Regional Development Assessment Panel Agenda

Meeting Date and Time: Thursday, 7 May 2026; 1.00pm
Meeting Number: RDAP/73
Meeting Venue: 140 William Street, Perth

A live stream will be available at the time of the meeting, via the following link:
RDAP/73 - 7 May 2026 - Shire of Merredin

PART A – INTRODUCTION

1. Opening of Meeting, Welcome and Acknowledgement
2. Apologies
3. Noting of Minutes

PART B – SHIRE OF MERREDIN

1. Declarations of Due Consideration
2. Disclosure of Interests
3. Form 1 DAP Applications
   - 3.1 Lot 19448 & 27381 Robartson Road, Merredin – Battery Storage & Solar Farm – DAP/26/03058
4. Form 2 DAP Applications
5. Section 31 SAT Reconsiderations

PART C – OTHER BUSINESS

1. State Administrative Tribunal Applications and Supreme Court Appeals
2. Meeting Closure

Please note, presentations for each item will be invited prior to the items noted on the agenda and the presentation details will be contained within the related information documentation

DAP Members
Francesca Lefante (Presiding Member)
Karen Hyde (Deputy Presiding Member)
Rob Karelse
Cr Paul Boehme (Part B – Shire of Merredin)
Cr Hayley Billing (Part B – Shire of Merredin)

DAP Secretariat
Ashlee Kelly
Shanara Wijethunga

PART B – SHIRE OF MERREDIN

1. Declarations of Due Consideration

2. Disclosure of Interests

3. Form 1 DAP Applications

3.1 Lot 19448 & 27381 Robartson Road, Merredin – Battery Storage & Solar Farm – DAP/26/03058

4. Form 2 DAP Applications

Nil

5. Section 31 SAT Reconsiderations

Nil

Part B – Item 3.1 – Lot 19448 & 27381 Robartson Road MERREDIN – Battery Storage & Solar Farm

Form 1 – Responsible Authority Report
(Regulation 12)

DAP Name:	Regional Development Assessment Panel (RDAP)
Local Government Area:	Shire of Merredin
Applicant:	Roy Winslow, Land Insights
Owner:	Ross Milton Robartson
Value of Development:	$335 million
Responsible Authority:	Shire of Merredin
Authorising Officer:	Chief Executive Officer
LG Reference:	MDPA001(2026)
DAP File No:	DAP/26/03058
Application Received Date:	30 January 2026
Report Due Date:	24 April 2026
Application Statutory Process Timeframe:	90 Days
Attachment(s):	**bit.ly/rdapmerredin** 1. Attachment 1 – Development Plans 2. Attachment 2 – Public Submission 3. Attachment 3 – CASA Reply 4. Attachment 4 – DWER Reply 5. Attachment 5 – DPIRD Response 6. Attachment 6 – DEFS Reply

Responsible Authority Recommendation

That the Regional Development Assessment Panel resolves to:

1. **Accept** that the DAP Application reference DAP/26/03058 is appropriate for consideration as a "Use not listed" land use and compatible with the objectives of the zoning table in accordance with Clause 3.4.2 (b) of the Shire of Merredin Local Planning Scheme No. 6;

2. **Approve** DAP Application reference DAP/26/03058 and accompanying plans (Attachment xx) in accordance with Clause 68 of Schedule 2 (Deemed Provisions) of the *Planning and Development (Local Planning Schemes) Regulations 2015* , and the provisions of Clause 3.4.2(b) of the Shire of Merredin Local Planning Scheme No. 6, subject to the following conditions:

Conditions

1. The preparation and lodgement of a dedicated Construction Management Plan (CMP), including a transport impact assessment, details showing the proposed interim and longer-term facilities including building/structure setbacks, carparking facility and landscaping/ screening etc, to the satisfaction of the local government.

2. The preparation and lodgement of a Drainage Management Plan (DMP) to contain all drainage on site to the satisfaction of the local government.

3. The revision of Bushfire Management Plan (BMP) dated 19 December 2025 to meet the recommendations according to DFES referral dated 27 March 2026.

4. The preparation and lodgement of an Emergency Management Plan (EMP) to the satisfaction of the local government.

5. The preparation and lodgement of a Risk Management Plan (RMP) in compliance with the REF Guidelines to the satisfaction of the local government.

6. Any new crossover to Robartson Road shall be located and constructed to the satisfaction of the local government.

7. The preparation and lodgement of a Decommissioning Plan to the satisfaction of the local government.

8. The preparation and lodgement of a Rehabilitation Plan after the decommissioning of the facility at the end of its operational lifespan to the satisfaction of the local government.

9. The preparation of Acoustic Report and Management Plan incorporating appropriate measures to reduce the noise impact of the facility to a level considered acceptable to the satisfaction of the local government.

10. The preparation and lodgement of E-Waste Management and Rehabilitation plan with appropriate measures to mitigate environmental impact to the satisfaction of the local government.

11. The preparation and compliance with a Stormwater Drainage Plan to contain all drainage on site to the satisfaction of the local government.

12. All potential Black Cockatoo Habitat trees listed in the Flora and Vegetation Survey submitted on 30 January 2026 shall be retained and weed management practice should be implemented to the satisfaction of the local government.

13. The preparation and lodgement of an appropriate Visual Impact Management Plan which incorporates appropriate landscaping and screening measures, building materials and colour treatments, and the management of lighting to minimise visual impacts, to the satisfaction of the local government.

14. The preparation of an operational Biosecurity Management Plan (BMP) to the satisfaction of the local government.

15. The preparation of revised Flora and Vegetation Survey incorporating pastures coverage requirement to meet the recommendations according to DPIRD's comments dated 27 March 2026.

16. The community benefits should be ensured by the compliance with Capacity Investment Scheme funding or *Shire of Merredin Policy Manual Policy 8.27 - Community Enhancement Fund Policy.*

Advice Notes

1. This decision constitutes planning approval only and is valid for a period of 2 years from the date of approval. If the subject development is not substantially commenced within the specified period, the approval shall lapse and be of no further effect. For the purposes of this condition, the term "substantially commenced" has the meaning given to it in the *Planning and Development (Local Planning Schemes) Regulations 2015* as amended from time to time.

2. If an applicant or owner is aggrieved by this determination, there is a right of review by the State Administrative Tribunal in accordance with the *Planning and Development Act 2005* Part 14. An application must be made within 28 days of the determination.

3. The applicant is advised that granting of development approval does not constitute a building permit and that an application for relevant building permits must be submitted to the Shire of Merredin and be approved before any work requiring a building permit can commence on site.

4. The applicant is advised that meaningful engagement and partnership is needed to ensure the transparency and long-tern benefits to the local community and Aboriginal people representing the area.

Details: outline of development application

Region Scheme	Not Applicable
Region Scheme - Zone/Reserve	Not Applicable
Local Planning Scheme	Shire Of Merredin
Local Planning Scheme - Zone/Reserve	General farming
Structure Plan/Precinct Plan	Not Applicable
Structure Plan/Precinct Plan - Land Use Designation	Not Applicable
Use Class and permissibility:	Use not listed
Lot Size:	Lot 19448 - 67.7940ha Lot 27381 - 161.8779ha
Existing Land Use:	Rural
State Heritage Register	No
Local Heritage	☒ N/A ☐ Heritage List

	☐ Heritage Area
Design Review	☒ N/A ☐ Local Design Review Panel ☐ State Design Review Panel ☐ Other
Bushfire Prone Area	Yes BMP Prepared
Swan River Trust Area	No

Proposal:

Proposed Land Use	Ngaangk Boodja Battery & Solar Farm (NBBSF)
Proposed Net Lettable Area	N/A
Proposed No. Storeys	N/A
Proposed No. Dwellings	N/A

Background:

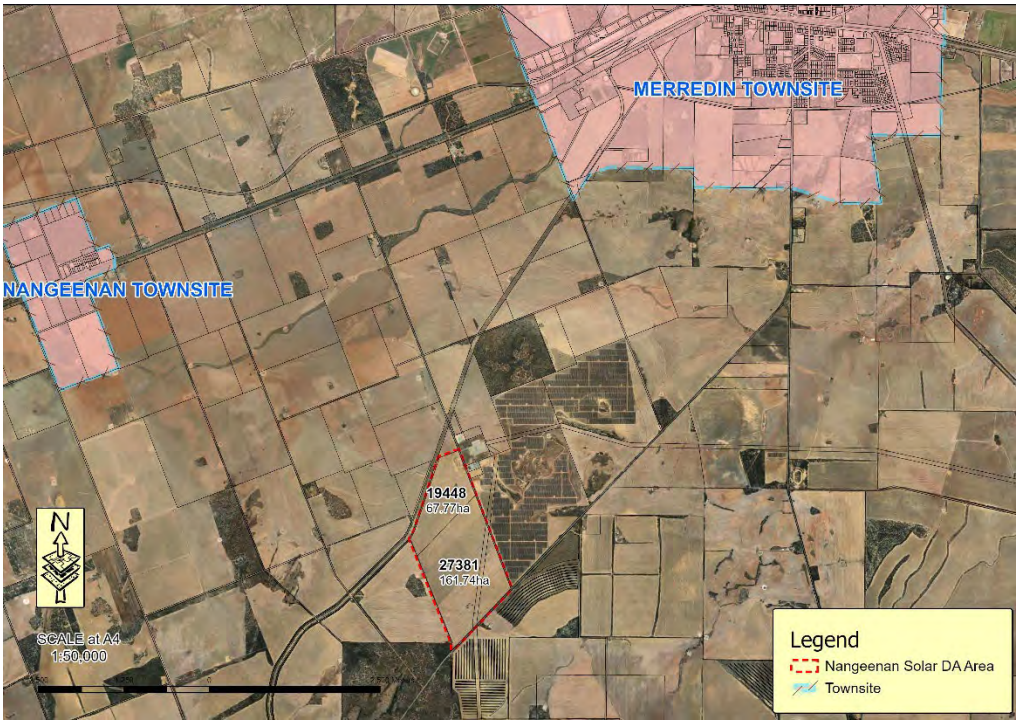
The site is located approximately 7.5km south-west of the centre of the town of Merredin and comprises two lots with a combined area of 230ha. The two lots are included on the same Certificate of Title, which has an easement protecting the electricity transmission line that traverses the site. This transmission line has been accommodated in the design of the facility, with all development outside of the easement.

The two lots are immediately adjacent to the Merredin Terminal substation, diesel peaking plant, BESS facility (currently under construction) and Merredin Solar Farm.

The subject site is a rural farming property, does not contain any areas of remnant vegetation and is currently used for cropping and sheep grazing purposes.

Figure 1 provides a location plan of the site.

FIGURE 1 - LOCATION PLAN



Source: Planwest

The proposed development is costed at $335m and consists of the Solar PV, Battery System, subsequent Generation, Storage and transmission of electricity facility that is comprised of solar panels, battery modules, inverters, transformers and control systems, and the associated high voltage substation and additional switch room(s)/control building(s), laydown areas, staff car parking, firefighting equipment, internal roads, communication tower. The battery modules will be located throughout the solar panel array rather than in one single location like the traditional Battery facilities. The NBBSF project will be connected to Western Power's transmission network at the adjacent Merredin Terminal by an easement.

The Shire of Merredin has become the renewable energy focus for the wheatbelt and Western Australia. It has pioneered wind turbines, solar farms and battery energy storage systems (BESS) generating green energy to replace greenhouse gas emitting sources and redistribute the energy. And now the Shire would like to step further in the storage and energy redistribution via the proposed Solar PV and Battery system.

Nomad Energy (the owner of the project) is an Australian company that has developed more than 500MW of renewable energy projects globally, including Western Australia's largest operational solar farm (Merredin Solar Farm).

Nomad Energy has partnered with Atmos Renewables on this project, that is one of the top 5 largest owner/operators of utility-scale renewable energy facilities in Australia and currently holds generation assets with a gross capacity in excess of 1.9GW. A core feature of the Nomad – Atmos partnership is the intent to develop, build, own and operate the assets they develop. This strategy demonstrates their long-term approach to the assets, the local communities in which they are situated and to the electricity market this project will ultimately support.

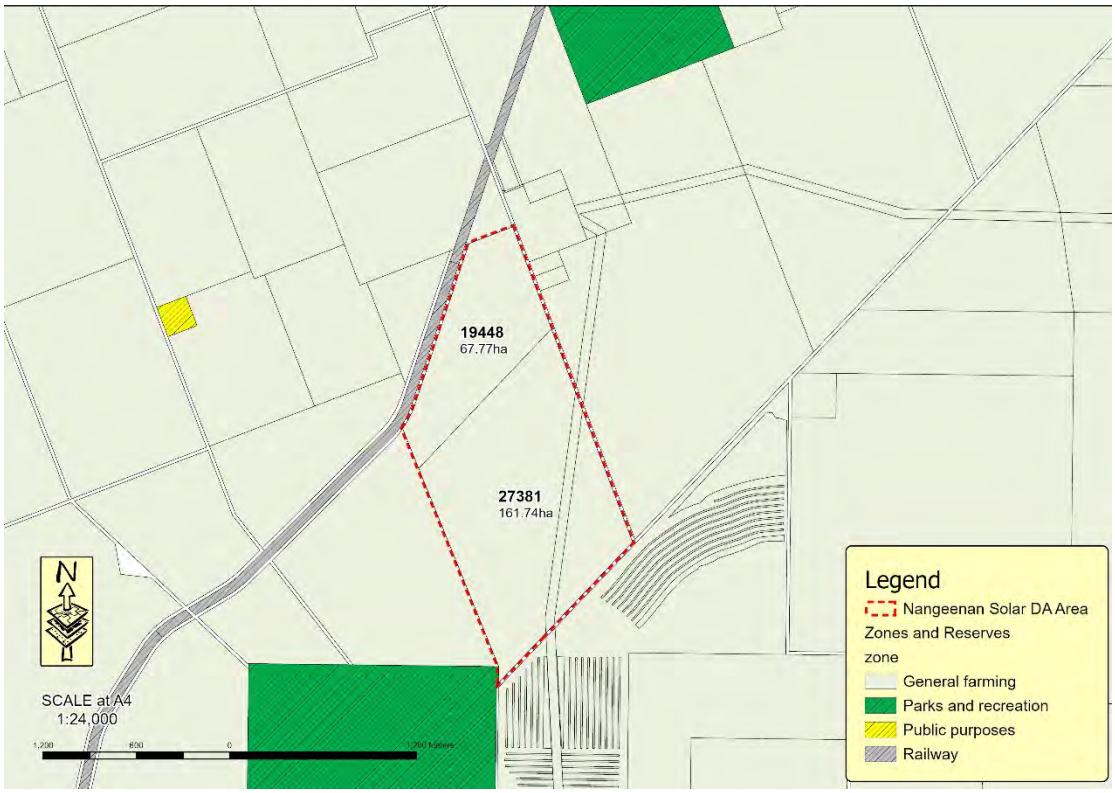
The proximity to Western Power's Merredin Terminal substation was a key consideration when selecting the site location and will result in relatively a least impact being required to connect the proposed facility to the South West Interconnector System (SWIS).

The land is surrounded predominantly by other agricultural properties to the north and west, Western Power's Merredin Terminal to the northeast and Merredin Solar Farm to the east. The subject site is near other energy infrastructure assets being the Merredin Energy dual-fuel peaking plant and Merredin Solar Farm (the largest operating solar farm in Western Australia).

Surrounding land uses include energy infrastructure (Western Power's Merredin Terminal), energy generation facilities (Merredin Energy peaking plant and Merredin Solar Farm) as well as agricultural (cropping and grazing) land. The closest sensitive receptor is over 2km away from the site. To the north and east of the subject site sits the energy infrastructure assets mentioned previously, to the southwest corner of the subject site at Lot 29241 (Crown Reserve 1313) Bruce Rock-Merredin Road is a Parks and Recreation reserve under the Shire of Merredin Local Planning Scheme No.6, known as Totadgin Rock National Park.

Figure 2 provides a zoning plan of the site.

FIGURE 2 - ZONING PLAN



Source: Planwest

This application and supporting planning report presents the merits and suitability of the Nomad Energy BESS facility for the location on Lot 19448 & 27381 Robartson Road, Merredin and located adjacent to the existing Merredin Terminal station.

This report and its appendices comprehensively demonstrate that the proposed development is consistent with the applicable planning framework, and the proposed facility can be approved subject to conditions and is consistent with the objectives of the General Faming zone within the Shire.

The proposal warrants approval for the following reasons:

1. The subject site is cleared and relatively flat with no remnant vegetation contained on the subject site.
2. The proposed development will also not have any adverse impacts on surrounding land or vegetation once the facility is operational.
3. The proposed development will not have a detrimental effect on the visual landscape within the immediate surrounds as outlined under the visual assessment and due to the location of the neighbouring existing Merredin Terminal, Merredin Energy peaking plant and Merredin Solar Farm.

Legislation and Policy:

The current RDAP application for Development Approval (DA) is lodged in accordance with the *Planning and Development (Development Assessment Panel) Regulations 2011 (DAP regulations)*. These regulations are part of the Planning and Development Act 2005 that operates in conjunction with the *Planning and Development (Local Planning Schemes) Regulations 2015* (that include the Deemed provisions). Regulation 7 of the DAP regulations provides for the applicant to elect to have the DA determined by the JDAP.

Regulation 10 of the DAP regulations provides for the application form and sets out an application fee schedule.

Legislation

- Planning and Development Act 2005 – Part 11A Development Assessment Panels and Development Control.
- Planning and Development (Local Planning Schemes) Regulations 2015 (Planning Regulations) - Regulations 64 and 66 outline the advertising procedures and timeframes for public consultation.
- Planning and Development (Development Assessment Panels) Regulations 2011
- Shire of Merredin Local Planning Scheme No.6 – General Farming Zone
  The proposed development is considered as 'Use Not Listed' under the Scheme. Notwithstanding this, it is noted that the Shire's omnibus amendment no. 8 to Scheme seeks to introduce cl. 4.7.7 which relates to the assessment of renewable assessment facilities. The omnibus amendment also introduces the land use 'Renewable Energy Facility' into the Scheme Zoning Table, with a permissibility of 'A' in the General Farming zone.

State Government Policies

- *WAPC Position Statement: Renewable Energy Facilities (2020)*

  The WA Planning Commission has prepared a Position Statement on Renewable energy facilities. (Mar 2020). The policy identifies assessment

measures to facilitate appropriate development of renewable energy facilities. It seeks to ensure these facilities are in areas that minimise potential impact upon the environment, natural landscape and urban areas while maximising energy production returns and operational efficiency.

The current proposal for a solar farm and battery storage facility is not discussed in the position statement, presumably as it is considered as a component of a renewable energy facility.

- *State Planning Policy 2.0 – Environment and Natural Resources (SPP2.0)*

  The objectives of SPP2.0 are to:
  - integrate environment and natural resource management with broader land use planning and decision-making
  - protect, conserve and enhance the natural environment; and
  - promote and assist in the wise and sustainable use and management of natural resources.

