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## Dalvui Battery Energy Storage System (BESS)

Dalvui BESS Bushfire Risk Assessment

Tilt Renewables

14 February 2022  
Rev 2

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## Document control record

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## 1 Introduction

### 1.1 Project background

Aurecon was commissioned by Tilt Renewables (the Proponent) to undertake a bushfire risk assessment for the proposed Dalvui Battery Energy Storage System (BESS) at Terang in western Victoria. The Proponent is proposing to install a BESS in Terang to help maintain reliable and affordable energy supply for Victoria. The intention is to combine the operation of the Dalvui BESS (herein referred to as 'the Project') with renewable energy generation to support Victoria's transition away from reliance on fossil fuels.

The Project area is within a designated Bushfire Prone Area (BPA), though the Bushfire Management Overlay (BMO) does not cover the site.

The policy for bushfire planning and risk assessment is outlined in Clause 13.02-1S of all Victorian Planning Schemes. The objective of this clause is to strengthen the resilience of settlements and communities to bushfire through risk-based planning that prioritises the protection of human life. Clause 13.02-1S outlines that bushfire risk must be considered in areas designated as a Bushfire Prone Area when assessing an application for the following uses and developments:

- Subdivisions of more than 10 lots
- Accommodation
- Childcare centre
- Education centre
- Emergency services facility
- Hospital
- Indoor recreation facility
- Major sports and recreation facility
- Place of assembly
- Any application for development that will result in people congregating in large numbers

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Given the proposed development (battery energy storage facility) is not listed in Clause 13.02, it is considered that the requirements of this clause do not apply.

However, Aurecon understands that consideration of bushfire risk is to be provided for the Project, and that the risks to life and property are considered as part of the planning permit application. As such, the Guidelines for Renewable Energy Installations (CFA 2021) have been applied to allow for the appropriate assessment of bushfire risk. These guidelines reflect the conditions likely to be included on a planning permit, in the case where The Minister for Planning refers the proposal to the CFA.

### 1.2 Purpose and scope

The bushfire risk assessment has been prepared to address the requirements of the Guidelines for Renewable Energy Installations (CFA 2021). While not applicable to the particular type of proposed development, the requirements of Clause 13.02-1S of the Victorian Planning Provisions have been considered as part of this assessment where relevant.

The scope of the bushfire risk assessment was to:

- Undertake a bushfire site hazard assessment, which considers all bushfire hazards within up to 150 metres of the proposed location for the BESS (including any classified vegetation identified as per the Australian Standard AS3959:2018).
- Undertake a bushfire landscape hazard assessment, which provides details of the bushfire hazards in the broader landscape considering likely bushfire scenarios as well as egress to built-up areas.

- Outline key bushfire management measures that are applicable to the site, detailing how the Project will implement these measures, specifically in relation to:
  - The proposed location and design of the BESS;
  - Defendable space; and
  - Water supply and access.

### 1.3 Limitations

The outcomes of this report are limited to the bushfire assessment undertaken for the Project site and immediate surrounds. This report is limited to the scope defined in Section 1.2. Should further information become available regarding the conditions at the Project site, Aurecon reserves the right to review the report in the context of the additional information.

While the measures identified in this report when fully implemented can assist in reducing the residual fire risk to the Project, they cannot fully guarantee assets will survive a bushfire or grassfire on every occasion due to the unpredictable nature of bushfires and extreme weather. Continual evaluation and review of this document, fire risk conditions at the site and updating management practices when necessary may assist in further reducing the residual fire risk at the site over the life of the Project.

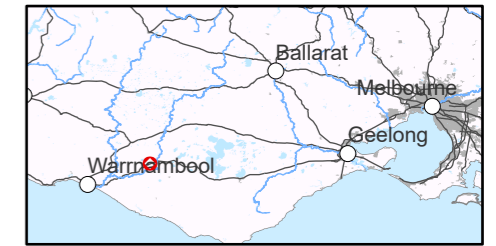
### 1.4 Location

The Project is located to the north east of the township of Terang, in western Victoria, approximately 184 kilometres west of Melbourne. The Dalvui BESS is proposed to be located within private property at 500 Dalvui Lane, which is situated immediately to the east of the Terang Terminal Station (TGTS). Access to the BESS is proposed via McCrae Street. Given the proposed works required in this area, the TGTS has been included in this assessment. The survey area as well as the location of the proposed BESS and associated infrastructure are shown in Figure 1.

