battery Unit burn out. |
| **CONSEQUENCE** | Minor |
| **JUSTIFICATION** | Any fire water that is used at the site will be contained until testing can occur and then in conjunction with EPA determine the most effective disposal method.<br>The Emergency Management Plan will include procedures to capture fire water and then if required, disposal arrangements. |
| **RISK RATING** | Low (7) |
| **STRATEGY TO LOWER RISK** | Onsite staff will be trained in the fire water runoff management procedures. They will then be available to assist firefighters with managing fire water runoff.<br><br>The requirement to regularly check the fire water runoff pond will be contained within the Fire Management Plan. |
| **RESIDUAL RISK** | Low (6) (Rare/Minor) |



**Table 17 - Risk assessment – Staff and firefighters**

| | |
|---|---|
| **RISK** | Staff and 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** | Possible |
| **JUSTIFICATION** | There is the potential for firefighters and/or staff and contractors to be present during an emergency event and not be familiar with the site.<br><br>The CFA Guidelines impose a variety of controls onto the management of the site through the Emergency Management Plan and how the CFA interacts with the site if they are called to a fire. |

| | |
|---|---|
| | Whilst a low risk that a fire will occur, if a fire does occur, there is the potential for a firefighter to arrive who is unfamiliar with property and the technology installed. |
| **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.<br><br>The layout of the site will ensure that firefighters will likely initially access the site from Lee Road, which is where the Emergency Information Container will likely be located (unless primary access is decided to be from Bowers Road in final project design). Firefighters may then assess the situation and determine if alternate access is required. |
| **RISK RATING** | High (13) |
| **STRATEGY TO LOWER RISK** | The arrangements for monitoring the SCADA system through the monitoring centre will ensure that an informed decision can be made following an assessment of the alerts being received.<br><br>In all cases a technician will be dispatched to the site to review the alert at the Project.<br><br>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 protection emergency.<br><br>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** | Moderate (8) (Possible/Minor) |



**Table 18 -Risk assessment – Smoke and gas**

| | |
|---|---|
| **RISK** | Smoke and gas |
| **CAUSE** | As a result of a fire involving a BESS unit, the production of gases and smoke can occur. |
| **LIKELIHOOD** | Unlikely |
| **JUSTIFICATION** | As discussed previously, the likelihood of a fire starting within a BESS Unit is considered Low. If a fire does ignite, there will be the production of smoke and gases depending on the stage of the thermal runaway event.<br><br>The monitoring systems will detect any faults and the BMS will commence shut down procedures. |
| **CONSEQUENCE** | Minor |
| **JUSTIFICATION** | The production of smoke or gases depending on the weather conditions may spread from the site and into neighbouring areas. Due to the slow progression of a fire within a BESS Unit, the production of smoke and gases will likely be influenced by the weather conditions causing dispersal to occur rapidly. |

| | |
|---|---|
| | The types of smoke and gases are consistent with a fire within a structure such as a dwelling, though specific differences may exist depending on the materials within the BESS unit. |
| **RISK RATING** | Low (7) |
| **STRATEGY TO LOWER RISK** | The mitigations outlined in previous assessments will limit the likelihood and consequence of a fire occurring within and externally of a BESS Unit. In addition to the mitigation treatments outlined previously, in support of future emergency management planning a detailed smoke and gas consequence analysis will be undertaken to enable responding firefighters to be aware of the likely dispersion of smoke and gas.<br><br>The emergency management agencies also operate an emergency warning system that could be utilised if they deem the smoke and gas dispersion to be a concern. |
| **RESIDUAL RISK** | Low (6) (Minor/Rare) |

# 5 Conclusion

The assessment of risk for the Winton BESS has found that the indicative design and layout can meet the requirements of the CFA Guidelines and adequately manage the fire risk to an acceptable level.

This RMP will be updated to confirm these findings once the selection of a BESS supplier has been finalised, prior to construction.

The reduction in risk is driven by compliance with the CFA Guidelines, which will be confirmed once the selection of a BESS supplier has been finalised. All the model requirements outlined within the CFA Guideline can be achieved with this Project as illustrated by the indicative layout and design.

The risk assessment along with the assessment against the CFA Guideline (Chapter 4.2) has identified the project can achieve compliance. The systems and procedures that will be implemented during design, construction (including commissioning) and operation will ensure that any risk is managed to an acceptable level.