  Clause 5.6 Agricultural Land and Rangelands states that:

  > Planning strategies, schemes and decision making should:
  >
  > - Protect and enhance areas of agricultural significance, having regard to State, regional and local issues and characteristics, and to the requirements of *Statement of Planning Policy No.11: Agricultural and Rural Land Use Planning;*
  > - Consider the natural resource capability of rangelands and agricultural lands;
  > - Diversify compatible land use activities in agricultural areas and rangelands based on principles of sustainability and recognizing the capability and capacity of the land to support those uses.

  The proposed development meets these objectives in that the subject site is already cleared and used for broad acre cropping and grazing. This land is not in an area of agricultural significance, given the extent of existing agricultural use, the establishment of the proposed NBBSF is expected to have limited impact on the agricultural significance of the area.

  Clause 5.10 Greenhouse Gas Emission and Energy Efficiency states that:

  > Planning strategies, schemes and decision-making should:
  >
  > - Support the retention of existing vegetation and revegetation in subdivision and development proposals;
  > - Support the use of alternative energy generation, including renewable energy, where appropriate;
  > - Support the adoption of adaption measures that may be required to respond to climate change.

  The proposed development meets the objectives outlined under the Greenhouse Gas Emission and Energy efficiency clause in that the development of the facility does not involve the removal of any remnant

vegetation, is a form of alternative renewable energy generation and is a measure that is responding to climate change.

- *State Planning Policy 2.5 – Rural Planning (SPP2.5)*

  The primary role of SPP2.5 is to protect and preserve rural land, and land uses due to the importance of their economic, natural resource, food production, environmental and landscape values. SPP2.5 sets out there is a need to ensure broad compatibility between land uses to delivering this outcome.

  The Policy promotes rural zones in schemes as flexible zones that cater for a wide range of land uses that may support primary production, regional facilities, environmental protection and cultural pursuits.

  The key objectives of the Policy are to:

  - Support existing, expanded and future primary production;
  - Promote economic growth and regional development on rural land for rural land uses;
  - Avoid and minimise land use conflicts;
  - Protect and sustainably manage environmental, landscape and water resource assets.

  The subject site is not identified as Priority Agricultural Land under the Local Planning Strategy or Local Planning Scheme. The proposed development is considered to support sustainability, economic growth, and regional development through the introduction of a new land use while contributing to the security and supply of energy for the region.

  The Policy further outlines that where a development is proposed for a land use that may generate offsite impacts, the separation distances used in environmental policy and health guidance, prescribed standards, accepted industry standards and/or Codes of Practice, should be followed. This includes consideration of:

  1) whether the site is capable of accommodating the land use; and/or
  2) whether surrounding rural land is suitable, and can be used to meet the separation distances between the nearest sensitive land use and/or zone, and would not limit future rural land uses; and
  3) whether if clauses (i) and/or (ii) are met, a statutory buffer is not required.

  There is no recommended separation distance for renewable energy facility development to separate a source of emissions in *Shire of Merredin Local Planning Scheme No. 6* and *Environmental Protection Guidance Statement No. 3: Separation Distances between Industrial and Sensitive Land Uses*. As previously stated, surrounding land uses include energy infrastructure facilities, energy generation facilities as well agricultural land. The closest sensitive receptor is over 2km away from the site. The applicant has undertaken an Environmental Noise Assessment for the proposal, indicates that with the implementation of appropriate noise management measures, the development can achieve compliance with the *Environmental Protection (Noise) Regulations 1997*.

Overall, the Development Application is considered to be generally consistent with this Policy given it promote sustainable development while diversifying compatible land uses for the benefit of the local economy as well as community enhancement and development.

- *State Planning Policy 3.7 – Bushfire (SPP3.7)*

  The site is predominantly located outside of designated bushfire prone area, with only two relatively small areas representing approximately 2 ha (< 1% of the site) that are located in the southwestern corner and western boundary of the site.

  The subject Development Application does not technically trigger any bushfire assessment under the current *SPP 3.7.* The Development Application does not propose to locate any 'Habitable Buildings' within a Bushfire Prone Area.

  According to *Planning and Development (Local Planning Schemes) Regulations 2015* Clause 67.2 Subclauses q) and r), the local government would take the Bushfire Management Plan as necessary requirement as the proposed development is considered as a high-risk land use.

Structure Plans/Activity Centre Plans

There are no Structure Plans or Activity Centre Plans associated, or affected by, this proposal.

Local Policies

- *Shire of Merredin Policy Manual Policy 8.27 - Community Enhancement Fund Policy*

  The Purpose of the Policy 8.27 is to ensure that large-scale renewable energy developments and carbon sequestration developments deliver lasting positive outcomes for the local community.

  For renewable energy projects, as a minimum, the contribution shall be no less than the benchmark rates recommended in the New South Wales Government's 2023 Benefit Sharing Guideline for renewable energy projects, which are: $1,050 per MW per annum for wind energy, $850 per MW per annum for solar energy, and $150 per MWh per annum for standalone battery projects, indexed annually to the Consumer Price Index (CPI).

  The Applicant is to comply with the provisions of Council Policy 8.27 Community Enhancement Fund Policy.

  It is noted that the applicant is applying for Capacity Investment Scheme funding, which incorporates funding for community benefit which aligns with the Council Policy, and will be provided if the grant application is successful. If the applicant is unsuccessful in applying for Capacity Investment Scheme funding, the provisions of Council Policy 8.27 will apply.

Consultation:

Public Consultation

A notice was published in the West Australian newspaper and local newspaper Phoenix on 27 February 2026 inviting submissions to the NBBSF proposal before 27 March 2026.

There were three (3) submissions received from the community.

Schedule below contains details of the submissions.

Issue Raised	**Officer comments**
Loss of agriculture land	The submissions noted that the concern of loss of productive agriculture land and the subsequence influence on local employment and food supply. The loss will also change the rural character.
E-waste management	Submissions raised concerns regarding the management of e-waste associated with the solar panels and batteries. It is important to ensure that e-waste is appropriately managed at the end of the operational lifespan of the solar panels and batteries.
Benefit to state and local community	It is suggested these matters can be addressed through compliance with *Shire of Merredin Policy Manual Policy 8.27 - Community Enhancement Fund Policy.* There is a need of transparency and meaningful engagement with the local community to ensure the long-term benefits from the NBBSF.
Impact to local flora and fauna	It can be addressed through development conditions.
Aboriginal Cultural Heritage Significance	The project land does not contain any Aboriginal Sites which aligns with the detailed heritage reports of adjoining land.
Bushfire Risk	It is suggested it can be addressed through development conditions. There is a need to prepare and implement a Bushfire Management Plan.
Long term rehabilitation	The recommendation contains a condition requiring the applicant to submit a Decommissioning Plan.
Visual Impact	It can be addressed through development conditions.

Referrals/consultation with Government/Service Agencies

In addition to the public invitation, several agencies were specifically contacted regarding the proposed development.

Two responses were received including, CASA (Civil Aviation Safety Authority) and DWER (Department of Water and Environmental Regulation).

CASA (Civil Aviation Safety Authority) and DBCA (Department of Biodiversity, Conservation and Attractions) indicated that they had no issues with the proposed development.

DFES (Department of Fire and Emergency Services) indicated that BMP has not demonstrated that the proposed development complies with the requirements of SPP 3.7 and the Guidelines, and some modification will be required. A summary of the main issues raised by DFES are provided below.

Issue Raised	**Officer comments**
BMP is inconsistent with all other plans and information submitted as part of the proposal	BMP would need to be revised based on the following comments and recommendations.
Compliance from Hazard Management Agency (HMA) perspective	BMP should be modified to ensure the bushfire risk management/mitigation measures are effective.
BAL Rating validation	The BMP should be modified to validate correct BAL rating.
Proposal against the CFA Design Guidelines and Model Requirements – Renewable Energy Facilities (REF Guidelines)	• A Risk Management Plan is required to be prepared. • the DFES District Officer and local fire and emergency services should be consulted for the development
Emergency Management Plan (EMP)	An EMP should be prepared and meet the satisfaction of the local government.
Inconsistency of with the following requirements of SPP 3.7 and the Guidelines: • Element 2: Siting and Design; and • Element 4: Water Supply.	• Compliance with Water Supply for firefighting not demonstrated. Modification to the BMP is required to address the Assessment advice. • BMP should be modified to validate correct BAL rating.

DPIRD (Department of Primary Industries and Regional Development) demonstrates that DPIRD does not object to the proposal and offers the following comments:

- Biosecurity
    - An operational Biosecurity Management Plan (BMP) should be prepared.
    - The detailed *Flora and Vegetation Survey* has not consulted DPIRD's Local Biosecurity team, and some species those growing in summer may be missed.
    - Laydown area should be in a clean condition when any machinery or equipment arriving at or leaving the BRM construction site.
- Erosion risk
    - pastures should be managed to ensure a minimum of 50% ground cover, with a target of 70% ground cover.
- Decommissioning Plan
    - The preparation of decommissioning plan for rehabilitation.
- Consultation and community benefits
    - Limited information on consultation and community engagement.

- No indication that the Traditional Owners will receive any benefits from the project.
- Lack of proposed tangible community benefits for local community or Aboriginal people representing the area.

DPIRD encourages the applicant to:

- Follow the *Community Benefit Guideline Community Benefits Guideline: Realising the Opportunities of the Energy Transition* and work with the Shire of Merredin to develop a local benefits package, while being flexible and open to suggestions for improved local benefits.
- Carefully analyse how its accommodation needs will be met given concerns about the availability of local housing and worker accommodation.
- Contact DPIRD's Local Adviser Network (local.content@dpird.wa.gov.au) to find out how they might best engage local regional businesses to supply the project.
- Prepare a Decommissioning Plan and a Biosecurity Management Plan.
- Minimise the risk of wind erosion by maintaining pasture cover.

Although the owners, operators, Department of Water and Environmental Regulation (DWER), Western Power (WP), Department of Biosecurity, Conservation and Attractions (DBCA), Water Corporation (WC) and the Environmental Protection Authority (EPA) were also notified, they have not responded.

Design Review Panel Advice

Not applicable

Swan Valley Planning

Not applicable

Other Advice

Nil

Planning Assessment:

The proposed Ngaangk Boodja Battery & Solar Farm (NBBSF) will be an important step in the expansion of renewable energy infrastructure in Merredin, contributing to the stabilisation and strengthening of the electricity grid. The WA Planning Commission's Position statement on renewable energy facilities generally deals with complete facilities from the energy generation to the feeding into the grid system.

The proximity to Western Power's Merredin Terminal substation was a key consideration when the site was selected and will result in relatively minor works being required to connect the proposed facility to the South West Interconnector System (SWIS).

The land is surrounded predominantly by other agricultural properties to the north, south and west, Western Power's Merredin Terminal to the northeast and Merredin Solar Farm to the east. The subject site is in close to other energy infrastructure assets being the Merredin Energy dual-fuel peaking plant and Merredin Solar Farm (the largest operating solar farm in Western Australia).

The potential impacts include;

- Visual
- Noise
- Fire risk
- Loss of agriculture land or vegetation

Visual

Provision	Requirement	Proposal	Assessment
Clause 67(m), (n), (p) and (y) of Deemed Provisions	Consider bulk, scale, and impact on current landscape.	a combination of photovoltaic (PV) panels and a Battery Energy Storage System (BESS).	Low to moderate visual impacts for this locality.

The closest sensitive receptor is over 2km away from the site. To the north and east of the subject site sits the energy infrastructure assets mentioned previously, to the south east corner of the subject site at Lot 29241 is a lot reserved for Parks and Recreation under the Shire of Merredin Local Planning Scheme No.6, known as Totadgin Rock National Park. The applicant considers that, given the nature of the facility, the proposed visual impacts are expected to be low to moderate and generally acceptable, as the site is located in a region already characterised by extensive cropping and existing renewable energy infrastructure.

A **Visual Impact Assessment** has been prepared as part of the DA.

The assessment concludes that the proposed NBBSF project will be moderately visible from most viewing points, all of which are located on public land such as road and rail reserves. In addition, in Merredin, the existing panels and renewable energy facilities have been shaping the landscape character for the locality centred on renewable energy generation, storage and transmission. Thus, It is reasonable to conclude that this site and its surrounds have a lower level of visual sensitivity than if it had been on a major highway, or close to the entry of a town, or situated on a picturesque or scenic landscape area.

Therefore, the views of proposed NBBSF most likely to generate low to moderate levels of visual impact and will be viewed as a further changing part of the rural scene, with the existing renewable energy facilities. The assessment the merit of managing the surroundings of the NBBSF and/or its design, and suggests the potential to explore the following mitigations:

- Minimise the visual cues of the facilities;
- Increase planting screening on Bruce Rock – Merredin Road northern verges and Robartson Road at some bare sections of the western road verge;
- Minimise the emission of light and noise for out of hours maintenance work.

Fire Risk

The DA is accompanied by a comprehensive Bushfire Management Plan (BMP) prepared by Bushfire Prone Planning. Although only relatively small areas of Lot 27381 are designated as bushfire prone area, the BMP is deemed necessary as the proposed use class is considered a high-risk land use.

The BMP deals with risk issues that are better assessed by agencies specialising in these areas rather than from a planning perspective. During the advertising, the DA will be forwarded to DFES, amongst others, for comment.

The BMP looks at:

- Assessment of potential bushfire impact
- Environmental considerations
- Assessment against the Bushfire Protection Criteria
- Protection measure implementation

Loss of agricultural land or vegetation

The land is currently cleared and cropped, and no vegetation will need to be cleared. The proposed development will take approximately 230ha of agriculture land; however, when considered in the context of the total area used for agricultural purposes, particularly cropping and grazing within the Shire of Merredin, the extent of land required is not considered significant.

Other potential impacts

These include noise, dust, odour and waste. Some of these risks may occur during construction, however these will be managed through an accepted construction management plan. On completion of the construction, it is anticipated that these impacts will be negligible.

Conclusion:

In summary, the key considerations of the proposed development of the NBBSF (Ngaangk Boodja Battery & Solar Farm) include;

- The State and local government's support for renewable energy projects,
- the proposal's visual impact on rural landscape,
- the influence on the local community,
- the risk of the development,
- the impact on the local vegetation, drainage and road system, and
- the loss of agricultural land.

The local government has exercised its discretion by using the 'uses not listed' provisions of clause 3.4.2 (b) of the Scheme and subsequently advertising the proposed development.

This support for the BESS development is reinforced through the Council's backing to an Omnibus Amendment to the Scheme that seeks to list the use class and permit further renewable energy projects in the Scheme area.

The following conditions of approval will assist in mitigating potential impacts on the environment and the local community and ensure that the community benefits are appropriately delivered.

The Chief Executive Officer
Shire of Merredin
PO Box 42
MERREDIN WA 6415

Attention: Xinyi Zhao, Development Services Officer

Dear Madam

Land Insights acts on behalf of BRM Solar Farm Nominee Pty Ltd, the proponent for the Ngaangk Boodja Battery and Solar Farm project on Robartson Road, Nangeenan.

We wish to submit the attached Development Application for consideration by the Regional Development Assessment Panel (RDAP). Attached is our Development Application Report, comprising an overview of the project and a justification against the various strategic and statutory planning and environmental considerations. Also included in our application are the following supporting reports:

- Bushfire Management Plan
- Traffic Impact Statement
- Glint and Glare Assessment
- Noise Assessment
- Visual Impact Assessment
- Flora and Vegetation Assessment
- Desktop Aboriginal Heritage Assessment

Due to the size of the application file, we will provide a file sharing link to the Shire. **It would be appreciated by the Proponent if this application can be acknowledged by the Shire as received for processing in 2025**.

The Proponent is happy to accept an invoice for payment of the Shire and RDAP fee. We request the invoice is made out to **BRM Solar Farm Nominee Pty Ltd as Trustee for the BRM Solar Farm Trust**.

The required applications forms and Certificate of Title is found at Appendix A and Appendix B of the application respectively.

Should you have any questions or require clarification of anything contained in our application, please do not hesitate to contact Roy Winslow on 0488 190 873 or at roy@landinsights.com.au.

Yours faithfully



Roy Winslow
Principal Planner

23 December 2025

DEVELOPMENT APPLICATION

RENEWABLE ENERGY FACILITY

NGAANGK BOODJA BATTERY & SOLAR FARM

PREPARED FOR
BRM Solar Farm Nominee Pty Ltd

December 2025

landinsights
PLANNING DESIGN ENVIRONMENT

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Document Name: 1319-Ngaangk Boodja Battery & Solar Farm-DA Report

Document History:

Date	Document Revision	Document Manager	Summary of Document Revision	Client Delivered
Nov 25	Rev 0	RW	Incomplete Draft for Client Review	Dec-25
Dec-25	Rev 1	RW	Final Draft (exc. BMP and TIS)	Dec-25
Dec-25	Rev 2	RW	Final for Lodgement	Dec-25

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1 Introduction

1.1 Background and Context

Land Insights acts for BRM Solar Farm Nominee Pty Ltd (the Proponent), which is seeking development approval to establish a **renewable energy facility** at Lots 19448 and 27381 Robartson Road, Nangeenan, in the Shire of Merredin (the Site). The project is known as the Ngaangk Boodja Battery & Solar Farm (NBBSF).

The name "Ngaangk Boodja" translates to 'Sun Country' and was selected in consultation with Traditional Owner representatives from the Ballardong Aboriginal Corporation, holders of the Indigenous Land Use Agreement which covers project site and the local Njaki Njaki group of Merredin.

The proposed NBBSF will consist of a number of elements, including:

- Renewable generation and storage assets: Solar PV array and integrated Battery Energy Storage System (BESS);
- Electrical and grid-connection infrastructure: High and medium voltage electrical systems, including a substation with switchgear, protection and control equipment, relay and control buildings, a step-up transformer, and associated Switchgear.
- Site infrastructure and operational facilities: An Operations and Maintenance (O&M) building, construction and operational laydown areas, internal access roads and maintenance tracks, employee and contractor parking, and dedicated firefighting and emergency-response equipment.
- Security, monitoring and communications: Perimeter fencing and controlled access gates, CCTV monitoring systems, and a communications tower with associated equipment.

The site is strategically located adjacent to Western Power's Merredin Terminal which forms part of the South West Interconnected System (SWIS), and existing energy infrastructure projects, namely: Merredin Energy's Peaking Plant (82MW), Merredin Solar Farm (100MW) and the Merredin BESS (100MW/400MWh) which is currently under construction.

The property is a multigenerational rural property currently used for cropping and sheep grazing purposes. It is located approximately 7.5km southwest of Merredin and is accessed from Robartson Road and Bruce Rock – Merredin Road. The two lots comprising the site total approximately 230ha and are bounded by the two aforementioned roads and the closed Merredin–Bruce Rock Railway.

This renewable energy facility application has been made as a "use not listed" proposal under clause 3.4.2 of Shire of Merredin Local Planning Scheme No.06 (the Scheme). In determining the proposed use to be applied for, the Proponent has referenced the definition of "renewable energy facility" included in the March 2020 ***WAPC Position Statement: Renewable Energy Facilities***.

Given the size and nature of the proposal, the Proponent has elected to seek consideration of the application by the Regional Development Assessment Panel (RDAP).

