

Summary of Changes

Elaine Battery Energy Storage System (BESS)

Project:	Elaine Battery Energy Storage System (BESS)
To:	FRV - Jennifer Blyth
From:	NJM Design - Javier Piedrahita
Project number	8022
Subject:	Summary of changes
Date:	12 January 2024



Dear Jennifer,

In order to facilitate the assessment of the fire safety measures for the Elaine BESS project, please see below a summary of the design and assessment changes that the project has gone through, from the revision of the Fire Hazard and Risk Assessment (FHRA 05) that was reviewed by the FRV, up to the latest revision, FHRA 11.

Summary of Design and Assessment Changes

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1. Elaine Facility Layout (updated information):

The layout of the facility has been updated. See new layout in the figure below and the latest FHRA 11 Appendix A.

The latest FHRA 11 has been updated to match the below layout, including fire models, calculations, clearances and conclusions.



Figure 1: New facility layout

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2. Fire Brigade Access (updated information):

The site has a safe access point direct from Murphys Road on the south-east side of the allotment and a secondary emergency access on the south-west side of the allotment, furthermore, there will be an alternative entrance to be used for emergencies located on the north-west side of the allotment (Figure 2).

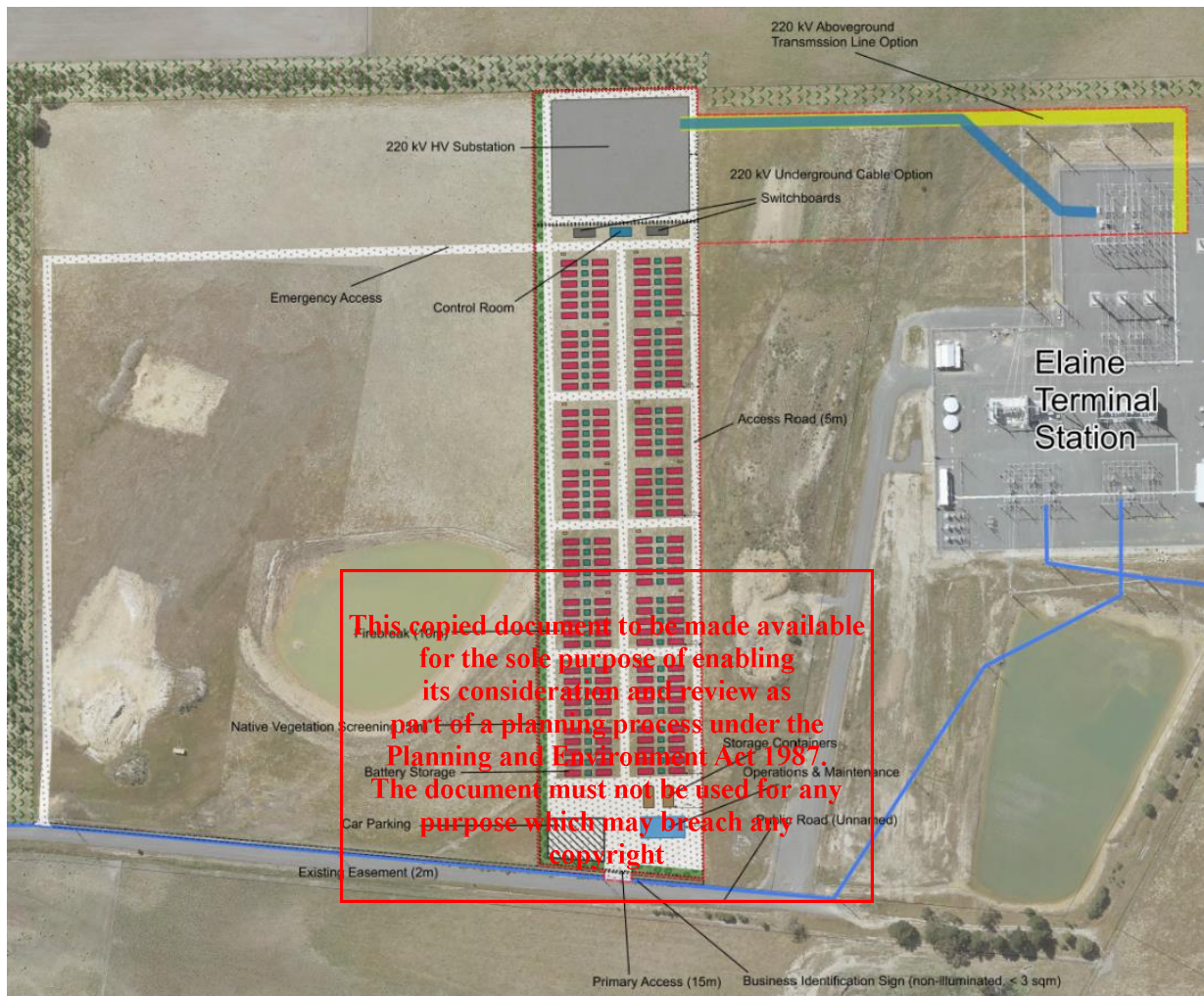


Figure 2: Access roads

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3. Water supply tank (updated requirement):

The firefighting water will be sufficient for 4 hours supply based on at least 1 hydrant. The hydrants will be located such that all areas can be covered by at least 2 hydrants. The water storage tank is therefore required to have at least 144kL.