The closest fire station is the Terang CFA Fire Station, which is located on the north eastern side of the Terang township, less than 1 kilometre from the proposed Dalvui BESS site.

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**Legend**

- Survey area
- Road
- Rail
- Watercourse

**Project Information**

- Indicative BESS Location
  - Indicative Underground Cable
  - Indicative Underground Cable and Access Track
  - Option 1 TGTS 66kV Transformer
  - Option 2 TGTS 66kV Transformer
- Vegetation**
- Scoria Cone Woodland (EVC 894)
  - Planted trees

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

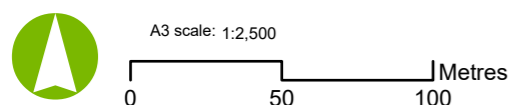
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Author: Nick Chen



Job No: 510575  
Coordinate System: GDA 1994 MGA Z55

**Dalvui Battery Energy Storage Project**  
Project area and native vegetation

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## 2 Methods

The following sources of information were reviewed to inform the preparation of this bushfire risk assessment:

- VicPlan (DELWP 2020a)
- Planning Schemes Online (DELWP 2020b)
- *Regional Bushfire Planning Assessment – Barwon South-West Region* (DPCD 2012)
- *Guidelines for Renewable Energy Installations* (CFA 2021).

For the purposes of bushfire hazard assessment, areas of vegetation considered to pose a bushfire threat are classified according to the vegetation classes defined as per the Australian Standard (AS 3959-2018). Under Clause 2.2.3 and Table 2.3 of AS 3959-2018, vegetation is classified into the following classes.

- Forest
- Woodland
- Shrubland
- Scrub
- Mallee/Mulga
- Rainforest
- Grassland
- Tussock Moorland

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AS 3959-2018 also describes situations where vegetation is classified as 'low threat'.

Details of the bushfire hazards within the Project area, including the presence and type of classified vegetation, was determined during a field assessment undertaken on 19 October 2020. Bushfire hazards situated beyond the Project area were determined based on aerial photo interpretation.

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## 3 Bushfire hazard assessment

### 3.1 Site description

The Project area (including the TGTS) totals approximately 10 hectares of land located in Terang, in the western volcanic plains of Victoria.

The main portion of the Project area is an area of privately owned farmland immediately to the east of the TGTS. This area has been long utilised for agriculture and is comprised exclusively of introduced pasture grasses (Photo 1). A row of established trees, mainly Sugar Gums, exists along the eastern border of the Project area (Photo 2). Native vegetation in/adjacent to the Project area is limited to three small patches of Blackwood (*Acacia melanoxylon*), which have been classified as Scoria Cone Woodland in Figure 1. The Project area is bounded to the south by the Warrnambool line rail reserve, which is comprised of introduced pasture grasses, and sparse treed vegetation.

Planted trees occur on both sides of McCrae Street (south of the TGTS) (Photos 3 and 4), as well as in the adjoining property to the south. The TGTS is fenced around the perimeter, and comprises hard surfaces, electrical infrastructure and sparsely planted trees.

The privately owned (eastern) portion of the Project area, as well as the area along McCrae Street and the adjoining rail reserve, is currently zoned as Farming Zone (FZ1). The AusNet TGTS is currently zoned Public Use Zone – Service and Utility (PUZ1). The Project area lies in the non-Alpine parts of Victoria, which have a Fire Danger Index (FDI) of 100. The site falls within a designated Bushfire Prone Area.



Photo 1: Introduced pasture in Project area farmland



Photo 2: Planted Sugar Gums along eastern boundary of Project area



Photo 3: Planted trees at eastern end of McCrae Street



Photo 4: Planted trees along McCrae Street and inside the TGTS



## 3.2 Bushfire hazards in the Project area

Vegetation in the Project area is largely open farmland. Classified vegetation in and adjacent to the Project area comprised:

- Grassland – throughout the farmland (where the grass is considered unmanaged); and
- Woodland – a planted tree line (>20m wide) situated along the eastern boundary fence.