1.2 Land Description

Site Context

The proposed Ngaangk Boodja Battery & Solar Farm is approximately 260km east of Perth and 7.5km southwest of Merredin. The site is bounded by Robartson Road to the east, Bruce Rock-Merredin Road on the south and the closed Merredin-Bruce Rock Railway on the north.

It is surrounded by other agricultural properties to the north, south and west. To the east exists the afore mentioned diesel peaking plant, solar farm, BESS facility (currently under construction) and the Western Power Merredin Terminal.

Site location and site context plans can be found at **Figures 1 and 2** respectively. Site details are found in **Figure 3**.

Site Details

Table 1.1 shows details for the two lots that form the development site:

Table 1.1 – Land details

Lot	Plan	Area	Certificate of Title	Registered Proprietor
19448	229756	67.7940ha	1400/393	Ross Milton Robartson
27381	150842	161.8779ha	1400/393	Ross Milton Robartson

We confirm that both lots are included on the same Certificate of Title (i.e. the Title is a multi-lot title).

The only encumbrance on the Title is the location of an easement protecting the electricity transmission line that traverses the site. This transmission line has been accommodated in the design of the facility, with all development outside of the easement.

The combined area of the two lots is approximately 230ha.

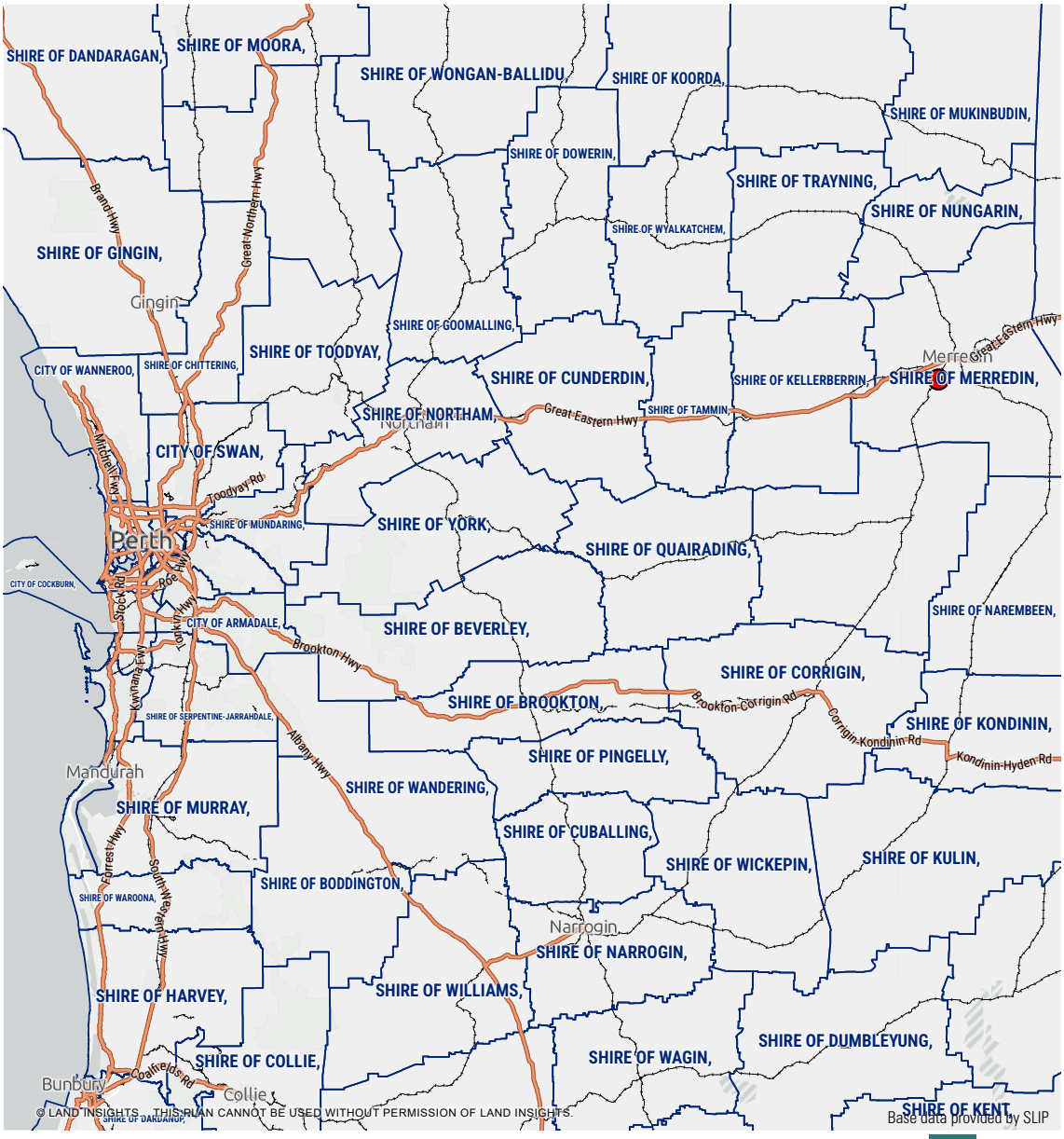
1.3 Proponent Details

The two lots that form the development site are owned by Mr Ross Robartson. The Proponent for the NBBSF development is BRM Solar Farm Nominee Pty Ltd, a joint venture between Nomad Energy Pty Ltd and Atmos Renewables Pty Ltd.

Nomad Energy is an Australian company that has developed more than 500MW of renewable energy projects globally. Atmos Renewables is one of the top five largest owner / operators of utility-scale renewable energy facilities in Australia. It currently holds generation assets with a gross capacity in excess of 1.9GW.

The two companies together have developed Western Australia's Merredin BESS which is currently under construction and is located on the neighbouring site to the east of Robartson Road. A core feature of the Nomad – Atmos partnership is to plan, build, own and operate the assets the two

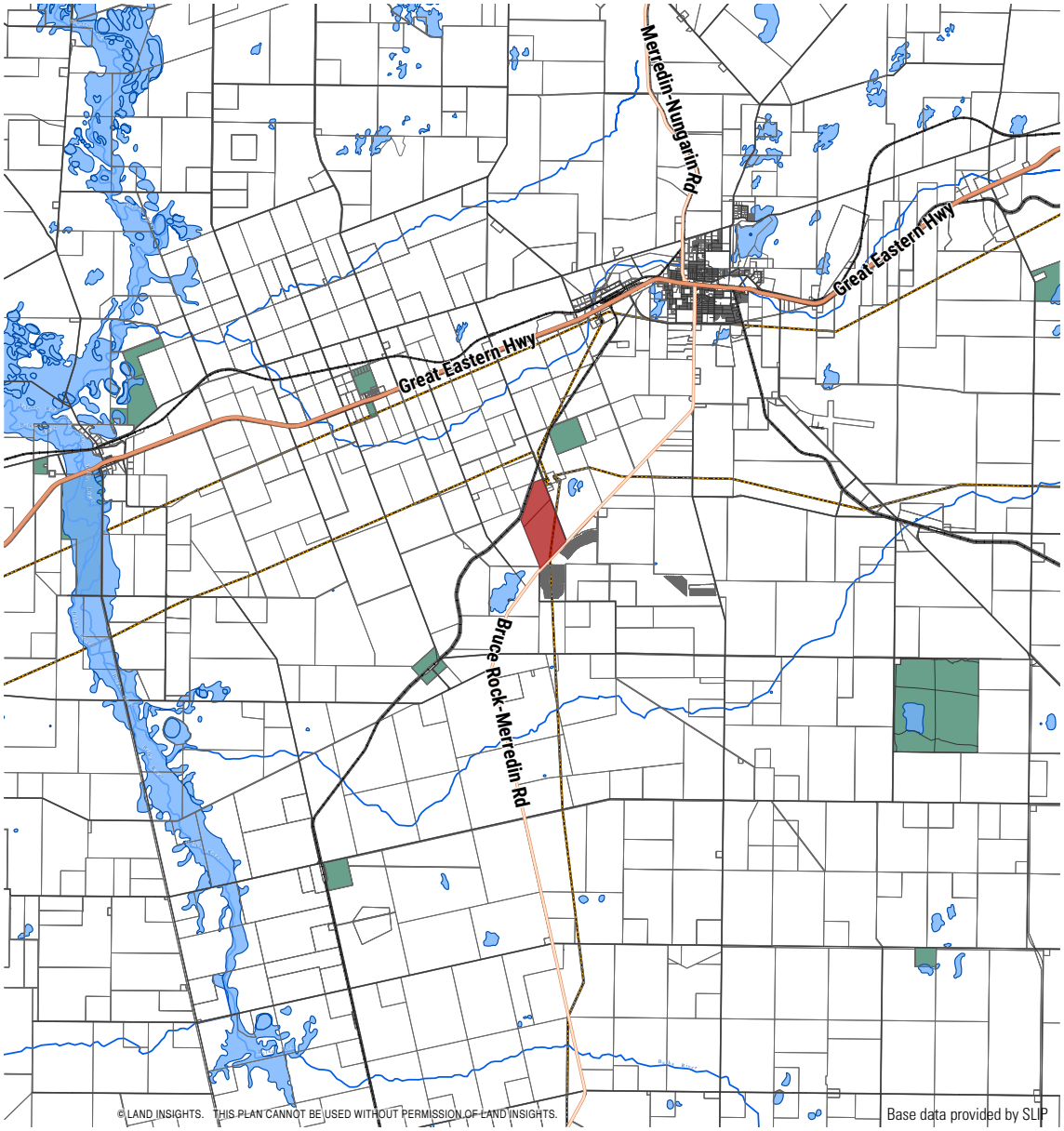
companies develop. This strategy demonstrates a long-term commitment to each asset, the local community in which it is situated and the electricity market the project will support.



Ngaangk Boodja Battery and Solar Farm

Project: 1319; Layout Name: BRM 1319-001-01-01 Fig 1 Site Location

FIGURE 1: LOCATION OF SITE



Ngaangk Boodja Battery and Solar Farm

Project: 1319; Layout Name: BRM 1319-001-02-01 Fig 2 Site Context

FIGURE 2: SITE CONTEXT



Ngaangk Boodja Battery and Solar Farm

Project: 1319; Layout Name: BRM 1319-001-03-01 Fig 3 Site Details

FIGURE 3: SITE DETAILS

1.4 Site Context

Current Use

The site is located on cleared and disturbed land which is currently used as a rural farming property, predominantly cleared for cropping and sheep grazing. Access is from farm gates on Robartson Road and Bruce Rock-Merredin Road.

Surrounding Land

In addition to farmland, surrounding land uses include the Western Power Merredin Terminal, Merredin Energy Peaking Plant, Merredin Solar Farm and the under construction Merredin BESS facility. The closest houses are approximately 1.4km and 1.75km to the east and 1.8km to the south of the site. To the southwest is a lot reserved for Parks and Recreation by the Shire of Merredin Local Planning Scheme No. 06. Surrounding houses are shown in **Figure 4**.

Topography and Elevation

The site is generally flat-undulating and moderately elevated as depicted in **Figure 5**.

Remnant Vegetation

Figure 6 shows the remnant vegetation in the locality of the site.

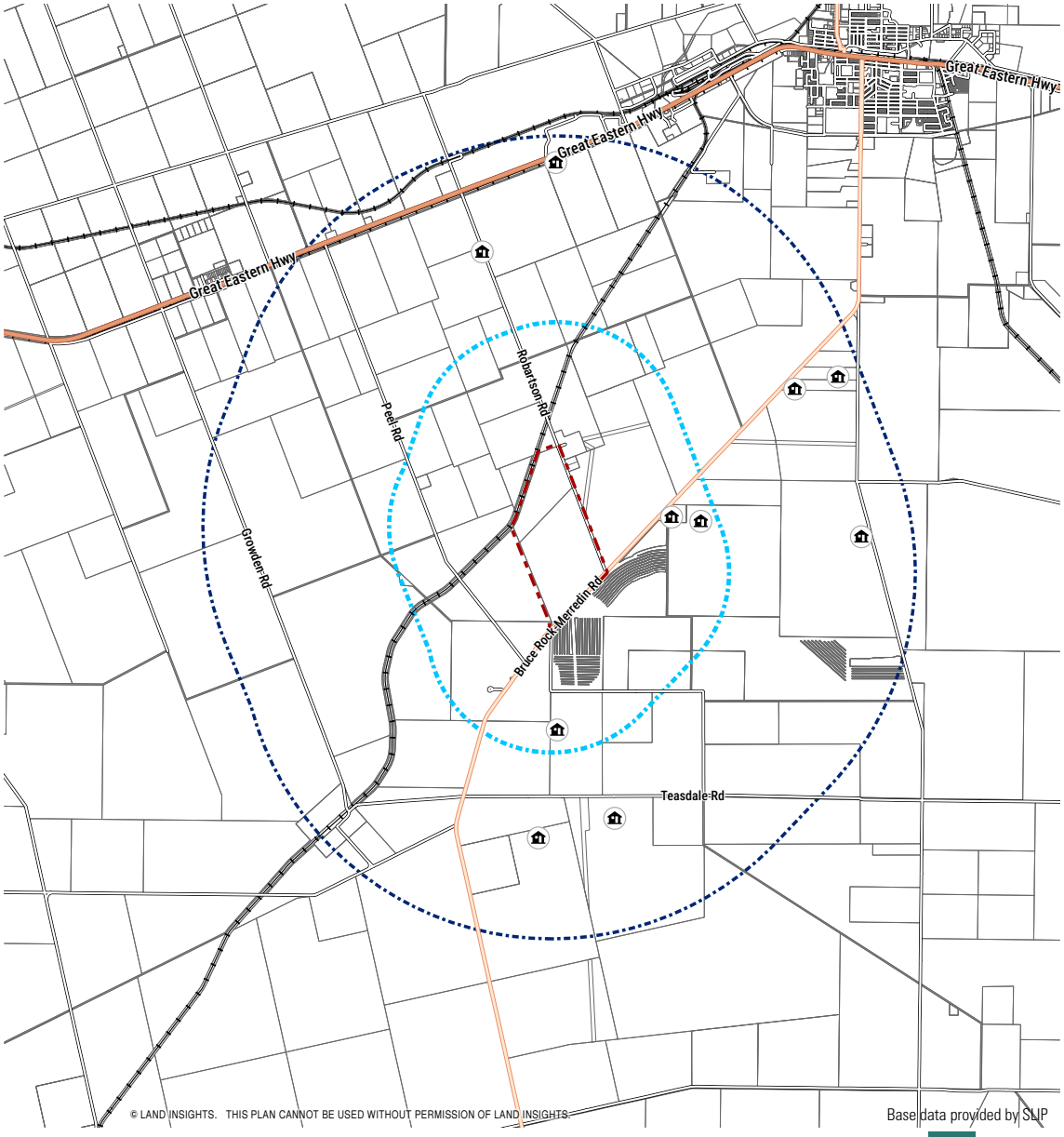
1.5 This Application

The Proponent has engaged Land Insights to prepare this Development Application in accordance with the requirements of the Shire of Merredin and Regional Development Assessment Panel. In preparing this application, the following supporting documents and information have been prepared and appended:

Table 1.2 - List of appendices

Appendix	Documentation	Author
A	Development Application Forms	Land Insights
B	Certificate of Title	Landgate
C	Development Plans	BRM Solar Farm Nominee Pty Ltd
D	Bushfire Management Plan	Bushfire Prone Planning
E	Traffic Impact Statement	Shawmac
F	Glint and Glare Assessment	SLR Consulting
G	Noise Assessment	Lloyd George Acoustics
H	Visual Impact Assessment	Land Insights

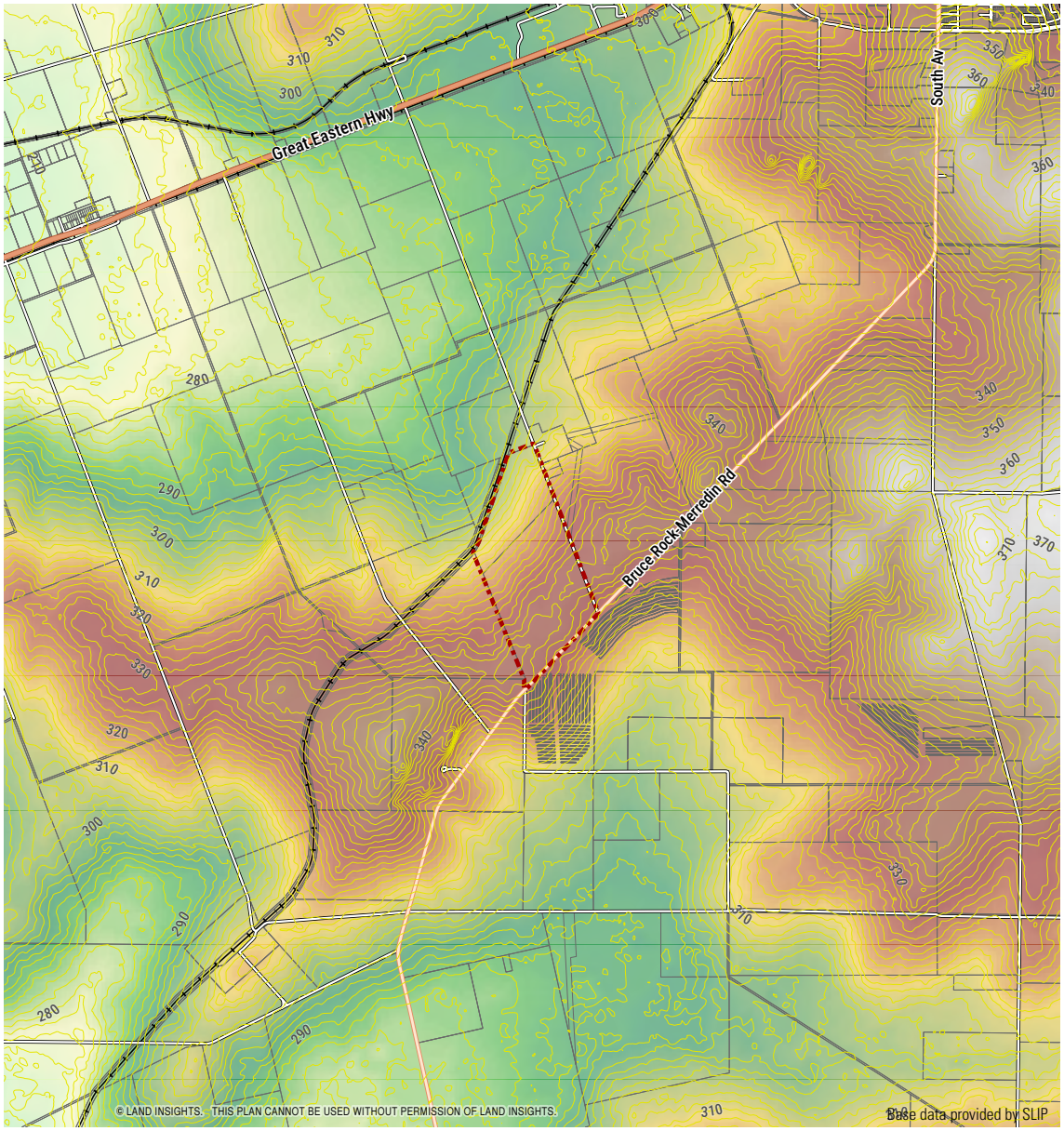
Appendix	Documentation	Author
I	Flora and Fauna Assessment	Del Botanics Environmental Consulting
J	Aboriginal Heritage Desktop Assessment	BRM Solar Farm Nominee Pty Ltd