The above requirement and conclusion do not match the 576kL water supply required by the Planning Permit PA2302247, however the assessment addresses the water requirements (please refer to the abstract below and Section 7.5 of the FHRA 11):

For facilities with battery energy storage systems, the fire protection system must include at a minimum: a) Where reticulated water is available, a fire hydrant system that meets the requirements of AS 2419.1-2005: Fire hydrant installations, Section 3.3: Open Yard Protection, and Table 3.3: Number of Fire Hydrants Required to Flow Simultaneously for Protected Open Yards. Except, that fire hydrants must be provided and located so that every part of the battery energy storage system is within reach of a 10m hose stream issuing from a nozzle at the end of a 60m length of hose connected to a fire hydrant outlet.

Response – Table 3.3 of AS2419 is reproduced below:

TABLE 3.3
NUMBER OF FIRE HYDRANT OUTLETS
REQUIRED TO DISCHARGE SIMULTANEOUSLY
FOR PROTECTED OPEN YARDS

Area of yard m ²	Number of fire hydrant outlets required to flow simultaneously (see Note)
≤3 000	1
>3 000 to ≤9 000	2
>9 000 to ≤27 000	3
>27 000	4

NOTE: Where more than one external fire hydrant, each with two valve-controlled outlets is installed and more than one outlet is required to flow, then one outlet on each of the most hydraulically disadvantaged fire hydrants has to achieve the required flow and pressure.

If the number of outlets required to flow exceed the number of fire hydrants installed, then simultaneous flow from each of the two outlets on the most hydraulically disadvantaged fire hydrant will be necessary.

Where only one external fire hydrant with two valve controlled outlets is installed and 2 outlets are required to flow, then simultaneous flow from each of the two outlets will be necessary.

The facility site is approximately 40,000m² within the security fence and the distribution of the equipment is as shown in Appendix A.

In accordance with the CFA guidelines, the yard area “may be considered that of the battery installation, including the minimum 10m fire break around the battery infrastructure, rather than the entire area of the yard or site”.

For the purpose of this assessment and given the previous fire spread risk review (see section 6.2, which demonstrates that fire spread is not likely within 10m from the BESS battery), the “yard area” will be defined as one of the battery arrays that are separated by a 5m wide road (see Figure 3).

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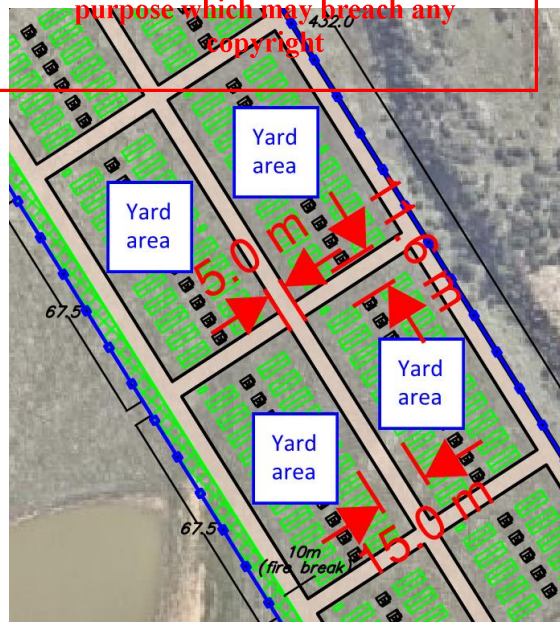


Figure 3: “Yard area” definition.

Each one of these battery arrays has an average area of between 2,400m² and 2900 m² (i.e., < 3,000m²), and each 220kV HV transformer yard is approximately 2,500m² (i.e., < 3,000m²). Accordingly, 1 hydrant running for 4 hours is required by the AS 2419.1-2005 for a BESS.

The water storage tank is therefore required to allow for 1 hydrant at 10L/s each for four hours, i.e., 144kL.

When required, a Megapack should be able to be reached by at least two hydrants if one of the hydrants is not accessible due to fire hazard conditions.

4. Perimeter Road (updated requirement):

The five (5) metre perimeter road within the perimeter fire break (as shown in the FHRA 11) must be maintained and designed to comply with the requirements of the CFA Guidelines for renewable energy facilities (Country Fire Authority (CFA) Specialist Risk and Fire Safety Unit, 2022) (this is compliant in the proposed layout in FHRA 11).

5. New fire safety requirements:

- A containment and management plan for contaminated fire water runoff from the BESS is to be developed by the facility.
- Where transformers are oil-insulated, transformers shall use an FR3 (or similar) Ester oil where practical in lieu of the normal mineral oil.

Note: This requirement has been updated due to the size and characteristics of the transformers:

- BESS transformers and switch gear. They will use FR3 fluid oil, and their oil capacity is expected to be not more than 3,800 litres (3.8 m³).
- 220 kV HV Substation: There will be 2 transformers that will use mineral oil and their oil capacity is expected to be not more than 60,000 litres (60.0 m³).

This information has been considered to update calculations and clearance distances and did not change the conclusions regarding this matter.

- The transformer at the 220 kV HV Substation must be located at more than 15m from any of the adjoining buildings which have a combustible facade or be surrounded by firewalls as defined by AS2067 where these clearances can't be achieved.
 - All buildings within the facility must comply with the performance requirements of the NCC (National Construction Code) where the DtS (Deemed to satisfy) provisions are not satisfied.
 - Each vehicle and heavy equipment 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.
- #### 6. General changes to the document:
- Typos and wording have been amended throughout the document.
 - All references to Powin BESS components have been removed and the wording and fire risk assessments have been updated to match the Tesla Megapacks.
 - The BAL (bushfire attack level) assessment has been updated (FHRA 11 Section 6.5) to be more specific. The conclusions remain the same: BAL-LOW.

Yours sincerely,

Renewable Age Pty Ltd.
Steve Phillips
Principal Consultant and MD

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