

4 September 2024



Regional Growth NSW Development
activationprecincts@regional.nsw.gov.au

Dear Sir/Madam,

Subject: 230246 Moree BESS NASAG Framework Guideline B Windshear Assessment

Our client, AE BESS 2 Pty Ltd as Trustee for AE BESS 2 Unit Trust, intends to construct and operate a Battery Energy Storage System (BESS) at Bullus Drive, within the Moree Special Activation Precinct (SAP).

This Windshear Assessment has been prepared by NGH to support an Activation Precinct Certificate (APC) and Development Application for the proposed development. The subject land is in proximity to the Moree Regional Airport and is identified on Figure 22 Moree Regional Airport Windshear Assessment Trigger Area in the Moree SAP Master Plan.

Accordingly, NGH has carried out a windshear assessment of the proposed development according to *NASAG Framework Guideline B Managing the Risk of Building Generated Windshear and Turbulence at Airports*. The result of the assessment is discussed below and provided in detail in the attachment.

The proposed development would involve the construction and installation buildings and structures with maximum height of approximately 8m above natural ground level (development design plans attached). The accompanying assessment demonstrates the proposed development would not penetrate the 1:35 surface and it can be concluded it would not have a windshear or turbulence impact on the airport and operating aircraft.

Please do not hesitate to contact me on 0401 931 355 or David Canterbury on 0403 709 813. We would be pleased to discuss further or provide further information if required.

Yours sincerely,

NGH

A handwritten signature in black ink, appearing to be 'SK' or similar, written over a light grey circular background.

Stephanie Kurta
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Appendix A Windshear assessment

A.1 Proposed development

AE BESS 2 Pty Ltd as Trustee for AE BESS 2 Unit Trust intends to construct and operate a 120MW/480MWh lithium-ion Battery Energy Storage System (BESS) at Bullus Drive, within the Moree Special Activation Precinct (SAP).

The proposed development would be carried out on Lot 82 DP751780 and part of Lot 144 DP751780 (subject land). The BESS would connect to the national electricity market (NEM) via TransGrid's 132 kilovolt (kV) Moree Bulk Supply Point substation (Lot 1 DP999486), located immediately north of the development site. The connection would be via underground transmission line to a new 132kV connection bay at the substation.

The proposal would include the following:

- Approximately 140 battery containers, containing lithium-ion technology.
- Approximately 42 skid-mounted Power Conversion Systems (PCS) comprising of:
 - Direct Current (DC) to Alternating Current (AC) inverters.
 - 33 kV medium-voltage transformer.
 - Medium-voltage switchgear, containing circuit breakers and disconnectors for the PCS.
- An internal HV substation including 33kV/132kV step up transformer and associated components to enable connection to the Moree Bulk Supply Point substation.
- A 33kV switch room, which collects all the individual medium voltage cables from the PCS units in one location, before connection to the high-voltage transformer. Auxiliary power is supplied from a low-voltage room, which is connected to the medium-voltage switch room. Underground cables would connect the switch room, power conversion units and batteries, to allow for easy access and minimal disruption (if access is required).
- A control room, which will contain battery-monitoring equipment, allowing operators to control the plant remotely.
- An underground transmission line which would connect the proposed BESS to a new 132kV bay within the adjacent Moree substation.
- Associated ancillary infrastructure, including:
 - Operations and Maintenance (O&M) building
 - Auxiliary low-voltage transformers
 - Underground cabling connecting site infrastructure.
 - Sewerage pump-out/ holding tank
 - On-site car parking.
 - A water tank.
 - Internal access roads and tracks.
 - Security fencing and landscape screening.
 - Bulk earthworks
 - Stormwater drainage infrastructure including detention basin.

The proposed development designs are attached at the end of this assessment.

A.2 Moree SAP Master Plan requirements

The subject land is located in proximity to the Moree Regional Airport and is identified on Figure 22 Moree Regional Airport Windshear Assessment Trigger Area (extract below as Figure 1).