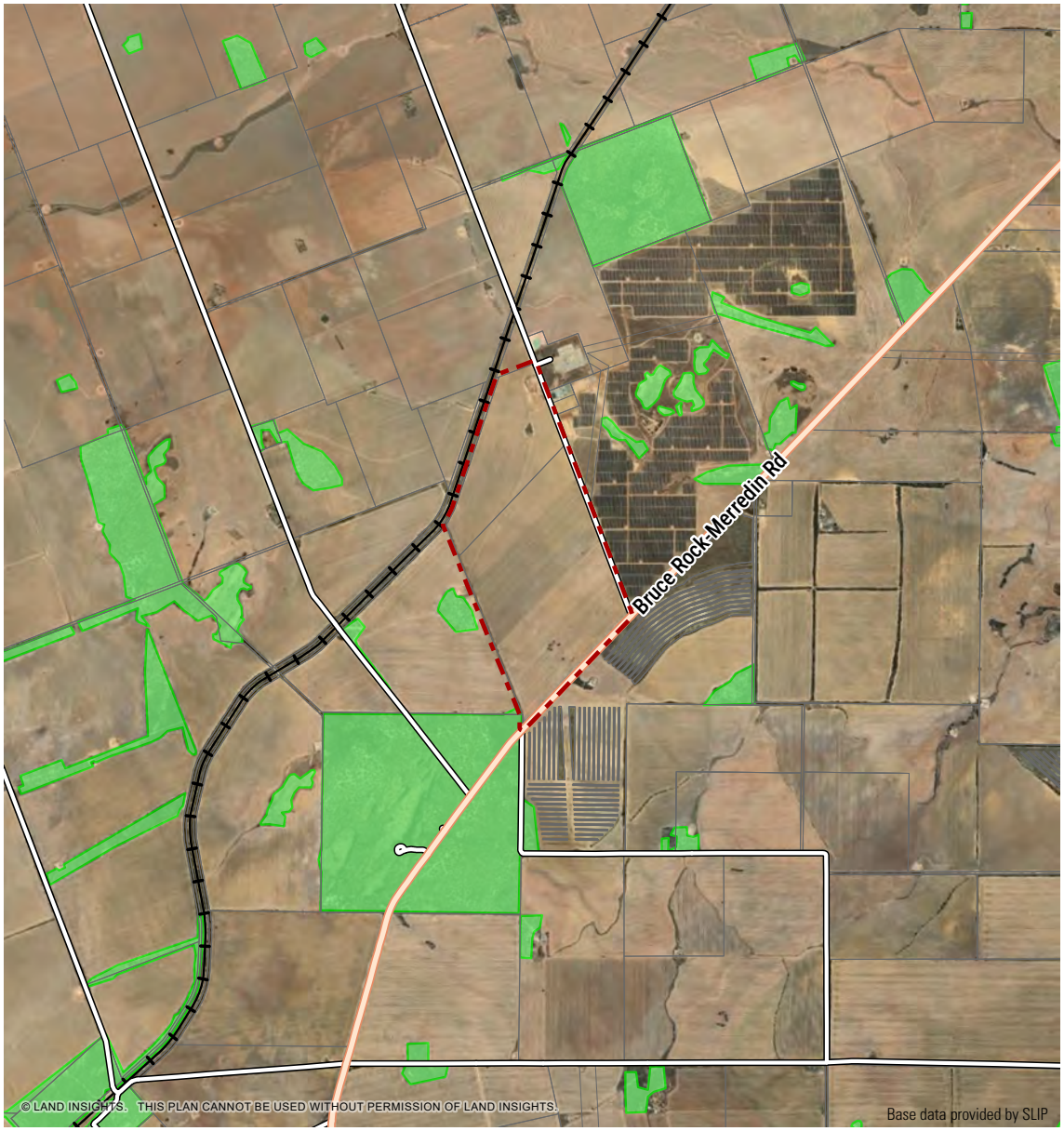


Ngaangk Boodja Battery and Solar Farm

FIGURE 4: SURROUNDING HOUSES

Project: 1319; Layout Name: BRM 1319-007-01-01 Fig 4 Surrounding Houses


Great Eastern Hwy
South Av
Bruce Rock-Merredin Rd
© LAND INSIGHTS. THIS PLAN CANNOT BE USED WITHOUT PERMISSION OF LAND INSIGHTS.
Base data provided by SLIP
Site Boundary
Cadastre
Highway
Main Road
Local Road
Rail Line
Elevation (m)
Value
386
258
N
0 0.5 1 1.5 2
km
Ngaangk Boodja Battery and Solar Farm
FIGURE 5: TOPOGRAPHY AND ELEVATION
Project: 1319; Layout Name: BRM 1319-004-01-01 Fig 5 Topography and Elevation



Ngaangk Boodja Battery and Solar Farm

FIGURE 6: REMNANT VEGETATION

Project: 1319; Layout Name: BRM 1319-006-01-01 Fig 6 Remnant Veg and TEC

2 The Proposal

2.1 Overview

The proposed Solar PV and BESS facility will have a generation capacity of approximately 100MW (AC), it is located adjacent to the existing Merredin Terminal Substation, which facilitates a least impact connection to the South West Interconnected System (SWIS). The proposed facility will take approximately 18 – 24 months to construct, with a peak construction workforce of approximately 200 people. The connection of the proposed onsite substation to the adjoining Merredin Terminal is a separate matter to this application and is currently being negotiated by the proponent and Western Power.

2.2 Components

The proposed Solar PV and Battery facility will have a generation capacity of approximately 100 MW (AC), delivered through a combination of photovoltaic (PV) panels and a Battery Energy Storage System (BESS). The site will comprise the following key components:

- 240,000-260,000 Photovoltaic Modules (solar panels)
- 120-130 Battery Modules (BESS)
- 30-35 Power Conversion Stations (Inverters)
- Switch Room/Control Room
- Western Power Relay Room
- Operations and Maintenance buildings, Workshop and Storage buildings with an enclosed area & undercover apron
- Construction facilities and laydown area
- Unsealed internal access roads
- Fire Water Tanks
- Communications Tower

Appendix C provides preliminary general arrangement for the site.

Unlike most traditional Battery facilities, the battery, as shown on the plan, will be located throughout the solar array rather than in one single location. This layout reflects a DC-coupled system, where batteries charge directly from the solar array. Locating units within the PV field reduces conversion losses, improves efficiency and allows the system to capture solar generation that would otherwise be curtailed.

2.3 Site Suitability

The Proponents contend that NBBSF site is highly suitable for the following reasons:

- The site is adjacent to the Western Power Merredin Terminal 132kV and 220kV terminal substation. The 220kV transmission line feeds the Goldfields to the east and connects back to Muja in the west, the 132kV network runs north to Merredin town and West back to Northam.
- The site is well-located to assist in the redistribution of energy generation throughout the SWIS and potentially reduce planned augmentation works on transmission infrastructure in the future.

- The close proximity of Merredin Terminal means that the length of cable route to connect the proposed facility to the SWIS is negligible, resulting in minimal impact from new transmission infrastructure.
- The site is predominantly cleared and has been used for cropping and grazing for over 100 years. Remnant vegetation on the site will be protected. Consequently, there is no significant environmental impact caused by the proposed development.
- The proposal expands on what has become a localised energy hub within the shire of Merredin. Use of this locality for renewable energy generation has now been established and is an accepted element of the landscape and community.
- The site is sufficiently large to contain all construction activities without the need to impact public roads or public places on a prolonged basis. Access will be directly from Great Eastern Highway to Robartson Road,
- No clearing is required within the site and given the relatively flat nature of the site, minimal cut and fill earthworks will be required to effectively prepare the site for the proposed infrastructure.

2.4 Pre-Lodgement Liaison & Consultation

The proponent has been in ongoing discussions with Western Power regarding the project parameters and the proposed connection to the adjoining Merredin Terminal.

Community consultation has also been undertaken with the proponent briefing the Traditional Owner groups (Ballardong Aboriginal Corporation and the Njaki Njaki group) as well as the Shire of Merredin.

Further a drop-in Community Information session was held in Merredin on the 2 December 2025 and there were no concerns raised by any of the attendees.

2.5 Construction

The construction phase will take approximately 18- 24 months and the peak workforce on site at any one time is anticipated to be 200 workers. Construction will commence with site preparation works (levelling, grubbing as required), construction compound set-up and upgrading the access to Robartson Road. A materials and equipment laydown area and construction worker parking area will be established adjacent to the site entrance. Temporary site offices, ablutions and supporting facilities will be placed on site to provide basic amenities for the construction phase.

Given the size of the site (over 200ha), there is sufficient room for vehicle manoeuvring and parking, as well as the location of temporary buildings and laydown areas. The preparation of a Construction Management Plan is anticipated as a condition of development approval. This plan will outline in detail all construction impacts and identify resolutions. This will be prepared in consultation with the Shire of Merredin.

The principal construction contractor will be responsible for the project Construction Management Plan and for all site access and health and safety inductions.

Temporary developments will be required during the construction phase of the project. These may include:

- Main office and meeting room
- Ablution block

- Crib room
- Water tanks (both for use onsite and bushfire)
- Car Park
- Construction laydown area

During the construction phase it is expected that both a local and specialist/technical workforce will be utilised. The specialist/technical workforce will be sourced from outside of the Shire. However, local workers will be used where possible. The construction workforce will be accommodated within the Merredin townsite and, if required, neighbouring towns. No construction camp is proposed or anticipated.

2.6 Operation

As with the adjoining operating solar farm, the facility will be largely autonomous and unmanned once operational, with locally based contractors/employees responsible for the ongoing management and maintenance of the site. Remote monitoring of the facility will take place to ensure that the facility is operating in accordance with Western Power technical rules and in accordance with AEMO guidelines.

Once operational, only occasional maintenance personnel visits to the site will be required.

2.7 Access

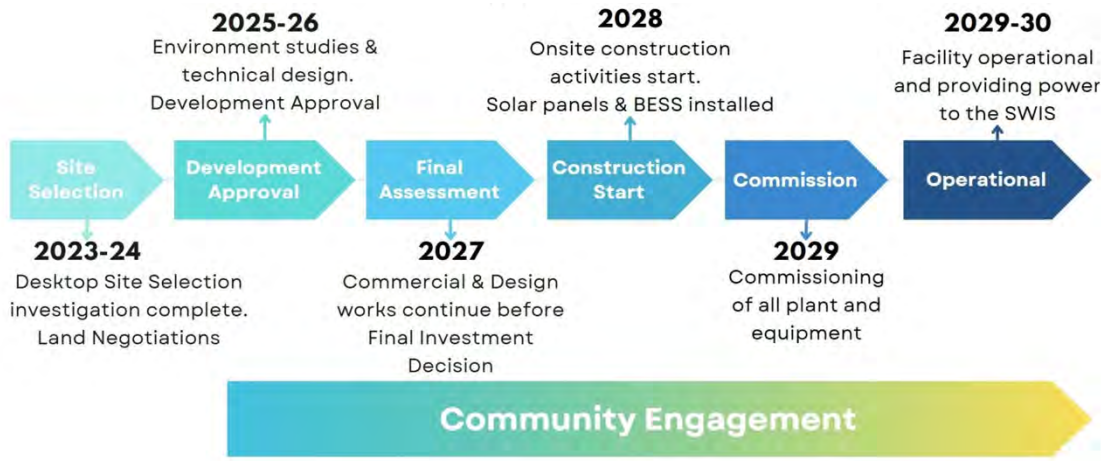
Access to the subject site will be via Robartson Road, with any crossovers and bellmouth widening built to both Shire and other required standards. The subject site will be fully fenced for security reasons with only those who need to be on site for operations or maintenance permitted access once the facility is operational.

2.8 Staffing

It is estimated that up to 250 people will be employed across the construction phase, with a peak manpower requirement of approximately 200 during PV module installation which is anticipated to take 4 – 6 months. Once the project is complete, operation will be largely autonomous and the site will be unmanned. Operation and maintenance personnel will visit the site a few times a year or as required if an unplanned maintenance activity is required. There will be permanent parking bays constructed to facilitate O&M workers, visitors and Western Power during the operation & maintenance phase of the project.

2.9 Development Timeline

The development timeline for NBBSF is illustrated in the diagram below, outlining the key stages from early site selection through to construction, commissioning and operation. The project progresses through technical studies, commercial assessment and statutory approvals before moving into on-site works in 2028, followed by commissioning in 2029 and full operation by 2029–30. Community engagement will occur throughout all phases to ensure transparency and ongoing communication with local stakeholders.



2.10 Community and Economic Benefits

The project is a major investment in the State and local economy, as well as a step towards a lower carbon future. It will benefit both local and wider communities.

The facility will use local, regional or Western Australian labour and materials as much as possible. However, certain electrical equipment will be manufactured overseas with local technical specialists utilised for installation and commissioning.

The project will create economic and employment opportunities for Merredin residents, including accommodation/housing and local goods and services during the construction period. The proponent will invite local companies to bid for jobs such as electrical, security, groundwork, and mechanical work, creating opportunities for local companies during the construction phase. The facility will also create local jobs for maintenance and monitoring during the operational phase.

3 Strategic Considerations

3.1 State Planning Strategy 2050

The NBBSF directly supports the State Planning Strategy 2050 by:

- Delivering Clean Energy: The project provides large-scale renewable energy and battery storage, helping Western Australia transition away from fossil fuels and reduce greenhouse gas emissions.
- Boosting Regional Economy: Located in Merredin, the proposal creates jobs and stimulates local businesses during both construction and operation, supporting economic diversification in the Wheatbelt.
- Enhancing Infrastructure: By co-locating with existing grid assets, the facility strengthens the South West Interconnected System (SWIS) and improves energy reliability for regional communities.
- Minimising Environmental Impact: The development uses cleared agricultural land, preserves remnant vegetation, and includes robust environmental management, aligning with the Strategy's sustainability goals.
- Supporting Community Wellbeing: Early and ongoing engagement ensures local benefits and community support, consistent with the Strategy's emphasis on inclusive planning.

The proposal advances the Strategy's vision for a sustainable, diversified, and resilient Western Australia—delivering tangible benefits in clean energy, jobs, infrastructure, and environmental stewardship.

3.2 Strategy Update: Western Australia's Future Battery and Critical Minerals Industries November 2020 – November 2022

The NBBSF proposal demonstrates direct alignment with the strategic priorities and guidance set out in the Western Australian Government's Future Battery and Critical Minerals Industries Strategy Update (2020–2022).

The Strategy Update sets out a vision for Western Australia to be a global leader in sustainable, value-adding battery and critical minerals industries, with a strong focus on regional economic benefits, job creation, and workforce capability. This proposal responds to this vision by proposing a large-scale, integrated solar farm and battery energy storage system (BESS) adjacent to the Merredin Terminal, supporting the South West Interconnected System (SWIS) and the Wheatbelt region.

The Strategy's Priority 4 calls for:

- Increased uptake and integration of battery energy storage across settings and industries.
- Support for workforce capability in the assembly, installation, and management of batteries.
- Deployment in rural and remote communities to create new jobs, skills, and technological capacity.

The proposal delivers a utility-scale integrated with a solar array, directly increasing battery storage capacity on the SWIS. The project is sited in a regional hub (Merredin), leveraging proximity to existing grid infrastructure and minimising environmental impact by utilising cleared agricultural

land. The proposal commits to supporting local procurement, workforce development and community engagement.

The Strategy emphasises efficient approvals and project facilitation for strategic energy projects. The proposal seeks determination via the Regional Development Assessment Panel (RDAP) and is framed as a "renewable energy facility", with comprehensive technical assessments provided to support streamlined decision-making.

The Strategy encourages WA's participation in global supply chains and the development of downstream processing and manufacturing. While this proposal focuses on generation and storage, it provides the stable, low-emissions energy infrastructure necessary to support future value-adding activities in the region.

The project minimises environmental impact by avoiding clearing of remnant vegetation and co-locating with existing infrastructure. Community benefits include local economic stimulation, job creation, and enhanced energy resilience for the Wheatbelt.

The proposal is guided by, and gives practical effect to, the Strategy Update. The proposal advances Priority 4 objectives by integrating large-scale battery storage, supporting local workforce capability, and delivering regional benefits—while aligning with State and local planning frameworks for renewable energy development.

4 Planning Framework

4.1 WAPC Position Statement: Renewable Energy Facilities

This document recommends assessment measures to facilitate appropriate development of renewable energy facilities. The objectives of the position statement are to:

- Outline key planning and environmental considerations for the location, siting and design of renewable energy facilities.
- Promote the consistent consideration and assessment of renewable energy facilities.
- Facilitate appropriate development of renewable energy facilities while minimising any potential impact upon the environment, natural landscape, and urban areas.
- Encourage informed public engagement early in the renewable energy facility planning process.

A definition of "renewable energy facility" is provided at clause 6 of the position statement and reads as follows:

> *Renewable energy facility means premises used to generate energy from a renewable energy source and includes any building or other structure used in, or relating to, the generation of energy by a renewable resource. It does not include renewable energy electricity generation where the energy produced principally supplies a domestic and/or business premises and any on selling to the grid is secondary.*

Clause 5.3 includes matters that should be considered when assessing renewable energy proposals:

- Community consultation
- Environmental Impact
- Visual and Landscape impact
- Noise Impact
- Public and aviation safety
- Heritage
- Construction impact

The responses to the position statement provided in this proposal are detailed in **Table 4.1** below:

Table 4.1 - Response to position statement on renewable energy

Position Statement Clause	Response by Proposal
5.3.1 Community consultation Early consultation with the community and stakeholders by the proponents is encouraged to ensure that the proposal is compatible with existing land uses on and near the site. The local government should be consulted with respect to the community consultation program.	The Proponent has been liaising with the Shire in relation to the proposal and the early community engagement plan. The Proponent has briefed the Traditional Owner groups and held a community drop-in session in December 2025, prior to formal advertising of the DA in 2026.