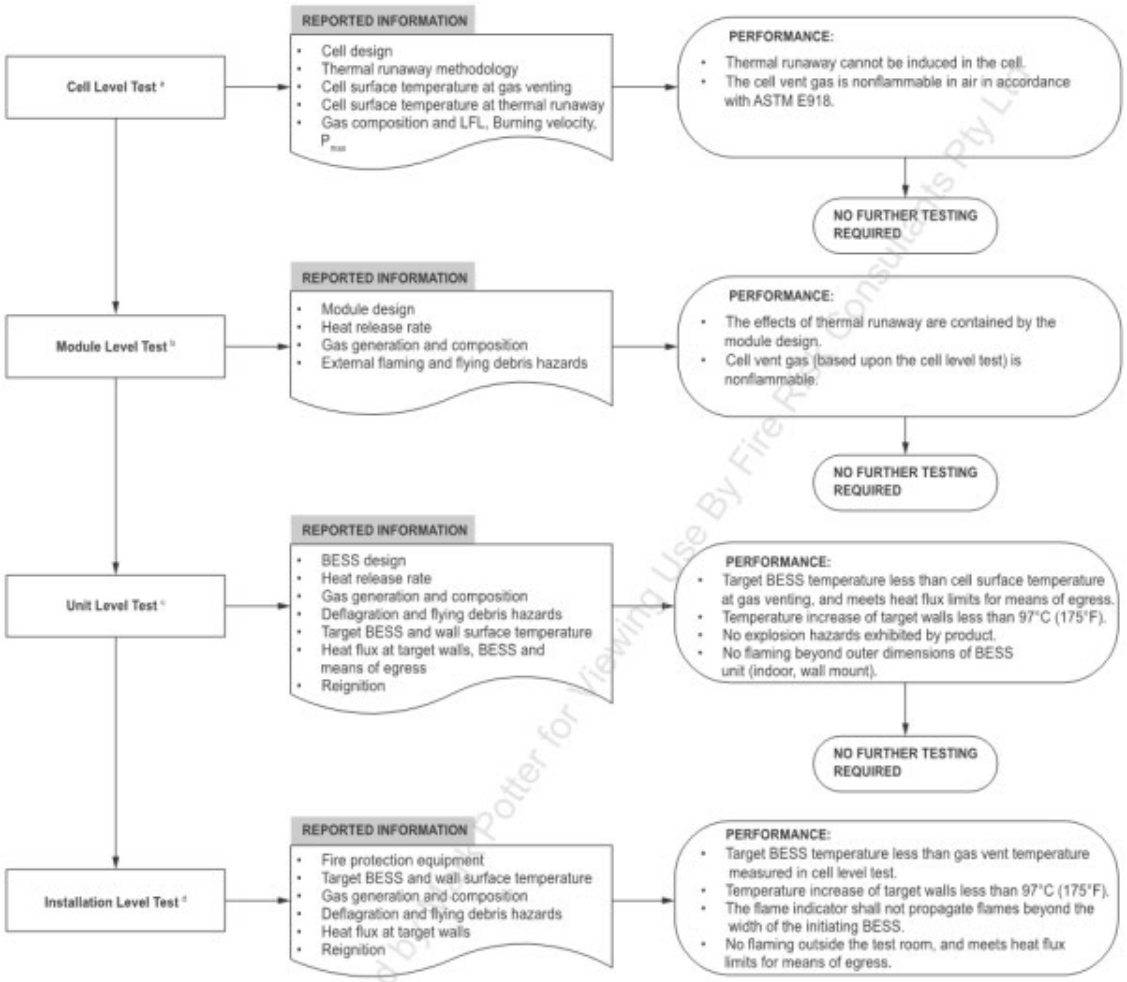
Historically, fire events involving these types of facilities are due to inappropriate procedures that include having not considered the risk of fire effectively. This RMP has considered these examples in the development of risk mitigation treatments for the Winton BESS.

BESS facilities can present fire risks if not designed, constructed, commissioned and operated effectively.