According to section 6.1 Protection of Airport Operations, the following is required:

H. An assessment is required for industries in close proximity to the airport as mapped on Figure 23 Moree Regional Airport Windshear Assessment Trigger to determine the plume velocity. A detailed assessment is required for buildings that are:

- 1200m or closer perpendicular from the runway centreline (or extended runway centreline).
- 900m or closer in front of runway threshold (towards the landside of the airport).
- 500m or closer from the runway threshold along the runway.

Accordingly, NGH has carried out a windshear assessment of the proposed development according to NASAG Framework Guideline B Managing the Risk of Building Generated Windshear and Turbulence at Airports.

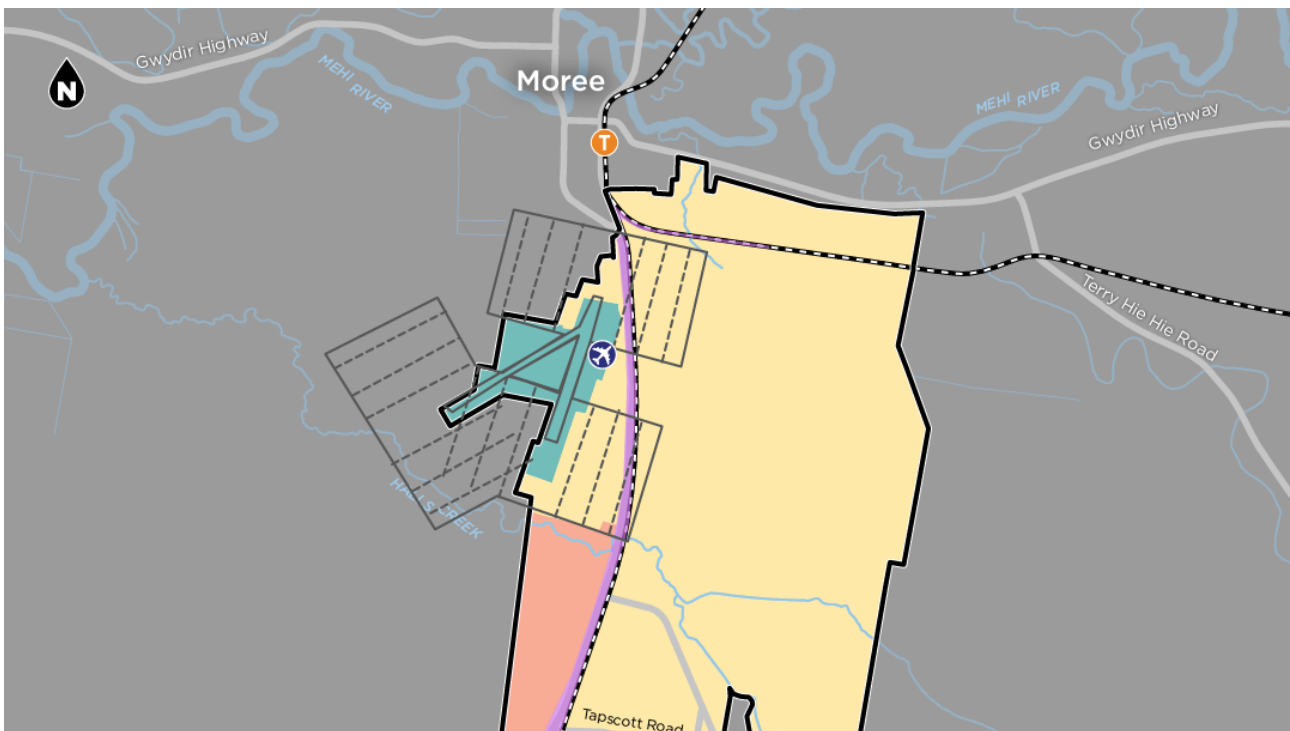


Figure 1 Extract of Figure 22 Moree Regional Airport Windshear Assessment Trigger Area (Source: Moree SAP Master Plan, 2024)

A.3 Windshear assessment

Windshear and turbulence are critical safety issues around airports and occur when a building or structure is located in a crosswind path affecting an operational runway. The wind flow is abnormally diverted around and over the buildings causing the crosswind speed to vary along the runway. The National Airports Safeguarding Framework (National Airports Safeguarding Advisory Group, 2018) was developed to provide guidance to decision-makers in mitigating these risks around operational airports.