Position Statement Clause	Response by Proposal
	The Proponent will work closely with the Shire on its engagement with the community as the proposal progresses.
5.3.2 Environmental Impact An environmental survey of the site should be conducted prior to the commencement of the renewable energy facility design. The type, location and significance of flora and fauna, particularly rare and endangered or threatened communities that may be impacted, should be described and mapped so that remnant vegetation and sensitive areas can be avoided.	The subject site is currently used for cropping and grazing and is predominantly cleared with small pockets of remnant vegetation contained on site. Remnant vegetation will be protected. The facility is well-located to minimise environmental impact whilst maximising the environmental and economic benefits of a renewable energy facility in this location. A flora/fauna survey forms part of this report and provides merit for the retention of pockets of remnant vegetation over the site.
Facilities should be located near the grid to minimise clearing of vegetation for grid connection power lines. Solar arrays over a large area may have significant effect on the clearing of native vegetation. Already cleared farming land may offer a practical solution to minimise any environmental impact.	The proposed facility is adjacent to the existing Merredin Terminal Station. No clearing of vegetation is anticipated to connect into the grid.
5.3.3 Visual and Landscape impact The location and siting of a renewable energy facility may require a visual and landscape impact assessment.	A Visual Impact Assessment has been prepared and is included at **Section 5** and **Appendix H**.
• landscape significance and sensitivity to change, site earthworks, topography, extent of cut and fill, the extent and type of vegetation, clearing and rehabilitation areas, land use patterns, built form character, public amenity and community values.	The proposal is supported by a Visual Impact Assessment at **Section 5** and **Appendix H**. The site is predominantly cleared with remnant vegetation to be retained. It is located adjacent to existing electricity generation and transmission infrastructure.
• likely impact on views including the visibility of the facility using view shed analysis and simulations of views from significant viewing locations including residential areas, major scenic drives and lookouts	The proposal is supported by a Visual Impact Assessment at **Section 5** and **Appendix H**. The site is located on cleared farmland approximately 4.4km south of Great Eastern Highway, a major tourist route. The nearest house is approximately 1.3km to the east. This house is located approximately 400m south of the existing Merredin solar farm.
• layout of the facility including the number, height, scale, spacing, colour, surface reflectivity and design of components,	Plans of the proposed development are provided with this application (**Appendix C**)

Position Statement Clause	Response by Proposal
including any ancillary buildings, signage, access roads, and incidental facilities	
• measures proposed to minimise unwanted, unacceptable or adverse visual impacts.	The proposal is supported by a Visual Impact Assessment at **Section 5** and **Appendix H**. The proposed development is adjacent to the existing Merredin Terminal Merredin Solar Farm and the under construction Merredin BESS.
Some locations may hold Aboriginal heritage, natural or historic heritage significance which may impact site suitability. An assessment should address: • local archaeological and ethnographical records • any impact upon the natural environment that have aesthetic, historical, scientific or social significance or other special value for the present and future community • any impact upon the historic heritage characteristics of adjoining/nearby places with an impact assessment of the proposal undertaken where relevant. Consultation with the Department of Planning, Lands and Heritage may be required if heritage issues are identified. Appropriate consultation should be undertaken with respect to Aboriginal heritage matters.	A review of the relevant information from the Department for Planning Lands and Heritage (DPLH) databases and other relevant documentation did not identify areas of Aboriginal Heritage, natural or historic significance. As such the trigger for consultation with the DPLH at this stage has not been triggered. The Proponent has undertaken an in-house Heritage Assessment which concludes that there are no significant heritage areas on the site (**Appendix K**). The DPLH will likely be consulted during the statutory advertising period.
5.3.7 Construction impact It is important to accommodate the full scope of works to occur on the site in the development of a renewable energy facility. Consideration needs be given to potential staging that may occur including one type of renewable energy being subsequently complemented by a second type of renewable energy to supplement continuity of feed into the grid, for example, wind turbines supplemented by solar arrays on the same site. Key matters that should be addressed during the construction phase are:	The impact will be significant during the construction phase given the size of the solar array and BESS. It is predicted that over the period of 18 to 24 months that there will be an estimated 1,000 truck movements in total, delivering the batteries and associated infrastructure for the site, with a peak of 26 truck movements per day. The majority of these deliveries will occur throughout all stages of the construction phase. At the height of construction activity, there will be approximately 200 workers moving to and from the site each day, with peak times being between 5-6am and between 6-7pm.
• a site construction management plan that identifies standards and procedures for the construction of the development including the management of	A Construction Management Plan (CMP) is expected to be implemented as a condition of any approval granted by the Regional Development Assessment Panel. The CMP would be in line with

Position Statement Clause	Response by Proposal
environmental emissions such as dust and noise	Shire of Merredin requirements and include the standards and procedures for the construction of the proposed development including the environmental emissions such as dust and noise that might occur during the construction phase. The CMP would also deal with matters such as traffic movements and stormwater that can be assessed once final detailed design has been undertaken.
• site disturbance should be minimised during construction through careful siting and measures to address erosion, drainage run-off, flooding, water quality, retention of remnant vegetation, stabilisation of topsoil, and weed and disease hygiene.	The proposed development has been designed to sensitively respond to the subject site and disturbance will be minimised during the construction phase. The design reflects the best possible use of the site taking into account all environmental factors outlined.
• vehicle and machinery access and movement. A decommissioning program should be separately developed in relation to removal of the facility and any rehabilitation requirements.	A Traffic Impact Statement has been produced for this development and is provided at **section 5** and **Appendix E**. This has found that there will be minimal impact on Robartson Road from construction traffic. The traffic associated with the ongoing operation of the facility will be limited to occasional light passenger and maintenance vehicles. The site is sufficiently large to accommodate all required space for parking, laydown and truck manoeuvring. The life of the proposed facility is expected to be up to 30 years. If/when the facility is decommissioned the infrastructure can be removed and the land returned to farming purposes.

4.2 State Planning Policy 2.0 – Environment and Natural Resources (SPP2.0)

The policy states that:

> *Western Australia is one of the most biologically diverse regions in the world, home to a broad range of ecological communities and species, and natural landscapes. The States vast areas encompass rich and extensive agricultural, pastoral, marine and mineral resources. The protection and wise management of the environment and natural resources of the State are of paramount importance if we are to maintain our lifestyle now and into the future.*

SPP 2.0 further states that:

Careful assessment will be required to resolve conflicts between land use and protection of natural resources, giving consideration to the potential impacts on the environment, community lifestyle preferences, and economic values. This requires an understanding of the competing pressures of development and environmental protection, together with the economics of sustainable land use and management practices, advances in technology, and the priorities of the community.

Clause 5.6 of SPP 2.0 relates to Agricultural Land and Rangelands and states that:

Planning strategies, schemes and decision making should:

i. Protect and enhance areas of agricultural significance, having regard to State, regional and local issues and characteristics, and to the requirements of Statement of Planning Policy No.11: Agricultural and Rural Land Use Planning
ii. Consider the natural resource capability of rangelands and agricultural lands
iii. Diversify compatible land use activities in agricultural areas and rangelands based on principles of sustainability and recognizing the capability and capacity of the land to support those uses.

The proposed development meets these objectives in that the subject site is already cleared and used for broad acre cropping and grazing and is not in an area of agricultural significance with the balance of the subject site still used for existing agricultural purposes. Further, the proposed development will allow the diversification of land use on the principle of sustainability by providing a green energy facility within the locality and broader surrounds.

Clause 5.10 of SPP 2.0 relates to Greenhouse Gas Emission and Energy Efficiency and states:

There is a widespread awareness of the need to increase the efficiency with which energy is used in Western Australia, including the need to reduce our reliance on energy produced from non-renewable resources such as fossil fuels. The primary objective is to reduce greenhouse gas emission by means (but not limited to) increasing energy efficiency, decreasing reliance on non-renewable fuels, and increasing usage of renewable energy sources.

Planning strategies, schemes and decision making should:

i. Promote energy efficient development and urban design incorporating such issues as energy efficient building design, walkable neighbourhoods, higher densities in areas accessible to high quality public transport, local access to employment, retail and community facilities, and orientation of building lots for solar efficiency.
ii. Support the retention of existing vegetation and revegetation in subdivision and development proposals.
iii. Support the use of alternative energy generation, including renewable energy, where appropriate.
iv. Support the adoption of adaption measures that may be required to respond to climate change.

The proposed development meets the objectives outlined under the Greenhouse Gas Emission and Energy efficiency clause in that the development of the facility does not involve the removal of any remnant vegetation, is a form of alternative renewable energy generation and is a measure that is responding to climate change.

Clause 6 of SPP2.0 relates to the Implementation of the policy and states that:

Implementation will also occur through the day-to-day process of decision-making on subdivision and development applications, and the actions of other State agencies in carrying out their responsibilities. Local Governments and State agencies will need to take account of these policy measures to ensure integrated decision-making and in the planning and management of the environment and natural resources.

The proposed development meets the requirements of SPP 2.0 in that the proposed development will help reduce the need to rely on traditional energy forms and the introduction of a renewable facility. Further as the proposed development is located close to the existing Merredin terminal station.

4.3 State Planning Policy 2.5 – Rural Planning (SPP2.5)

The purpose of this policy is to protect and preserve Western Australia's rural land assets due to the importance of their economic, natural resource, food production, environmental and landscape values. In terms of the proposed solar farm development compliance with SPP2.5 and compatibility with surrounding rural land uses.

The objectives of SPP2.5 are outlined and addressed in the **Table 4.2** below:

Table 4.2 - Response to objectives of SPP 2.5

Objective	Response
a) Support existing, expanded and future primary production through the protection of rural land, particularly priority agricultural land and land required for animal premises and/or the production of food;	The subject site is not identified as priority agricultural land in the Local Planning Strategy or Scheme. The size of the land holding required for the facility is not significant when compared to all land used for cropping and grazing in the Shire of Merredin.
b) Provide investment security for existing, expanded and future primary production and promote economic growth and regional development on rural land for rural land uses;	The proposed facility will promote economic growth and regional development through the development of a new land use and the protection of energy for the region.
c) Outside the Perth and Peel planning regions, secure significant basic raw material resources and provide for their extraction	This is not applicable to this proposal.
d) Provide a planning framework that comprehensively considers rural land and land uses, and facilities consistent and timely decision-making	The Shire of Merredin has a relatively contemporary local planning framework that has been used previously to allow similar facilities. The proposal also appropriately addresses the current WAPC Position Statement on Renewable Energy Facilities.
e) Avoid and minimise land use conflicts	The facility will be a westwards extension of the renewable energy hub that is already in place. The site is bounded by roads on two sides and partly bounded by the railway reserve. This effectively separates the facility from surrounding farmland.

Objective	Response
	Notwithstanding this separation, the activities proposed on the site are inherently compatible with modern farming practises.
f) Promote sustainable settlement in, and adjacent to, existing urban areas; and	This is not applicable to this proposal.
g) Protect and sustainably manage environmental, landscape and water resource assets.	The proposed development will not have any detrimental effects on the environment, landscape, water nor resource assets. Instead, the proposed facility will allow for the protection of the environment through the production of green energy.

Section 5.5 of SPP2.5 relates to regional variation, economic opportunities and regional development it states that:

> *Western Australia is a large and diverse State with regional variations of climate, economic activity, cultural values, demographic characteristics and environmental conditions. The WAPC's decisions will be guided by the need to provide economic opportunities for rural communities and to protect the States primary production and natural resource assets. WAPC policy is to:*
>
> *(a) continue to promote rural zones in schemes as flexible zones that cater for a wide range of land uses that may support primary production, regional facilities, environmental protections and cultural pursuits…*

The proposed Ngaangk Boodja Battery & Solar Farm facility is consistent with the policy in that:

- The proposal is providing economic opportunities for the Shire and will not have a detrimental effect on the State's primary production and natural resource assets.
- The facility will have regional importance and contributes to the State's renewable energy generation targets without undue impact on the objectives of the General Farming zone.

Section 5.12 relates to preventing and managing impacts in land use planning and states that:

> *Planning decision makers need to consider the broad suitability of land uses and the ability to manage offsite impacts prior to determining whether the use of a buffer is necessary.*

Table 4.3 outlines the matters to be taken into consideration by decision-makers to avoid land use conflict at section 5.12.1 of the Policy:

Table 4.3 - Objectives of avoiding land use conflict

Objective	Response
a) Where an existing land use that may generate impacts is broadly compatible with surrounding zones and land uses, a separation distance should be indicated in	The proposed facility is expected to generate little to no impact on its surrounds. Therefore, a separation distance from the facility to other uses within the General Farming zone is not required.

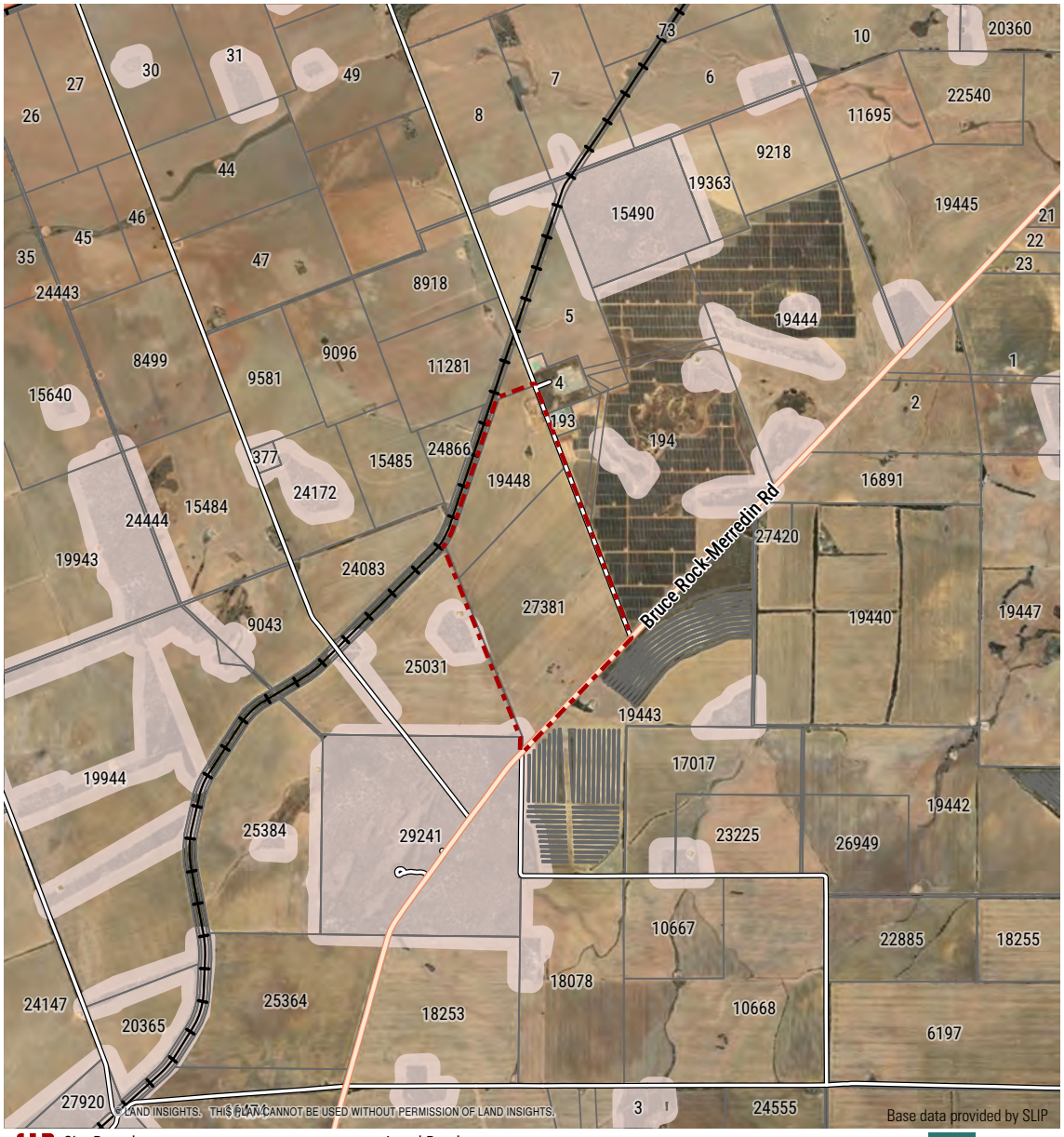
Objective		Response
	a local planning strategy so there is broad awareness of the land use	The proposal is a westwards extension of the existing renewable energy hub centred on the Western Power terminal and is a logical and well-located site that does not require separation from other uses.
b)	Where a development is proposed for a land use that may generate offsite impacts, there should be application of the separation distances used in environmental policy and health guidance, prescribed standards, accepted industry standards and/or Codes of Practice, followed by considering I. Whether the site is capable of accommodating the land use and/or II. Whether surrounding rural land is suitable, and can be used to meet the separation distances between the nearest sensitive land use and/or zone, and would not limit future rural land uses; and III. Whether if clauses (i) and/or (ii) are met, a statutory buffer is not required	There are no significant offsite impacts from the proposed battery and solar farm.
c)	Where a development is proposed for a land use that may generate off-site impacts and does not meet the standard outlined in clause 5.12.1 (b) then more detailed consideration of off-site impacts will be required, in accordance with clause 5.12.3 of this policy; and	There are no significant offsite impacts from the proposed battery and solar farm.
d)	Where a development is proposed that could be contemplated in the zone, and has been assessed under clause 5.12.3 as having unacceptable off-site impacts that cannot be further mitigated or managed, the proposal should be refused	The presence of a similar facility to the east indicates that a renewable energy facility is appropriate in the zone.

4.4 State Planning Policy 3.7 – Planning in Bushfire Prone Areas (SPP3.7}

Relevance of Policy to Proposal

The bushfire prone areas in the locality surrounding the site are depicted in **Figure 7**. This demonstrates that the majority of the site is not identified as bush fire prone. Two relatively small

areas representing approximately 2 ha (< 1% of the site) are located in the southwestern corner and western boundary of the site.



Ngaangk Boodja Battery and Solar Farm

Project: 1319; Layout Name: BRM 1319-003-01-01 Fig 7 Bushfire Prone Areas

FIGURE 7: BUSHFIRE PRONE AREAS

Notwithstanding the site is not inherently bush fire prone, it is prudent that consideration and management of the risk take place due to the nature of the development.

Policy Implications

The intent of SPP3.7 is to implement effective, risk-based land use planning and development to preserve life and reduce impact of bushfire on property and infrastructure.

Policy Measure 5 relates to the policy objectives and are as follows:

> *5.1 Avoid any increase in the threat of bushfire to people, property and infrastructure. The preservation of life and the management of bushfire impact are paramount.*
>
> *5.2 Reduce vulnerability to bushfire through the identification and consideration of bushfire risks in decision making at all stages of the planning and development process.*
>
> *5.3 Ensure that higher order strategic planning documents, strategic planning proposals, subdivision and development application take into account bushfire protection requirements and include specified bushfire protection measures.*
>
> *5.4 Achieve an appropriate balance between bushfire risk management measures and, biodiversity conservation values, environmental protection and biodiversity management and landscape amenity, with consideration of the potential impacts of climate change.*

The proposed development meets the objectives of the Policy in that it will:

- Not increase the threat of bushfire to people, property and infrastructure and the preservation of life and the management of the possible bushfire impact are paramount to this proposal;
- It will reduce the vulnerability of bushfire over the subject site through the identification and consideration of bushfire risks through all stages of the planning and development process;
- The proposed development application will take into account bushfire protection requirements and will include specified bushfire protection measures within the applicable Bushfire Management Plan;
- The proposed development is aiming to achieve, through careful design, a balance between bushfire risk management measures, biodiversity and conservation values, environmental protection, biodiversity management and landscape amenity;
- A specialist risk assessment has been undertaken with appropriate measures identified in relation to risk and management of the facility in relation to bushfire.