All other rows of planted vegetation within and nearby to the Project area (i.e. planted trees along McCrae Street and within neighbouring properties) were too narrow and isolated to be considered as classified vegetation, and rather are considered as low-threat vegetation. The slope across the Project area was noted as flat (0°).

## 3.3 Bushfire hazards in the broader landscape

The broader landscape largely supports open farm paddocks, occasionally separated by planted tree lines. No dense forested or bush blocks exist nearby to the Terang township or within five kilometres of the Project area.

No significant bushfire hazards are identified nearby to the Terang township in the Regional Bushfire Planning Assessment for the Barwon South-West Region (DPCD 2012).

## 3.4 Fire risk

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### 3.4.1 Bushfire risk

Bushfire hazards in and around the Project area are largely limited to grassland. If a fire were to start at the Dalvui BESS, there is potential for a grass fire to spread widely and rapidly through the surrounding landscape. In the event of such a grass fire originating on the eastern edge of the Terang township could be threatened (<1km from the Project area). This considered a battery fire risk are managed at several levels in the BESS design and fire protection systems.

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### 3.4.2 BESS Fire risk and management in design

Fire mitigation at the battery cell level is achieved through appropriate battery cell design and certification. Battery cell safety testing and certification includes a range of testing, including overcharge, heat, crush, impact and short circuit. The UL1973 certificate compliance for battery systems is a third-party issued certificate (DNV or equivalent), witnessing the destructive test of a battery system under defined conditions, with a cell, or group of cells, set on fire, and confirmation that the fire does not spread to other cells. Battery cell certification to this standard is provided by all leading battery OEMs and will apply to the Project.

BESS facilities are equipped with Battery Management Systems (BMS). The BMS monitors the operational and fault status of the system for all parameters required to ensure safe operation of the batteries, including State of Charge (SOC), voltage, current, power limits, and temperatures. Parameters are monitored at the appropriate level of the battery cell, module and rack as applicable. The BMS functions to prevent potential battery fire causes such as overcharging, shutting down of battery modules / racks if monitored conditions are outside of those permissible for safe operation.

The BESS arrangements that will be considered for the Project will also be certified to UL 9540. This standard uses Failure Mode and Effect Analysis (FMEA) to understand the likelihood and severity of risks. This is then used to inform the necessary safety controls (fire and other electrical safety) that should be included in the system. It is also expected that the BESS design will comply with NFPA 855, which is another standard providing minimum requirements for mitigating the hazards associated with BESS facilities.

Different BESS Original Equipment Manufacturers (OEMs) have differences in the specific measures they apply to meeting these requirements. The selection of the battery supplier is therefore a factor in the

management of fire risk. A combination of a range of the following mitigations is expected to be applied, depending on the BESS supplier:

- BESS enclosure fire detection
- Site level flame detectors installed externally to enclosures
- BESS enclosure fire suppression systems (gaseous / aerosol-based suppression systems)
- Dry suppression pipes for use with an external firewater supply
- Ventilation design for safe venting of off-gases in event of battery thermal runaway
- BESS unit physical spacing to ensure fire from one unit will not propagate to another unit
- Site Fire Indicator Panel

A fire risk evaluation report will also be prepared to incorporate fire risks and mitigations specific to the BESS supplied for the Project, these measures will be managed via way of a Fire Management Plan, to be prepared in consultation with the relevant fire authority. This will include fire detection and protection for any site buildings in accordance with the National Construction Code (NCC).

Mitigation measures are outlined in the following section to:

- Reduce the likelihood of a fire starting at the Dalvui BESS; and
- Manage the risk to life and property in the event of a fire at or nearby to the Dalvui BESS.

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## 4 Managing fire risk

To reduce the risk of bushfire associated with the operation of renewable energy facilities, the CFA have provided specific guidance for siting, operation and fuel/vegetation management, with particular guidance for battery facilities (CFA 2021). The measures recommended for implementation which are relevant to the proposed Dalvui BESS are detailed in the following sections.