This windshear assessment has been prepared according to *NASAG Framework Guideline B Managing the Risk of Building Generated Windshear and Turbulence at Airports* (Guideline B) (National Airports Safeguarding Advisory Group, 2018). Guideline B sets out steps to identify the risk and provide appropriate guidance.

In accordance with section 64 of Guideline B, it is first necessary to determine if the proposed development is within the assessment trigger area around the runway ends of an airport (refer Figure 2). The area is defined within the guidelines as follows and is replicated in the Moree Master Plan provisions:

- a. 1200m or closer perpendicular from the runway centreline (or extended runway centreline)
- b. 900m or closer in front of runway threshold (towards the landside of the airport); and
- c. 500m or closer from the runway threshold along the runway.

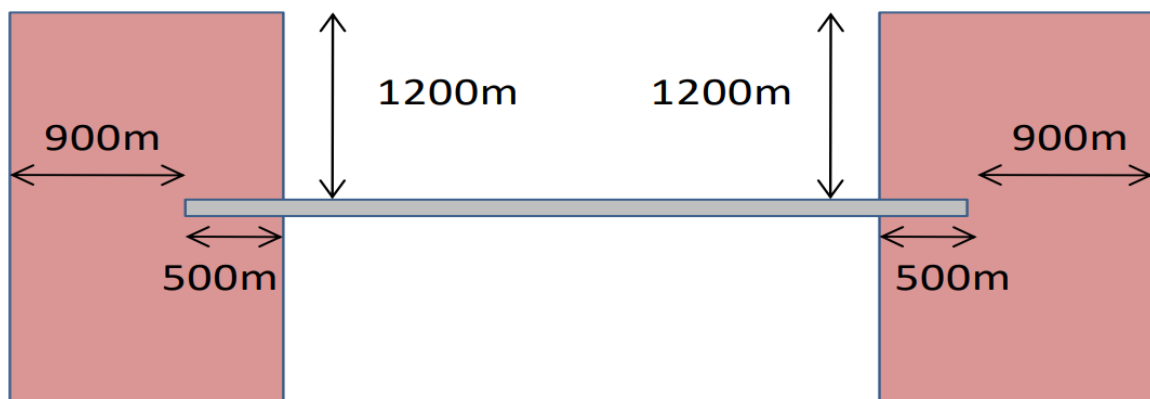


Figure 2 Assessment trigger area around runways, within which buildings should be assessed (Source: (National Airports Safeguarding Advisory Group, 2018))

The proposed development site is within the assessment trigger area in respect of the primary runway (Runway 01/19 at Moree Regional Airport) but sits outside the assessment trigger area for the secondary runway (Runway 05/23 at Moree Regional Airport) as defined by the guidelines.

According to section 66 of Guideline B, the second step is to determine if the building height within the assessment trigger area is compliant with the guidelines. A 1:35 ratio is used to determine the height and the distance between the building and the runway centre line (inclusive of the extended runway centreline). According to the guidelines, at the closest point to the runway centreline, a building should be 35 times its height. A building 10 metres in height would be acceptable if located 350m from the runway.