An overview of the bushfire management measures to be used for this facility are outlined at **section 5.1** of this application and in full at **Appendix D**.

4.5 Local Planning Strategy (LPS)

The Shire of Merredin Local Planning Strategy provides a 15-year strategic vision for the land use development of the Shire. The Strategy identifies the site of the facility within the General Agriculture land use category. Clause 4.3.4 relates to the rural areas within the Shire and states:

…rural land should be protected from proposals that might compromise agricultural viability such as ad-hoc subdivision and incompatible use or development.

As has been demonstrated throughout this Application and in the supporting assessments, this proposal is inherently compatible with ongoing farming operations on surrounding land. The Ngaangk Boodja Battery & Solar Farm is well-located and a logical extension of the existing renewable energy generating and storage Merredin hub.

Whilst the Strategy does not explicitly identify renewable energy uses, the overall strategic intent of ensuring agricultural viability will remain unaffected by this development.

4.6 Shire of Merredin Local Planning Scheme No.6

The site is zoned 'General Farming' by the Scheme. The zoning and reservations surrounding the site is shown in Figure 8:

Land Use Classification

The proposed use of the land has been defined as a "renewable energy facility", as defined by the March 2020 WAPC Position Statement: Renewable Energy Facilities, namely:

Renewable energy facility means premises used to generate energy from a renewable energy source and includes any building or other structure used in, or relating to, the generation of energy by a renewable resource. It does not include renewable energy electricity generation where the energy produced principally supplies a domestic and/or business premises and any on selling to the grid is secondary.

LPS6 does not include the use class "renewable energy facility" in its Zoning Table. Consequently, this application is to be dealt with as a "use not listed" under clause 3.4.2 of the Scheme. Clause 3.4.2 states:

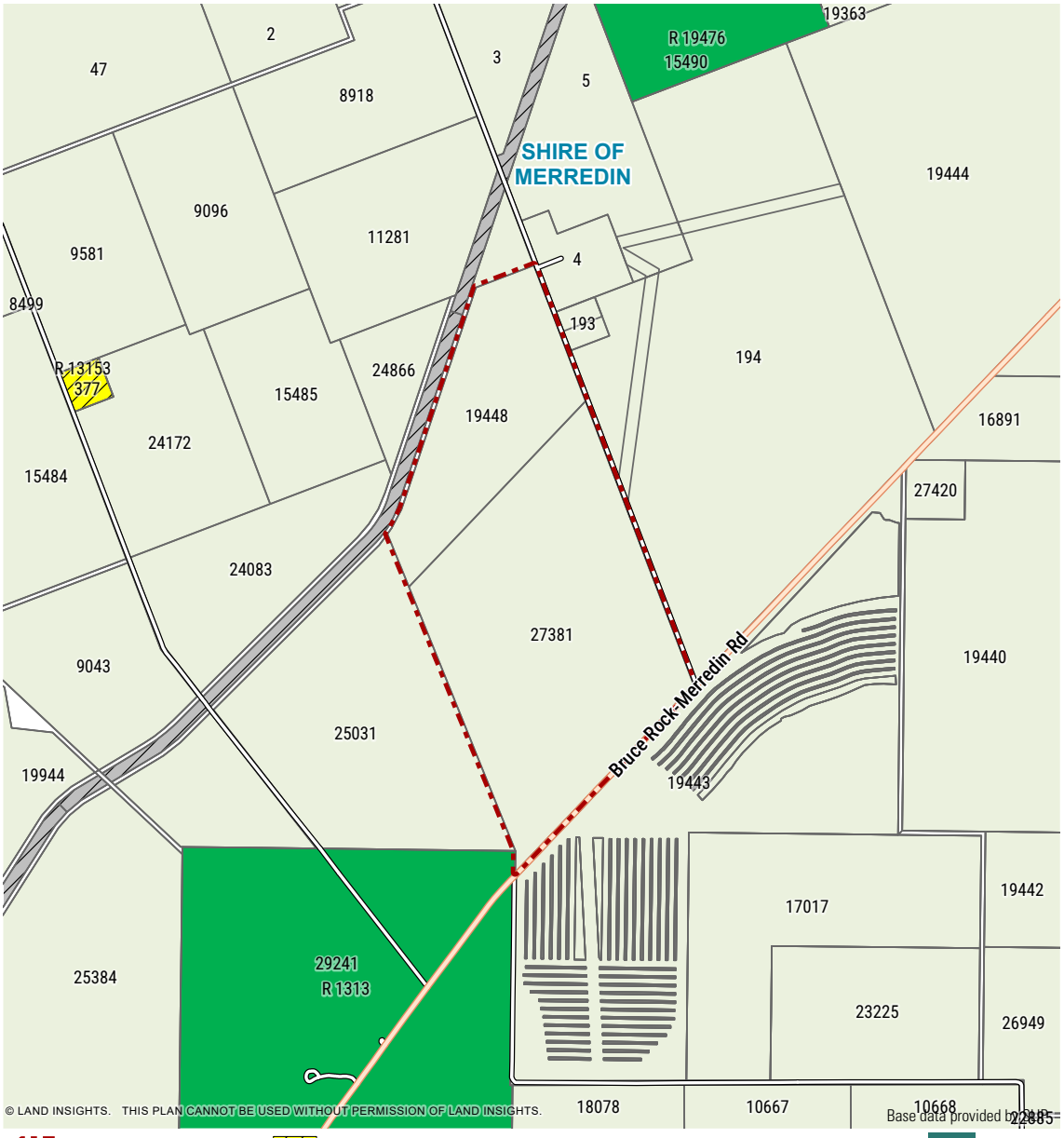
If a person proposes to carry out on land any use that is not specifically mentioned in the Zoning Table and cannot reasonably be determined as falling within the type, class or genus of activity of any other use category the local government may –

a) determine that the use is consistent with the objectives of the particular zone and is therefore permitted;
b) determine that the use may be consistent with the objectives of the particular zone and thereafter follow the advertising procedures of clause 64 of the deemed provisions in considering an application for development approval; or
c) determine that the use is not consistent with the objectives of the particular zone and is therefore not permitted.

It is requested that the RDAP determines the proposal is consistent with the General Farming zone objectives and considers acting under sub-clause b). It is noted that previous renewable energy facility developments have been approved under clause 3.4.2 of the Scheme. This supports the Proponent's contention that the use is consistent with the objectives of the General Farming zone and can be considered on its merits for development approval.

Zone Objectives

The objectives of the General Farming zone as contained in clause 3.2.11 of the Scheme are outlined below, together with a statement of how this proposal addresses each objective:



Ngaangk Boodja Battery and Solar Farm

Project: 1319; Layout Name: BRM 1319-002-01-01 Fig 8 Zoning

FIGURE 8: ZONING

3.2.11.1 *To provide for a range of rural pursuits that are compatible with the capability of the land and retain the rural character and amenity of the locality.*

The proposed renewable energy facility will complement and not compete with rural pursuits (such as farming) on surrounding land. As demonstrated by the application, the solar farm and BESS will operate with minimal impacts on surrounding land or amenity of the locality.

3.2.11.2 *To protect land from urban uses that may jeopardise the future use of that land for other planned purposes that are compatible with the zoning.*

The proposed renewable energy facility is not an urban use and is consistent with the rural location of the site. There are no other planned purposes for the land.

3.2.11.3 *To support sustainable farming practices and the retention of remnant vegetation.*

All remnant vegetation on the site will be retained and protected.

3.2.11.4 *To prevent any development that may affect the viability of a holding.*

The proposed development demonstrates that the land holding is viable for its current farming purposes and the intended renewable energy facility.

3.2.11.5 *To encourage small scale, low impact tourist accommodation in rural locations.*

The development will not affect the ability to locate low impact tourist accommodation in the locality.

3.2.11.6 *To encourage a diversification of rural activities that will reduce the dependency of the rural sector on traditional crops.*

The proposed development will continue the use of suitable land for renewable energy generation that was established by the existing solar farm east of Robartson Road.

3.2.11.7 *To support the creation of homestead lots in accordance with adopted Local Planning Policy.*

This objective is not applicable to the proposed development.

3.2.11.8 *To support mining activities where an environmental management plan has been prepared and is acceptable to the local government and the Environmental Protection Authority.*

This objective is not applicable to the proposed development.

3.2.11.9 *To preclude the disposal of used tyres or any other material that may be detrimental to the quality of the land.*

This objective is not applicable to the proposed development.

Development Requirements

Clause 4.13 of the Shire's LPS6 relates to development in the General Farming zone and states:

All proposals for development in the General Faming zone must have regard to both on-site and off-site impacts and, where necessary, should be accompanied by information identifying –

a) Environmental values and environmental risks
b) The potential for land use conflict
c) The potential impacts and restrictions on allowed uses on adjacent or nearby locations
d) The separation distances and/or buffer relating to a potentially incompatible land use which needs to be provided on- site and the appropriate conditions relating to subdivision and development.

The proposed Solar and BESS facility meets these requirements as:

- The location of the Solar and BESS facility on predominantly cleared land that contains some pockets of remnant vegetation, and the facility will not have any detrimental environmental effect with on-site or off-site. Rather the proposed facility located over the road from the existing Merredin terminal station will provide the Shire and the state with a source of clean green energy as the State moves towards net zero and therefore the environmental value that will be produced offsite is of an extremely high value.
- There are no potential impacts nor proposed restrictions on allowed uses on adjacent land broad acre cropping, grazing and other farming practices will be able to continue to occur on the surrounding land.
- Appropriate buffers will be put in place in relation to the Solar and BESS facility in regard to applicable separation distances and these will be contained within the fence that will protect the facility.

4.7 Matters to be Considered (cl.67(2) Deemed Provisions)

Clause 67(2) of the Deemed Provisions sets out the matters for which due regard is to be given when considering a development application. Refer to **Table 4.4** below for an assessment against the matters to be considered.

Table 4.4 - Matters to be considered

Matters to be Considered	Response
The aims of the provisions of this Scheme and any other local planning scheme operating within the Scheme area;	This section outlines in detail how the proposed development meets the aims and provisions of the Shire's LPS06.
The requirements of orderly and proper planning including any proposed local planning scheme or amendment to this Scheme that has been advertised under the Planning and Development (Local Planning Scheme) Regulations 2015 or any other proposed planning instrument that the local government is seriously considering adopting or approving;	The proposed development meets the requirements of orderly and proper planning in that it meets the aims and objectives of the current local planning scheme. The proposed development also supports the Australian Government's targets, including achieving 82% renewable electricity by 2030 and reaching net zero emissions by 2050. It aligns with policy objectives to transition away from coal-fired generation, including the Western Australian Government's commitment to retire all State-owned coal power stations by 2030.

Matters to be Considered	Response
Any approved State Planning Policy	State Planning Policies 2.0, 2.5 and 3.7 are addressed in **section 4** of this application.
Any environmental protection policy approved under the Environmental Protection Act 1986 section 31(d)	There are no relevant EPP's applicable to this area.
Any policy of the Commission	All applicable policies and position statements of the Commission have been addressed under **section 4** of this report.
Any policy of the State	The State Planning Strategy 2050 and the Strategy Update on Renewable energy is addressed at **section 3** of this application.
Any local planning policy for the Scheme area	There are currently no local planning policies that relate to this proposal.
Any structure plan, activity centre plan or local development plan that relates to the development	There are no such plans that relate to the proposed development.
Any report or review of the local planning scheme that has been published under the Planning and Development (Local Planning Schemes) Regulations 2015	There is no report of review that relates to this proposal.
In the case of land reserved under this Scheme, the objectives for the reserve and the additional and permitted uses identified in this Scheme for the reserve	The entire site is zoned by the Scheme and is not subject to a reserve.
The built heritage conservation of any place that is of cultural significance	There is no identified built heritage within and/or impacting the subject site.
The effect of the proposal on the cultural heritage significance of the area in which the development is located	A check of available data has not identified any aboriginal cultural heritage registered or lodged site either on or within the vicinity of the site.
The compatibility of the development with its setting including the relationship of the development on adjoining land or on other land in the locality including, but not limited to, the likely effect of height, bulk, scale, orientation and appearance of the development	The facility will form a logical and well-located extension of the existing renewable energy hub southwest of Merredin. It will integrate with existing transmission infrastructure and not create adverse impact on the amenity of the locality.
The amenity of the locality including the following – Environmental impacts of the development The character of the locality Social impacts of the development	The proposed development will have negligible environmental impact over the site. The site is currently cleared of remnant vegetation and used for grazing and cropping purposes. The proposed development will not have an impact on the character of the locality. The broadacre farming that surrounds the subject site will not be affected by the development and the character of the rural area will not be

Matters to be Considered	Response
	impacted. The facility will form a logical and well-located extension of the existing renewable energy hub southwest of Merredin. It will integrate with existing transmission infrastructure and not create adverse impact on the amenity of the locality. There will be no social impacts from the proposed development.
The likely effect of the development on the natural environment or water resources and any means that are proposed to protect or to mitigate impacts on the natural environment or the water resource	As stated previously the proposed development has been carefully designed so that the Solar and BESS facility will be located on cleared cropping and grazing land.
Whether adequate provision has been made for the landscaping of the land to which the application relates and whether any trees or other vegetation on the land should be preserved	The site contains small pockets of remnant vegetation that will be retained as part of this application.
The suitability of the land for the development taking into account the possible risk of flooding, tidal inundation, subsidence, landslip, bushfire, soil erosion, land degradation or any other risk	The land has been selected by the proponent due to the suitability of the site for the proposed development and its location near the Western Power Merredin Terminal and other transmission infrastructure. A bushfire management has been undertaken to ensure that the proposed development is suitable on the subject site. The subject site is not subject to any of the other identified risks. A risk assessment has been prepared at **section 6** of this Application.
The suitability of the land for the development taking into account the possible risk to human health or safety	As the site will be developed and operated in a safe manner, there is no risk to human health or safety.
The adequacy of - The proposed means of access and egress from the site; and Arrangements for the loading, unloading, manoeuvring and parking of vehicles	Access and egress to the subject site from Robartson Road will be upgraded to suitable standards to allow for private vehicle and truck movements during the construction phase and the subsequent operation phase. There is sufficient room on the subject site for loading and unloading of trucks and laydown areas and the parking of vehicles.
The amount of traffic likely to be generated by the development, particularly in relation to the capacity of the road system in the locality and the probable effect on traffic flow and safety	It is expected that over the construction period of 18-24 months that there will be approximately 1,000 truck movements to and from the site. It is estimated that approximately 250 workers will work on the subject site during the construction phase and that the peak numbers of movements for these workers will be during the am period of approximately 5-6 am and then the pm period between 6-7 pm as workers arrive in the morning to commence working and then leave in the pm period.

Matters to be Considered	Response
The availability and adequacy for the development of the following – Public transport services Public utility services Storage, management and collection of waste Access for pedestrians and cyclists (including end of trip storage, toilet and shower facilities) Access by older people with disability	Given its regional location, there are no public transport options to the subject site. The proposed development will be integrated into the SWIS. All waste generated by the construction and operation/maintenance of the facility will be dealt with by the Proponent using experienced contractors. No provision for pedestrians, cyclists and end of trip facilities is appropriate for the nature of development proposed. Public access to the facility is not proposed.
The potential loss of any community service or benefit resulting from the development other that the potential loss that may result from economic competition between new and existing businesses	The facility is complementary to the existing Merredin Solar Farm and Merredin BESS facilities located adjacent. Construction of the NBBSF will strengthen the economic benefit of renewable energy production in Merredin, with this benefiting the community.
The history of the site where development is to be located	The site is a multigeneration agricultural property used for cropping and grazing. However, there is no identified cultural heritage.
The impact of the development on the community as a whole notwithstanding the impact of the development on particular individuals	The proposed development will not have a detrimental effect on the community or any particular individuals. The development is seen as adding value to the community with the Shire potentially becoming a green hub in the wheatbelt region.
Any submissions received on the application	The Shire and RDAP will consider all submissions received.
Za) the comments or submissions received from an authority consulted under clause 66	The Shire and RDAP will consider all submissions received.
Zb) any other planning consideration the local government considers appropriate	All planning considerations have been addressed above and in this application.

5 Technical Assessments

A number of Technical Assessments have been prepared to support this application and are contained in **Appendices D-J**. The main findings / recommendations from each assessment are summarised below.

5.1 Bushfire Management Plan

A Bushfire Management Plan (BMP) was prepared by Bushfire Prone Planning in December 2025 (**Appendix D**) in accordance with State Planning Policy 3.7 – Planning in Bushfire Prone Areas and the Guidelines for Planning in Bushfire Prone Areas.

The BMP concludes that the proposal is compliant with the Bushfire Protection Criteria, including siting and design, vehicular access, water supply and ongoing management. The development is located on cleared agricultural land, and all required Asset Protection Zones (APZs) are provided wholly within the site.

The BMP identifies appropriate access arrangements and firefighting water supply provisions to support emergency response, with detailed specifications to be confirmed at the detailed design stage. The presence of lithium-ion battery systems and transformer oil has been considered, and the development will comply with the *Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007*.

5.2 Traffic Impact Statement

A Traffic Impact Statement (TIS) was prepared by Shawmac Civil and Traffic Engineers in December 2025 (**Appendix E**). The TIS concluded that peak daily traffic generation during the construction period is estimated at approximately 26 truck movements and 66 light vehicle or bus movements per day. Peak hour traffic is expected to be in the order of 35 vehicle movements per hour.

Heavy vehicle access will be from Great Eastern Highway along Robartson Road rather than from Bruce Rock–Merredin Road. The overall traffic volume during construction is considered low and can be accommodated within the capacity of the existing road network. The minimum required sight distance is achieved in both directions at the proposed vehicle access on Robartson Road. The access will be designed to accommodate the turning movements of construction trucks and a preliminary swept path analysis using Main Roads WA's RAV vehicle templates has been undertaken to demonstrate the likely extent of the crossover.

A review of crash history on the adjacent road network indicates no major safety issues. Given the low volume of additional traffic over a limited period, the development is unlikely to increase crash risk to an unacceptable level.

Once the development is constructed and operational, it will generate little or no traffic.

5.3 Glint and Glare Assessment

A comprehensive Glint and Glare Assessment (**Appendix F**) was undertaken by SLR Consulting Australia to evaluate the potential for reflective glare from the proposed NBBSF. The assessment considered impacts on road and rail traffic, nearby residential dwellings and aviation, using industry-

standard modelling (SANDIA Labs Forge Solar SGHAT) and conservative assumptions that excluded vegetation screening and topographic shielding.

The baseline scenario, with panels set at a 0° rest angle, predicted up to 1,265 minutes per year of "Yellow" (potential after-image) glare for northbound vehicles on Robartson Road, primarily in the late afternoons from mid-April to August. No glare was predicted for Bruce Rock–Merredin Road or any of the assessed residential dwellings. Further analysis determined that much of the predicted glare occurred at very high incidence angles, where the sun itself would dominate the field of view, and thus would not constitute a true glare hazard. This approach aligns with accepted international best practice, which only considers glare a concern if the angle difference between the sun and the reflection exceeds approximately 10 degrees.