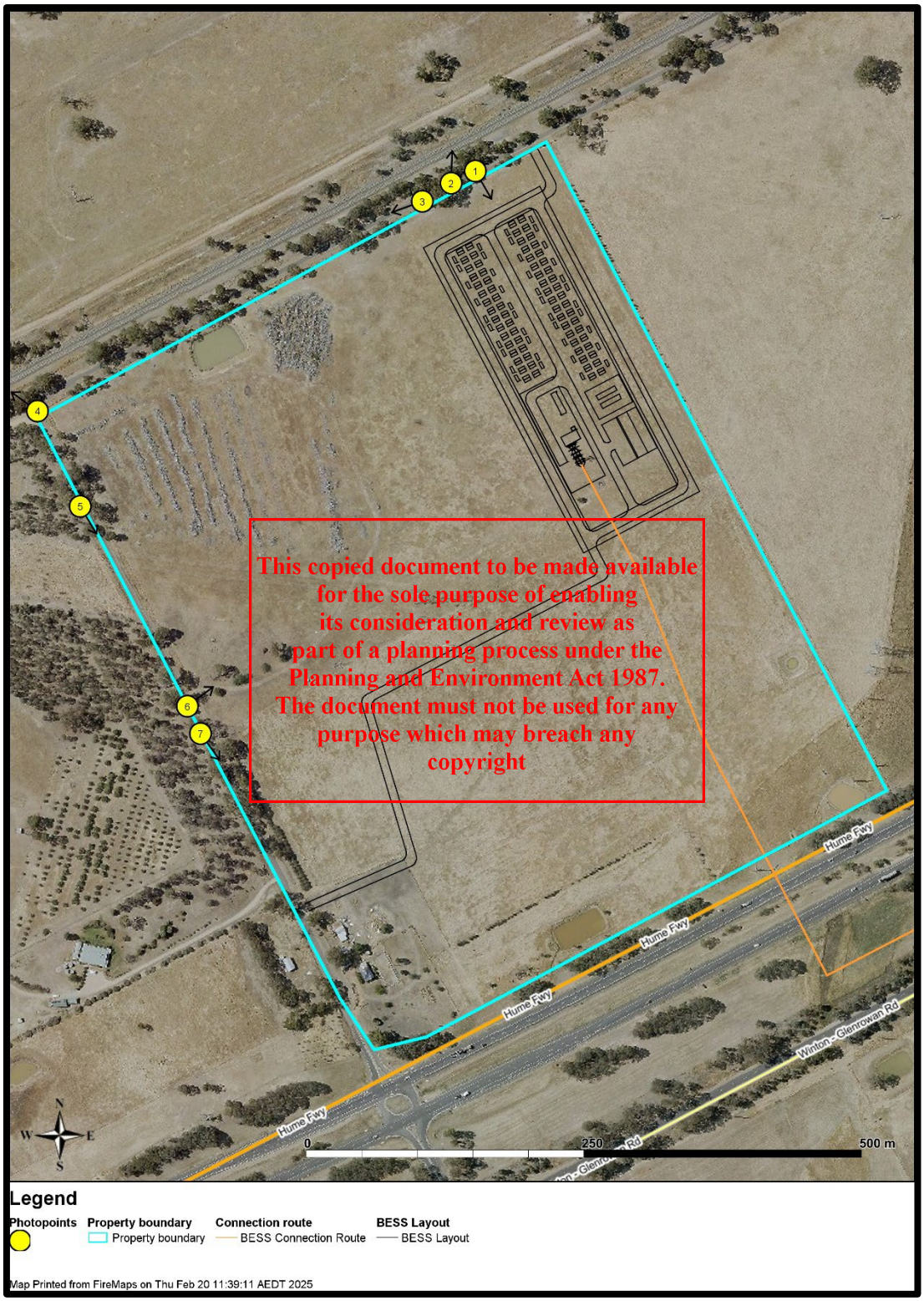
The importance of following design requirements and committing to the ongoing maintenance of the system is critical to reduce fire risk.

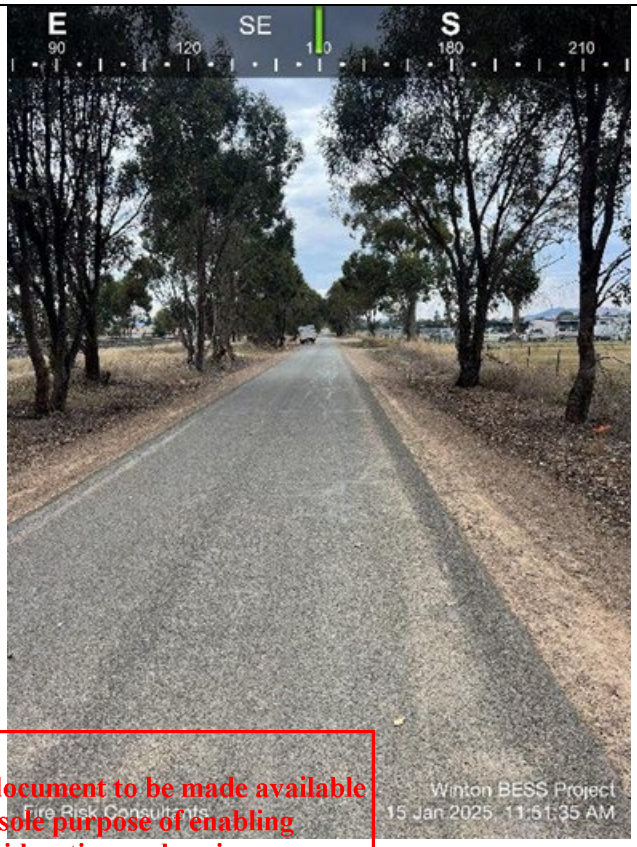
# Appendix A – UL9540A test sequence

**Figure 1.1**
**Schematic of Test Sequence**



# Appendix B – Site photos



| | |
|---|---|
| 1. Looking southeast along Lee Road. |  |
| 2. Looking north at vegetation present on Lee Road. |  |

| | |
|---|---|
| 3. View of subject site from Lee Road. |  |
| 4. Corner of Bowers and Lee Road. |  |

| | |
|---|---|
| 5. View of the subject site from Bowers Road. |  |
| 6. View of the subject site from Bowers Road. |  |

| | |
|---|---|
| 7. Looking southeast along Bowers Road. |  |