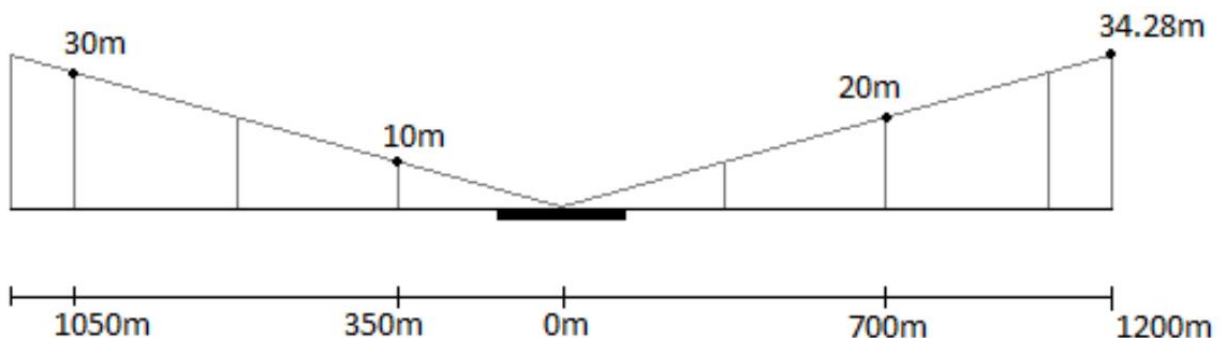


Figure 3 Elevation view of the 1:35 surface, looking down the runway centreline (NTS) (National Airports Safeguarding Advisory Group, 2018)

At section 53, Guideline B states:

The 1:35 surface can be applied to rule out buildings that will clearly not pose a risk. This will therefore be the first test that will be applied when approval authorities/decision makers are presented with a building to assess within the trigger area. This approach will enable the vast majority of developments at regional airports to be assessed very quickly. The 1:35 surface is very conservative and any building that does not penetrate the surface is not expected to create unsafe wind effects.

According to the development design plans provided in Appendix B, the tallest structures on the site would be associated with the high voltage (HV) internal substation, as indicated in the figure below. Refer to Sheet PS212248 WSP-ELE 102 – HV Substation Plans and Elevations, prepared by WSP and dated 15 March 2024. The maximum height is stated as 7m.

The proposed internal substation would be established in an area of the site that may be filled between 0.5m-1.5m, according to the accompanying Bulk Earthworks Layout Plan.

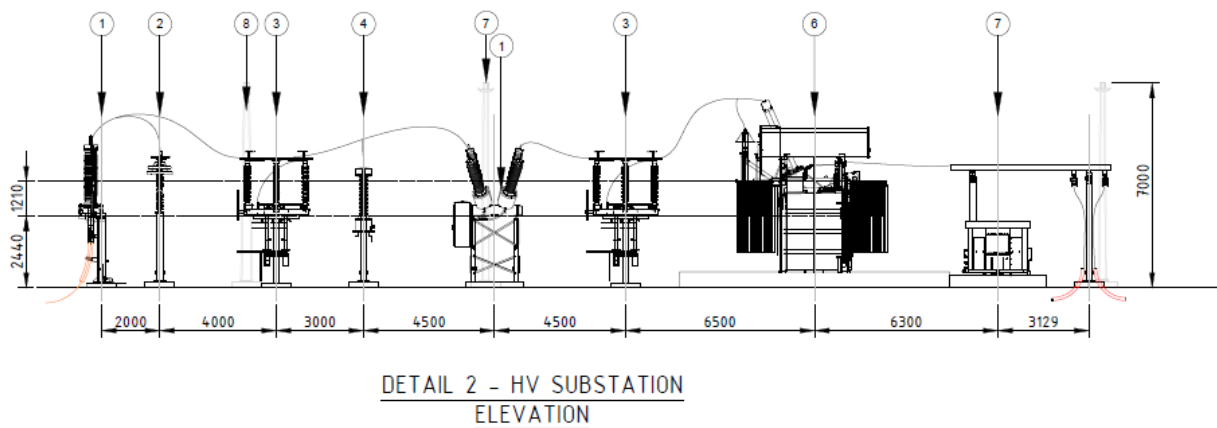


Figure 4 Elevation view of the proposed HV substation indicating height (Source: WSP, 2024)