A mitigation scenario was modelled, applying a 5° rest angle to the panel tracking system in the afternoons between mid-April and the end of August. This measure eliminated all predicted glare for Robartson Road, with no operational restrictions required at other times. The proponent has indicated a desire to initially retain standard tracker operations and conservative elements of the model such as the expected reduction factors for cloud cover. The mitigation strategy for the facility could involve a review being conducted once construction is complete to confirm whether glare is observed during the impact times/dates found by the assessment. If the occurrence of glare is confirmed, the 4-month (mid-April to August) afternoon 5° rest angle mitigation could then be applied or further vegetation screening implemented.

The assessment also notes that existing and future vegetation screening, as well as topographic shielding, would further reduce potential impacts, although these factors were not included in the conservative modelling. Aviation glare was not considered relevant due to the distance from Merredin Airport.

5.4 Environmental Noise Assessment

An Environmental Noise Assessment (**Appendix G**) was undertaken by Lloyd George Acoustics in December 2025 to evaluate the potential noise impacts associated with the proposed facility. The assessment considered noise emissions from the batteries, power conversion systems/inverters and high voltage substation, with reference to the Environmental Protection (Noise) Regulations 1997.

The assessment applied computer modelling (SoundPLAN 9.1 with CONCAWE algorithms) to predict noise levels at all nearby sensitive and industrial receivers, taking into account worst-case meteorological conditions, local topography, ground absorption and the operational sound power levels of all major plant items. Two operational scenarios were considered: daytime/evening operations (with BESS at 100% and PCS/inverters at 80% run speed) and night-time operations (with BESS at 100% and PCS/inverters at 60% run speed). The modelling assumed all equipment operating concurrently and included a conservative adjustment for potential tonal noise characteristics.

The results indicated that under both daytime/evening and night-time scenarios, predicted noise levels at most identified sensitive receivers (R1, R2, and R5) and industrial receivers (R6 and R7) would comply with the assigned levels set by the Regulations. At two residential receivers (R3 and R4), predicted noise levels during night-time operations marginally exceeded the assigned night-time level by 4 dB and 1 dB respectively, after applying a 5 dB penalty for potential tonality. The assessment identified the BESS units as the dominant noise source at these locations.

To achieve compliance at all receivers, the report recommends specific noise control measures could be taken for R3 and R4. These may include reducing the sound power of close by BESS containers by 4 dB, either by lowering running speeds or installing noise mitigation kits. Given the distances involved, tonality may not be evident at the receivers and may not warrant a penalty; this could be confirmed post-construction with monitoring and, if necessary, the consideration of the recommended mitigations.

5.5 Visual Impact Assessment

The Visual Impact Assessment for the NBBSF was prepared by Land Insights in December 2025 (**Appendix H**). The assessment concludes that the proposed facility will introduce new visual elements to the local landscape, but these impacts are expected to be low to moderate and generally acceptable. The site is located in a region already characterised by extensive cropping and existing renewable energy infrastructure, including the adjacent Merredin Solar Farm and battery storage facilities. As a result, the community has developed a familiarity and acceptance of such developments and the proposed facility is considered compatible with the evolving landscape character.

The assessment found that the facility will be moderately visible from several public viewpoints, primarily along local roads. However, most views will be brief or partially screened by remnant vegetation and the overall visual impact will be less than that of the larger, neighbouring solar farm. Direct views are limited due to the site's location away from major highways and populated areas. The relatively low volume of passing traffic further reduces the likelihood of significant visual disturbance.

Mitigation measures recommended include enhanced landscape planting and the use of building materials and colours that recede into the environment, minimising reflection and visual prominence. Where direct views are possible, targeted screen planting could be considered. These interventions are expected to ensure that the facility remains a minor and acceptable component of the broader landscape.

Overall, the assessment concludes that the NBBSF will not result in unacceptable visual impacts. The site's context and existing community acceptance of renewable energy infrastructure, support the view that the development can be accommodated within the local landscape without significant adverse outcomes.

5.6 Flora and Fauna Assessment

A Detailed Flora and Vegetation Survey, including a Black Cockatoo Habitat Assessment, was undertaken by Del Botanics Environmental Consulting (**Appendix I**). The survey was conducted in spring and followed EPA and DBCA guidelines for terrestrial flora and vegetation surveys, with fieldwork completed in October 2023.

The site, covering approximately 230 hectares in the Avon Wheatbelt bioregion, is characterised by a gently undulating landscape that has been extensively cleared for agriculture. The remaining vegetation consists primarily of paddocks with isolated *Eucalyptus capillosa* and small remnant patches of *Eucalyptus burracoppinensis* with *Allocasuarina campestris* over a sparse grass and herb understorey. The survey identified two local vegetation communities, both of which reflect the highly modified nature of the site and its similarity to the broader wheatbelt region.

A total of 43 flora taxa were recorded, representing 37 genera and 14 families. Weed species comprised 21% of the total flora, with nine introduced species present. None of the recorded species are listed as Declared Pests under the *Biosecurity and Agriculture Management Act 2007*. The vegetation condition across the site ranged from "Good" to "Completely Degraded," with intact patches largely confined to fence lines and isolated trees in paddocks. The site has experienced significant historic disturbance from cropping and grazing, resulting in fragmentation and susceptibility to further degradation.

Database searches and field surveys found no species of Threatened or Priority Flora pursuant to the *Biodiversity Conservation Act 2016* or the Federal *Environment Protection and Biodiversity Conservation Act 1999*. Although desktop assessments indicated that several threatened and priority species could potentially occur in the area, the degraded nature of the site and ongoing agricultural activities make their presence highly unlikely. No Threatened Ecological Communities (TECs) listed by the Federal Department of Climate Change, Energy, the Environment and Water or the Department of Biodiversity, Conservation and Attractions were identified on site. The remnant Eucalypt woodland present does not meet the size or condition thresholds required for TEC classification.

The Black Cockatoo Habitat Assessment recorded 26 potential habitat trees, all *Eucalyptus capillosa*, with 16 trees containing hollows. However, none of the hollows were suitable for Black Cockatoo breeding and no evidence of roosting or foraging was observed. The site lies within 1 km of Totadgin Conservation Park and the Merredin Nature Reserve, which provide more suitable habitat for Carnaby's Cockatoo and other threatened species than the project area itself.

Based on the results of the survey, the report recommends retaining all potential habitat trees where possible and implementing best practice weed management across the site. These measures will help maintain the limited ecological values present and support ongoing biodiversity conservation in the locality.

In summary, the assessment demonstrates that the proposed development site is highly modified and supports limited native vegetation and habitat values. No significant flora, fauna, or ecological communities are present that would constrain development, provided the recommended management actions are adopted.

5.7 Aboriginal Heritage Desktop Assessment

An Aboriginal Heritage Desktop Assessment (**Appendix J**) was undertaken in September 2025 for the proposed facility. The assessment was carried out to fulfil due diligence obligations under the Aboriginal Heritage Act 1972 (WA), prior to progressing with detailed design and construction.

The Project Land is situated within the Ballardong region, one of six Noongar regions established under the South West Native Title Settlement. Native title has been extinguished across these lands in exchange for settlement benefits outlined in the registered Indigenous Land Use Agreement (ILUA). The site itself has been extensively cleared and modified over decades of agricultural use, with only small remnant sections of native bushland remaining, predominantly around the property boundary.

The assessment involved a review of the Aboriginal Cultural Heritage Inquiry System (ACHIS), the National Native Title Tribunal (NNTT) database, and relevant heritage reports from adjoining land. The ACHIS search revealed no recorded Aboriginal sites within the Project Land, with the nearest site—Talgermine Rock (ACH Lodged ID 5605)—located approximately 22 km northeast of the project

area. No other sites are listed for the Shire of Merredin, and no heritage surveys are recorded for the facility site itself. A 2018 survey of adjoining land with similar environmental conditions also found no Aboriginal sites or artefacts, citing the absence of suitable lithic materials.

The Project Land does not contain any landforms typically associated with Aboriginal heritage sites, such as rock outcrops, water sources, elevated terrain, or stone tool materials. The area is highly disturbed and lacks features that would have supported traditional Aboriginal use or occupation. No sites were reported in the NNTT database during native title processes within the vicinity of the Project Land.

The assessment concluded that the proposed development does not pose any risk to Aboriginal heritage sites.

6 Environmental Risk Assessment

6.1 Environmental benefits

Solar energy offers significant environmental advantages by decreasing dependence on fossil fuels, which are known to produce greenhouse gases and other pollutants like sulphur dioxide, nitrogen oxides, carbon monoxide and volatile organic compounds. Further, solar projects bring economic growth and job opportunities to local communities. Since the site will no longer be used for agriculture, there will be a reduction in the use of fertilisers and pesticides, leading to fewer chemicals entering nearby waterways and benefiting local plants and animals.

6.2 Potential environmental risks

A risk assessment has been undertaken to review the environmental risk to the key environmental values, and how these may be managedl. The assessment is based on the criteria in the Department of Water and Environmental Regulation's *Guidance Statement: Risk Assessments (2017)*. The risk rating will be determined in accordance with the risk matrix in **Table 6.1** below.

Table 6.1 - Risk matrix

Likelihood	Consequence				
	Slight	*Minor*	*Moderate*	*Major*	*Severe*
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

Source: DWER, 2017

The following criteria in **Table 6.2** has been used to determine the likelihood and consequence of the risk occurring.

Table 6.2 - Likelihood and consequence

Likelihood		Consequence	
Almost certain	The risk event is expected to occur in most circumstances.	Severe	On-site impacts: catastrophic (significant impact to the environment) Off-site impacts local scale: high level or above Off-site impacts wider scale: mid level or above Mid to long term or permanent impact to an area of high conservation value or special significance^ Significant long-term damage/loss of ecosystem function and loss of individuals of species locally
Likely	The risk event will probably occur in most circumstances.	Major	On-site impacts: high level (moderate impact to the environment) Off-site impacts local scale: mid level Off-site impacts wider scale: low level Short term impact to an area of high conservation value or special significance^

Likelihood		Consequence	
			Moderate damage to ecosystem function and major loss of individuals of species locally.
Possible	The risk event could occur at some time.	Moderate	On-site impacts: mid level (Minor adverse affect to the environment) Off-site impacts local scale: low level Off-site impacts wider scale: minimal Moderate loss of individuals of species locally.
Unlikely	The risk event will probably not occur in most circumstances.	Minor	Off-site impacts local scale: minimal Off-site impacts wider scale: not detectable Minor number of individuals of species may be affected locally.
Rare	The risk event may only occur in exceptional circumstances.	Slight	On-site impact: minimal (No discernible adverse impact).

Source: DWER, 2017

^ Determination of areas of high conservation value or special significance should be informed by the Guidance Statement: Environmental Siting.

*'onsite' means within the Lot boundary.

The risk assessment below is based on consideration of the risk matrix, likelihood and consequence scales identified earlier in this section. In considering the *managed risk* associated with the project, the EPA mitigation hierarchy for environmental factors has been followed. This proposes the following:

Table 6.3 - Mitigation hierarchy

AVOID	Avoid the adverse environmental impact altogether. This may include reducing the footprint or changing the location of the footprint to avoid areas with high environmental values.
MINIMISE	Limit the degree or magnitude of the adverse impact. This may include reducing the footprint or carefully selecting technologies, processes (such as re-use of waste products) and management measures (such as bunding or dust and noise control measures) to reduce the impact.
REHABILITATE	Repair, rehabilitate or restore the impacted site as soon as possible. Adequate rehabilitation information is integral to the mitigation hierarchy to ensure early identification of knowledge gaps and risk as well as development of criteria and research to meet objectives.
OFFSET	Undertake a measure or measures to provide a compensatory environmental benefit or reduction in environmental impact to counterbalance significant adverse environmental impacts from implementation of a proposal. The measure(s) are taken after all reasonable mitigation measures have been applied and a significant environmental risk

	or impact remains. Offsets are not appropriate for all proposals and will be determined on a proposal-by-proposal basis[1]

Adapted from EPA Guideanace

Table 6.4 - Environmental risks and response

ISSUE	UNMANAGED RISK			MANAGEMENT	MANAGED RISK		
	Likelihood	Consequence	Risk		Likelihood	Consequence[2]	Risk
ENVIRONMENTAL FACTOR: Flora and Vegetation **(Aim: Maintain vegetation values, diversity and ecological functions).**							
Loss or degradation of vegetation, threatened flora, TECs	Rare	Major	Medium	There are no known TECs on the property. Furthermore, remnant vegetation has been avoided by siting the proposed development in already cleared areas.	Rare	Major	Medium
Weeds may be introduced to areas of native vegetation, become established and impact the local environment.	Rare	Moderate	Medium	Weed hygiene protocols will be implemented for vehicles and equipment. A weed monitoring and control program will be established during construction and operation. Disturbed areas will be rehabilitated with native species to minimise weed establishment opportunities.	Rare	Moderate	Low

[1] Source: Statement of environmental principles, factors, objectives and aims of EIA (EPA, 2023)

[2] Note that the 'consequence' of an action occurring remains the same, regardless of the 'likelihood'.

ISSUE	UNMANAGED RISK			MANAGEMENT	MANAGED RISK		
	Likelihood	Consequence	Risk		Likelihood	Consequence[2]	Risk
Dieback may be introduced or become present and impact on the local and onsite vegetation.	Possible	Minor	Medium	Dieback hygiene practices will be in place at the site as required.	Rare	Minor	Low
Environmental Factor: Terrestrial Fauna **(Aim: Maintain habitat and fauna communities).**							
Native fauna (individuals and communities) significantly impacted by the operation through land clearing, introduction of weeds and disease and activities on site.	Unlikely	Minor	Medium	Vegetated areas will be avoided. Likelihood and consequence are as indicated due to lack of vegetation on the site prior to development.	Rare	Minor	Low
Threatened and Priority Fauna disturbed and impacted by the operation (predominantly through clearing).	Rare	Minor	Low	Vegetated areas will be avoided. Likelihood and consequence are as indicated due to lack of vegetation on the site prior to development.	Rare	Minor	Low
Environmental Factor: Inland waters **(Aims: Avoid impact to surface and ground water features and maintain hydrological regimes and water quality).**							

ISSUE	UNMANAGED RISK			MANAGEMENT	MANAGED RISK		
	Likelihood	Consequence	Risk		Likelihood	Consequence[2]	Risk
Hydrological impact to surface water features (watercourses and/or wetlands) through draining/flooding or changes to water regimes. In this instance, there are limited hydrological features in the vicinity.	Possible	Slight	Med	There will likely be some additional runoff and stormwater management required on the site. This will be addressed in a detailed Stormwater Management Plan to be prepared once technical details are known.	Rare	Slight	Low
Impact to groundwater through changes to hydrology (changes to recharge, pumping, alterations to flow etc.). There are no proposals to intersect or use groundwater for the project.	Rare	Slight	Low	The operation will not intersect or impact groundwater.	Rare	Slight	Low
Environmental Factor: Landforms and Terrestrial environmental quality **(Aims: Maintain the integrity, safety of landform and soils).**							
Soils subject to significant water and wind erosion due to the 'wind erosion' soil quality being 'high risk' in this broader locality	Possible	Moderate	Medium	Appropriate measures to control dust and limit wind erosion will be implemented as part of the Construction Management Plan.	Unlikely	Moderate	Medium

ISSUE	UNMANAGED RISK			MANAGEMENT	MANAGED RISK		
	Likelihood	Consequence	Risk		Likelihood	Consequence[2]	Risk
The development creating a visual impact.	Possible	Moderate	Medium	The site is a western extension of an existing renewable energy hub (comprising solar farm, BESS, switchyard), along with a diesel powered power plant, and as such the proposal will not be introducing new visual elements to the locality.. A detailed VIA has been undertaken (refer **Appendix H**). This proposes key visual amenity actions to minimise visual impact.	Possible	Minor	Med
Environmental Factor: Social surroundings **(Aims: Protection of known heritage sites).**							

ISSUE	UNMANAGED RISK			MANAGEMENT	MANAGED RISK		
	Likelihood	Consequence	Risk		Likelihood	Consequence[2]	Risk
Impact to Aboriginal Heritage Sites.	Rare	Minor	Low	No Aboriginal Heritage sites are located on or adjoining the site. A desktop aboriginal heritage study has been undertaken and demonstrates that there are no heritage sites over the site and has made recommendations in line with best practices should during the construction phase any sites be found. Procedures are outlined in the Aboriginal Heritage Act 1972.	Rare	Minor	Low
Impact to sites of European heritage.	Unlikely	Slight.	Low	There are no local heritage sites within the vicinity of the project location. No management of these is proposed.	Unlikely	Slight	Low

Environmental Factor: Social Surroundings

(Aims: Ensure that operations have minimal off-site impact from noise, dust and traffic and minimise impact to the local community)

ISSUE	UNMANAGED RISK			MANAGEMENT	MANAGED RISK		
	Likelihood	Consequence	Risk		Likelihood	Consequence[2]	Risk
Noise levels cause impact to sensitive land uses (such as residential properties).	Possible	Minor	Med	An acoustic assessment has been undertaken for the proposed facility with recommendations to ensure the facility meets the required environmental standards in relation to noise to the nearest sensitive receptors. Appropriate management measures have been identified in the assessment.	Rare	Slight	Low
Dust emissions cause impact to sensitive land uses (such as residential properties) and cause impact off-site.	Possible	Minor	Med	A dust management plan will form part of the Construction Management Plan.	Rare	Minor	Low

ISSUE	UNMANAGED RISK			MANAGEMENT	MANAGED RISK		
	Likelihood	Consequence	Risk		Likelihood	Consequence[2]	Risk
Buffers and separation distances are not adequate enough to reduce impact on sensitive land uses.	Unlikely	Slight	Low	The proposed development will be set back from site boundaries under the applicable development requirements of the Shire's Local Planning Scheme. The project represents a western expansion of an existing renewable energy hub and there are no sensitive land uses within the nearby vicinity aside from houses identified earlier. These houses are closer to the existing solar farm, and thus the impact of this proposal should not be significant.	Unlikely	Slight	Low

6.3 Environmental Management – response to risk

The following table outlines the response to the *managed risks* identified in **Table 6.5**.