### 4.1 Siting and design requirements

In lieu of any current Australian Standard, the current version of UL 9540: Energy Storage System Requirements and NFPA 855 must be used in the design and operation of battery energy storage systems. As documented in Section 3.4.2, the Dalvui BESS will be certified to UL9540.

All battery facility infrastructure is to be located so as to be directly accessible to emergency responders through provision of a suitable access road. Access to the Dalvui BESS will be via McCrae Street. Any specific road access requirements should be discussed with the CFA.

All wiring must be closed, and all BESS cables must be buried, except where required to be above-ground for grid connection.

### 4.2 Firebreak requirements

All containers/infrastructure must maintain a firebreak of 10 metres width around the perimeter. This fire break must comprise an area of either mineral earth or non-combustible mulch (i.e. crushed rock). The fire break must be free of vegetation, including grasses, at all times. The application of a 10-metre-wide firebreak is applicable to the Dalvui BESS and will be incorporated at detailed design phase.

In addition to the maintenance of a permanent firebreak, the following requirements must also be adhered to:

- Grass in the surrounding Project Area must be maintained to less than 100mm in height during the CFA declared Fire Danger Period.
- In the event of a fire, sufficient water must be available and accessible to responders and trucks to ensure that fire suppression activities are not hindered in any way. The location of firefighting water access points and the quantity of water supply must be established through a comprehensive risk management process that considers the credible hazards, in consultation with CFA.
- Consultation with CFA should be undertaken to determine the requirements for water storage tanks onsite.
- All plant and heavy equipment must carry a water stored fire extinguisher (minimum 9 litre), with minimum rating of 3A, must be kept on site at the facility during the Fire Danger Period.
- All other restrictions and guidance provided by the CFA during the declared Fire Danger Period, days of high fire danger and/or Total Fire Ban days must be adhered to.

### 4.3 Operational requirements

BESS facilities must all provide specifications for safe operation regarding temperature and fire risk. Safety information relevant to the operation of the Dalvui BESS is to be stored on site at the facility at the entrance to the site, and easily accessible to responding firefighting resources.

BESS facilities must be free of any extraneous or combustible materials. Any dangerous goods stored onsite at the Dalvui BESS facility, must meet the requirements of the *Dangerous Goods Act 1985*; the *Dangerous Goods (Storage and Handling) Regulations 2012*; and relevant Australian Standards.

The Dalvui BESS facility must be serviced and maintained as per the manufacturer's requirements. Specifications for safe operating conditions and manufactures requirements will be identified following determination of a preferred battery supplier. This is likely to be identified at the detailed design phase.

An Emergency Management Plan (EMP) must be prepared for the Project, detailing the procedures that will be followed in the case of a fire onsite. The EMP will be prepared in consultation with CFA and will incorporate the BESS supplier's recommended emergency response procedures. The EMP must incorporate a Fire Management Plan which specifically addresses the relevant management measures to be implemented to reduce a fire starting at the BESS.

## 4.4 Additional requirements

Appropriate ventilation is to be provided where required under (DR) Australian Standard 5139 Electrical Installations – *Safety of battery systems for use with power conversion equipment*; the manufacturer's requirements and/or the Safety Data Sheet (SDS) for battery storage.

Spill containment provisions are to be provided around the facility with provision for fire water runoff. The requirement to provide a firefighting water supply onsite should be discussed with CFA.

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- Committee FP-020. Australian Standards AS 3959-2018, Construction of Buildings in Bushfire-Prone Areas, Standards Australia, Sydney, NSW
- DELWP 2020a, VicPlan. Government of Victoria, Department of Environment, Land Water and Planning, Melbourne, Victoria, viewed 17<sup>th</sup> December 2020, <<https://mapshare.vic.gov.au/vicplan/>>
- DELWP 2020b, Planning Schemes Online, Department of Environment, Land, Water and Planning, Melbourne, Victoria, viewed 17<sup>th</sup> December 2020, <<https://www.planning.vic.gov.au/schemes-and-amendments/browse-planning-scheme/>>
- DPCD 2012, Regional Bushfire Planning Assessment – Barwon South-West Region, (then) Department of Planning and Community Development, Melbourne, Victoria.

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