A.4 Conclusion

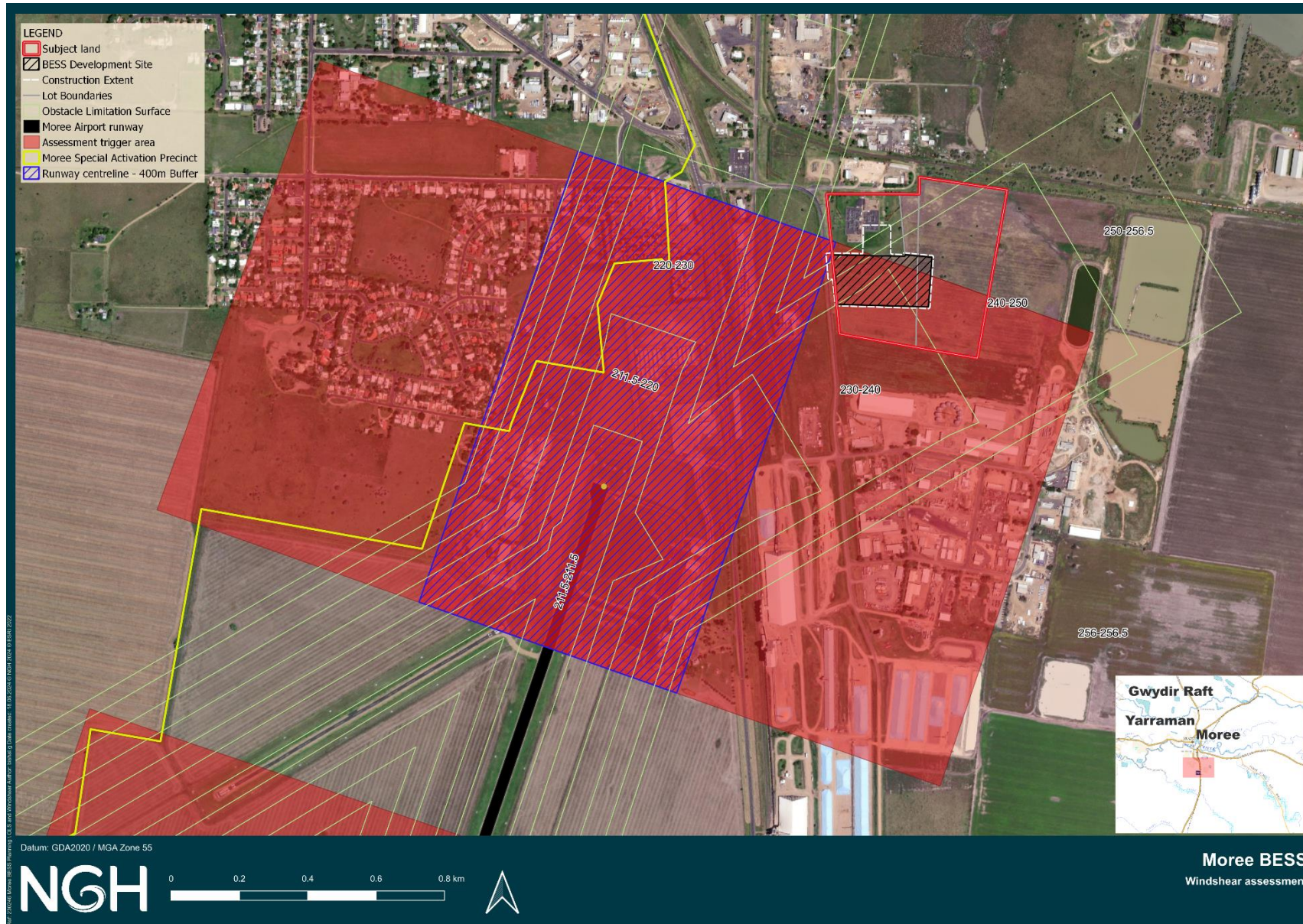
To adopt a conservative approach, the maximum height of all structures on the proposed development site is taken to be 7m or less above ground level.

The windshear assessment map in Appendix A.5 identifies the nearest point of the proposed development site to be 400m from the Runway 01/19 centreline. This would permit a maximum height of structures on the site to be 11.4m above natural ground level.

As noted above, the proposed development involves infrastructure of a maximum height of 8.5m (including site filling) above existing ground level and is it therefore concluded that the proposed development would not exceed the 1:35 surface.

No further assessment is required according to Guideline B.

A.5 Windshear assessment map



Appendix B Development Design Plans

PS212248-WSP-ELE-100 - c

132 KV UNDERGROUND CABLE TO MOREE SUBSTATION

NOTES

- THIS DRAWING IS CONCEPT DESIGN ONLY AND WILL BE CONFIRMED DURING DETAILED DESIGN.
- ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
- PUMP-OUT SEPTIC TANK - DETAILS TO BE CONFIRMED

SYSTEM CONFIGURATION

SITE COORDINATES	-
ENERGY CAPACITY (IN MWH)	480
AC POWER (IN MW) AT POI	120
NO. OF PCS MODULES	42
INVERTER RATING (KVA)	4200
BATTERY CAPACITY (MWH)	4.073
NO. OF BESS MODULES	140

SYMBOL	DESCRIPTION	REFERENCE
	BESS MODULE	PS212248-WSP-ELE-302
	POWER CONVERSION SYSTEM	PS212248-WSP-ELE-301
	10m ASSET PROTECTIN ZONE	PS212248-WSP-ELE-301
	5m LANDSCAPE BOUNDARY	PS212248-WSP-ELE-301
	33 KV UNDERGROUND CABLES	PS212248-WSP-ELE-700
	132 KV UNDERGROUND CABLES	PS212248-WSP-ELE-700
	LAYDOWN/CONSTRUCTION AREA	N/A
	DENTENTION POND	N/A
	HV SUBSTATION	PS212248-WSP-ELE-102
	SWITCHROOM	PS212248-WSP-ELE-401
	OPERATIONS BUILDING	PS212248-WSP-ELE-402
	HARMONIC FILTER (TBC)	N/A
	VISTERS CARPARKING	N/A

SITE GENERAL ARRANGEMENT
PLAN VIEW

REFERENCE COORDINATION DRAWINGS				SCALES		A3 ORIGINAL		CLIENT:		PROJECT:		DRAWING STATUS:	
DESCRIPTION		DRAWING NO.		REV	CHK	DO NOT SCALE THIS DRAWING		MOREE BESS		120 MW / 480 MWH		PRELIMINARY ISSUE	
SURVEY DATUM		HORIZONTAL DATUM:		VERTICAL DATUM:		APPROVED		SIGNED:		TITLE:		NOT FOR CONSTRUCTION	
Full Size 1:1000 A3 SCALE (m)		DATE:		REQ:		DESIGNED:		CHECKED:		APPROVED:		DRAWING No:	
0 10 20 30		15.08.24		11.04.24		C. WYNN-WILLIAMS		A. MIRZAEI		S. MANOHARAN		PS212248	
© WSP Australia Pty Ltd.		BY:		CHK:		PROJECT No:		DRAWN:		DATE:		PS212248-WSP-ELE- 100	
D 15.08.24		JIM		AM		SM		SM		SM		D	
C 07.06.24		CW		BS		SM		SM		SM			
B 11.04.24		SM		SM		SM		SM		SM			
A 15.03.24		CW		SM		SM		SM		SM			
Updated Legend		ADDED 14 BESS UNITS		FINAL ISSUE		CONCEPT ISSUE							



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