Table 6.5 - Managed risk response

Risk	Potential Impact	Assessment	Management
Landscape and Visual Impact	Potential for impact on visual amenity for nearby sensitive land uses (houses) and the surrounding rural area.	The site is a western expansion of the current renewable energy hub in this locality. It is noted that there are several houses nearby. The two closest houses to the east are adjacent to the existing solar farm, and the development of the current proposal will have negligible additional visual impact. The closest houses to the south are well screened from the site by existing road reserve vegetation along Bruce Rock-Merredin Road.	Refer to the Visual Analysis (**Appendix H**). Mitigation measures recommended include the use of non-reflective materials and colours that recede visually into the landscape, strategic siting of the solar arrays to minimise reflection, installation of low berms and landscape screening at key locations along Bruce Rock-Merredin Road and Robartson Road and the use of shrouded lighting to reduce light spill beyond the site boundaries.
Soil management	Potential for erosion and degradation of soil qualities.	Construction of the project will result in some soil disturbance through movement of machinery across the land and digging/backfilling of trenches for the cabling, also small civil works will be required for the distributed battery system. There may be some potential for soil erosion as the soil becomes disturbed, particularly wind erosion, and this will need to be managed via a Dust Management Plan. The site has low risk of water erosion, which should assist in mitigating any future water runoff, however this will be considered further within the Construction Management Plan. Following construction, the site will naturally continue to grow pasture which will help bind the soil and decrease erosion.	Soil disturbance and erosion can be managed during the construction phase using water to suppress the creation of dust (and wind erosion). Following construction, the likelihood of soil disturbance will be low. The growth of pasture across the site will help manage soil erosion.
Vegetation and habitat	Removal and degradation of native vegetation and habitat for native fauna.	The site is already largely cleared of native vegetation and there are no plans to remove further vegetation.	This site was selected for the development because it is largely cleared of native vegetation. Areas of native vegetation have been identified for retention.

Risk	Potential Impact	Assessment	Management
	Potential impact to threatened species including Threatened and Priority Flora, Threatened and Priority Fauna and Threatened Ecological Communities.	Vegetation along the property boundaries will be retained Therefore, it is concluded that the proposed development will not have a significant impact to native flora and fauna.	Given that there is no proposed clearing as part of the proposed development there will be no impact on the existing threatened ecological communities.
Water resources and drainage	Modification and degradation of surface and groundwater features and modification to drainage flow (either increase or decrease in flow) which can have impacts downstream.	There are no concerns about flooding on the property (flood risk and waterlogging risk is low). There are no drainage lines on the site that will be impacted.	The preparation and approval of a Stormwater Management Plan is expected as a condition of any development approval.
Separation distances	Potential impact on nearby sensitive receptors.	The nearest closest residences are located around 1.5km to the east and south, separated by the Bruce Rock-Merredin Road, a significant vegetation buffer, and the existing Merredin Solar Farm. As is outlined below, the potential impacts associated with noise, dust, visual amenity, odour and reflection will be minimal and, as such, impacts to nearby sensitive land uses will be low.	The vegetation between the proposed solar farm and the nearest closest residence located to the east should be maintained to provide a visual buffer with additional planting put in place during the construction period. Vegetation around the perimeter of the property will be maintained to provide a visual buffer from the road. Impacts typically associated with noise, dust, odour, reflection and visual amenity will be negligible. The proponent has worked closely with the acoustic co-consultant and as demonstrated within the attached acoustic report the noise associated with the batteries located throughout the site can be made compliant with the applicable environmental regulations.
Dust	The potential for the creation of dust from the operation which may reach adjoining properties and sensitive land uses.	Some dust may be created during the construction phase as footings are installed and machinery moves across the site. However, as the site is relatively large, it is expected that the likelihood of dust leaving the boundary of the property is low. It should also be noted that current agricultural practices over the site create dust as part of normal farming practices so it is envisaged that during the construction phase the	A watercart can wet the soil if dust levels are high. Refer to suggested dust management actions in Section 6.4 below. Once the site is operational pasture will naturally grow in between solar panels which will assist with the reduction of soil erosion and dust suppression.

Risk	Potential Impact	Assessment	Management
		creation of dust will be no more than normal farming practices. Once the site is fully constructed there will be minimal to no dust creation. Dust may only be created when maintenance is being undertaken on the site which will take place on an ad hoc basis.	
Noise	The potential for the creation of noise from the operation which may reach adjoining properties and sensitive land uses.	Some noise will be emitted during construction, largely from piling rigs, machinery and vehicles. Once the site is fully constructed, there will be no audible noise from the boundary of the site. The BESS located on the site generates noise through the use of fans contained within the battery packs.	The nature of a solar farm installation ensures that there is no excess noise generated from the installation of the panels themselves. The proponent has worked closely with the acoustic co-consultant and as demonstrated within the attached acoustic report the noise associated with the batteries located throughout the site can be made compliant with the applicable environmental regulations.

6.4 Dust Management

The Dust Management Plan actions, responsibilities and timing is presented in in **Table 6.6** below. It is anticipated that that the dust management actions will be refined and incorporated into the Construction Management Plan prior to development on site occurring.

Table 6.6 - Dust management plan – during construction

Indicative Management/Action	Responsibility
When winds are sufficiently strong to negate the effects of dust management, operations will cease until conditions improve and compliance can be achieved. The team have authority to stop work if they see visible dust issues, especially if wind conditions deteriorate.	Construction Project Manager
Maintain all equipment in good condition.	Construction Project Manager
Keep vehicle speed limits low throughout the site.	Construction Project Manager
Continue training programmes on dust control requirements to all workers and contractors.	Construction Project Manager

Indicative Management/Action	Responsibility
All non-conformances and dust related complaints immediately reported to the CPM.	Construction Project Manager
Following complaints, the source of any excessive dust will be identified and work practices will be modified or re-scheduled to reduce or eliminate the risk of future events.	Construction Project Manager
A notice is placed on site with contact details of the CPM and details as to where dust complaints are to be addressed. It will be displayed at all times.	Construction Project Manager
Maintain regular communication with the owners of the nearest sensitive receptors.	Construction Project Manager
Ensure that all site operators are trained to observe whether dust is leaving the property boundary or if adverse weather conditions are present.	Construction Project Manager
Ensure that all site operators are trained in procedures should dust be observed leaving the boundary or if there are adverse weather conditions such as when to stop operations or when to increase dust management measures (such as wetting down areas etc.)	Construction Project Manager
Should dust visibly cross the site boundary at any time, dust suppression measures shall be increased immediately and if works are taking place they shall be modified accordingly. Should dust continue to be generated all works shall cease immediately and the site shall be sufficiently stabilised by application of water until the wind conditions are appropriate to resume works.	Construction Project Manager
Watercarts will be utilised to wet down access tracks to prevent dust generation. Water for the carts should be obtained from the pond onsite.	Construction Project Manager
Chemical dust suppressants (such as Dustex) can be used on unsealed areas if they are planned to be unused for extended periods.	Construction Project Manager
Maintain sealed bitumen at the main site entrance.	Construction Project Manager
Train and discuss the impacts of vehicle speeds on dust generation.	Construction Project Manager

6.5 Construction Management Plan

It is suggested that a Construction Management Plan be prepared prior to on-site work commencing. This will ensure that the management of the site is appropriate for the construction phases and methodologies required to implement the project. The Construction Management Plan will review the management actions identified as part of the Development Assessment process and provide further details on site-specific management as required.

7 Conclusion

The proposed Ngaangk Boodja Battery & Solar Farm represents a well-considered and strategically located development that builds upon Merredin's established renewable energy infrastructure. The site is adjacent to existing energy assets, including the Western Power Merredin Terminal, Merredin Solar Farm, Merredin Energy's Peaking Plant and the Merredin BESS, making it a logical and efficient extension of the local energy hub. The use of predominantly cleared agricultural land minimises environmental impacts and avoids significant disturbance to remnant vegetation.

Community engagement has been a key focus of the Proponent, with early and ongoing consultation undertaken with Traditional Owner groups, the Shire of Merredin, and local stakeholders. Feedback received to date has been positive, and the Proponent remains committed to transparent communication and collaboration throughout all phases of the project.

Comprehensive planning and technical assessments demonstrate that the development is consistent with relevant State and local planning frameworks, including State Planning Policies 2.0, 2.5 and 3.7, and Shire of Merredin Local Planning Scheme No. 6. The proposal supports the transition to clean energy, contributes to regional economic growth, and remains compatible with ongoing agricultural activities in the area. The facility's design and operational approach ensure that potential off-site impacts—such as noise, dust, traffic and visual amenity—are appropriately managed and maintained within acceptable limits.

Assessment of bushfire, traffic, noise, visual impact and environmental considerations confirms that the development will not adversely affect the amenity, safety or character of the locality. Construction and operational activities have been planned to minimise disruption and the site's separation from sensitive receptors further reduces the likelihood of adverse impacts.

Therefore, it is requested that the Shire of Merredin and the Regional Development Assessment Panel favourably consider the proposal and grant Development Approval for the Ngaangk Boodja Battery & Solar Farm.

APPENDIX A
Application Forms

Application for development approval

SHIRE OF MERREDIN
INNOVATING THE WHEATBELT

Owner details		
Name: Ross Milton Robartson		
ABN (if applicable):		
Address: PO Box 109, Merredin, Western Australia		
		Postcode: 6415
Phone: Work:	Fax:	Email: rossrobartson@bigpond.com
Home:		
Mobile: 0428 411 516		
Contact person for correspondence : Jorge Quezada (jorge.quezada@nomadenergy.com.au)		
Signature: RM Robartson		Date: 16th Dec 23
Signature:		Date:

The signature of the owner(s) is required on all applications. This application will not proceed without that signature. For the purposes of signing this application an owner includes the persons referred to in the Planning and Development (Local Planning Schemes) Regulations 2015 Schedule 2 clause 62 (2).

Applicant details (if different from owner)		
Name: Land Insights		
Address: PO Box 289, Mt Lawley, Western Australia		
		Postcode: 6929
Phone: Work: 1300 725 522	Fax:	Email: roy@landinsights.com.au
Home:		
Mobile: 0488 190 873		
Contact person for correspondence : Roy Winslow		

The information and plans provided with this application may be made available by the local government for public viewing in connection with the application. ☐ Yes ☐ No

Signature:	Date: 22-12-2025

Property details		
Lot No: 19448 & 27381	House/Street No:	Location No:
Diagram or Plan No: 229756 & 150842	Certificate of Title Vol. No: 1400/393 (for both)	Folio:
Title encumbrances (e.g. easements, restrictive covenants): C734821 EASEMENT TO THE STATE ENERGY COMMISSION OF WESTERN AUSTRALIA		
Street Name: Robartson Road	Suburb: Nangeenan	
Nearest street intersection: Robartson Road and Bruce Rock-Merredin Rd		

Proposed development		
Nature of Development Solar PV and Battery	☐ Works ☐ Use ☒ Works and use	Generation, Storage and transmission of Electricity
Is an exemption from development claimed for part of the development? ☐ Yes ☒ No		
If yes, is the exemption for	☐ Works ☐ Use	
Description of proposed works and/or land use: RENEWABLE ENERGY FACILITY — Construction of Solar PV and Battery and subsequent Generation, Storage and transmission of Electricity		
Description of exemption claimed (if relevant):		
Nature of any existing buildings and/or land use: Farm land		
Approximate cost of proposed development: $335 MM AUD		
Estimated time of completion: Q3 2029		

OFFICE USE ONLY

Acceptance Officer's initials:	Date Received:
Local government reference No:	

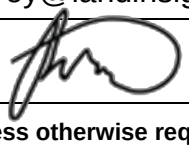
DAP FORM 1

Notice of Development Application to be Determined by a Development Assessment Panel

Planning and Development Act 2005
Planning and Development (Development Assessment Panel) Regulations 2011 – regulations 6, 7, 10 and 21

Part A – Applicant Details

- By completing this notice, I declare that all the information provided in this application is true and correct.
- I understand that the information provided in this notice, and attached forming part of the development application will be made available to the public on the Development Assessment Panel and local government websites.

Name/Company	Land Insights	
Contact Person	Roy Winslow	
Address	*Street Number/PO Box number, street name, suburb, state, postcode* 25/108 St Georges Terrace PERTH WA 6000	
Contact Details	*Email* roy@landinsights.com.au	*Phone* 0488 190 873
Signature		*Date* 19 December 2025

Please note: unless otherwise requested, the DAP Secretariat will contact you via your nominated email address provided above.

Part B - Application Details

Responsible Authority	*Name of local government and Western Australian Planning Commission (if applicable)* Shire of Merredin	
Planning Scheme(s)	*Name of planning scheme(s) that applies to the prescribed land* Local Planning Scheme No.06	
Land	*Lot number, street number, street name, town/suburb* Lot 19448 on DP 229756, Robartson Road, NANGEENAN Lot 27381 on DP 150842, Robartson Road, NANGEENAN	
Certificate of Title (provide copy)	*Volume Number* 1400	*Folio* 393 (Both lots are on same title)
	Location Number Avon Locations 19448 & 27381	*Plan / Diagram Number* See above
Details of development application made to responsible authority	*Summary of Proposal* Construction and operation of solar farm and BESS facility	
Development Use	*Residential / Commercial / Industrial / Rural / Mixed Use / Community Housing/ Other* Use not listed - Renewable energy facility	
Estimated cost of development (GST Exc)	$335,000,000	

Part C – Election as DAP Application or Delegated Application

DAP Application	☒ I give notice that I have elected to have the development application that accompanies this form determined by a Development Assessment Panel *(regulation 6 & 7)*
Delegated Application	☐ I give notice that I understand that this is an application of a class delegated to a Development Assessment Panel for determination *(regulation 19)*

Part D – Community Housing Provider

By completing this notice, I declare that the development is or includes community housing that is to be provided by a registered community housing provider as defined by Regulation 3.	
Provider's Name	N/A
Contact Details	
DAP Community Housing Provider Register Reference	

Part E – Acknowledgement by Local Government

Responsible Authority	☐ Local Government (LG) ☐ * Dual – Local Government and Western Australian Planning Commission	
* DUAL reporting details	*If DUAL is selected, please provide details of relevant provision (or within covering letter)*	
Fees for applications *(DAP Regulations - Schedule 1)*	$ Amount that has been paid by the applicant $ Amount to be paid by local government *(delegated applications only - regulation 22)*	
Statutory Timeframe *(regulation 12)*	☐ 60 days (advertising not required) ☐ 90 days (advertising required or other scheme provision)	
LG Reference Number		
Name of planning officer *(Report Writer)*		
Position/Title		
Contact Details	*Email*	*Phone*
Date application accepted as per Clause 63A of the deemed provisions		
Planning Officer's Signature		

Please note that Landowner(s) details are no longer required on this form. The landowner(s) consent as provided on the local government development application form is taken as agreement from the landowner(s) for the applicant to make this election for the subject application.

APPENDIX B
Certificate of Title

WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
1400	**393**

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts

REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

THIS IS A MULTI-LOT TITLE

LAND DESCRIPTION:

LOT 24866 ON DEPOSITED PLAN 148983
LOT 27381 ON DEPOSITED PLAN 150842
LOT 19448 ON DEPOSITED PLAN 229756

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

ROSS MILTON ROBARTSON OF "GLEN WILLS", ROBARTSON ROAD, NANGEENAN
(T C484600) REGISTERED 19/1/1983

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. C734821 EASEMENT TO THE STATE ENERGY COMMISSION OF WESTERN AUSTRALIA FOR ELECTRICITY PURPOSES - SEE INSTRUMENT C734821 AND SKETCH IN VOLUME 1400 FOLIO 393. AS TO LOT 27381 ON DP 150842 ONLY REGISTERED 22/3/1984.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

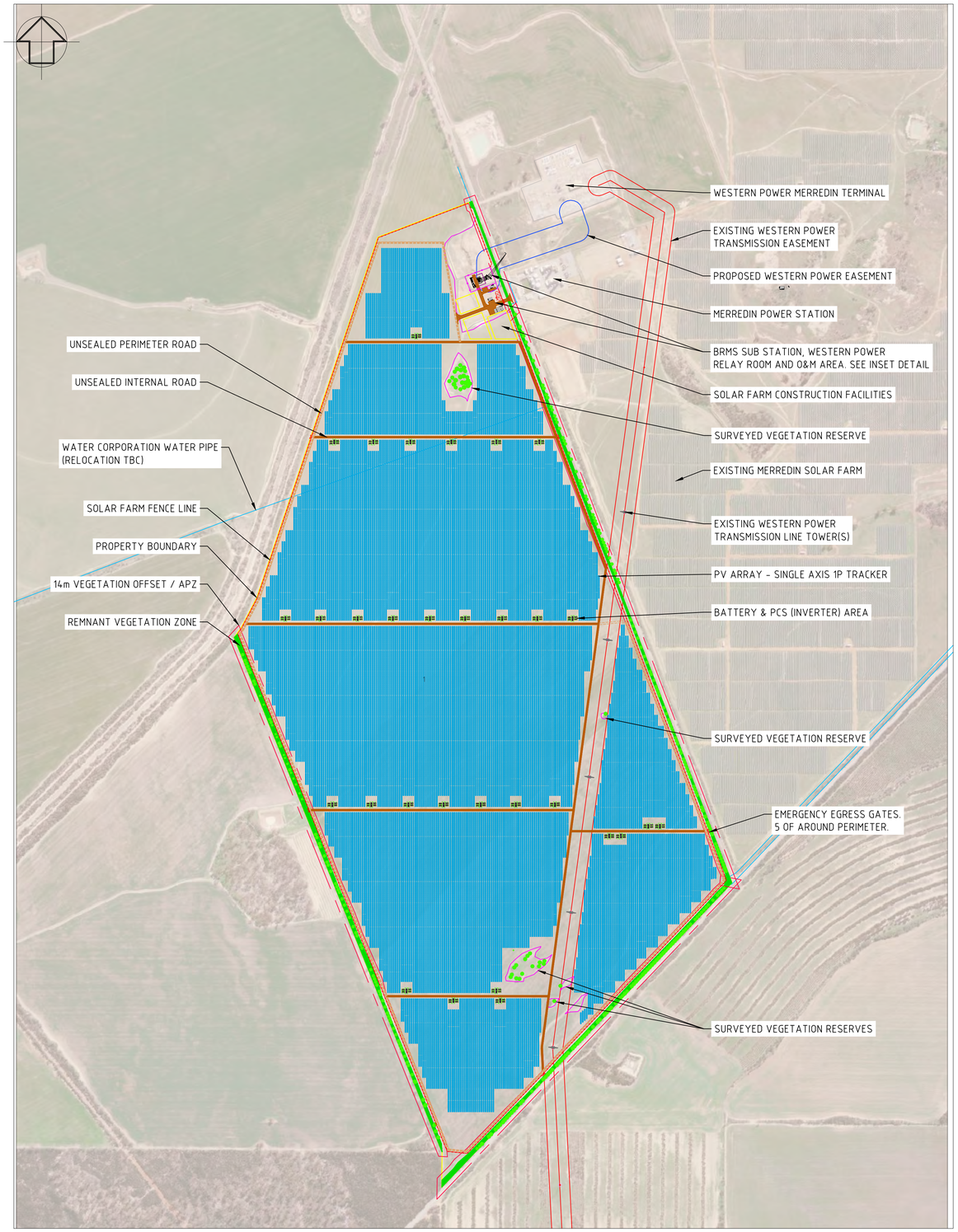
The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	1400-393 (24866/DP148983), 1400-393 (27381/DP150842), 1400-393 (19448/DP229756)
PREVIOUS TITLE:	239-23A
PROPERTY STREET ADDRESS:	NO STREET ADDRESS INFORMATION AVAILABLE.
LOCAL GOVERNMENT AUTHORITY:	SHIRE OF MERREDIN

LANDGATE COPY OF ORIGINAL NOT TO SCALE 13/11/2025 09:34 AM Request number: 69030059

Landgate
www.landgate.wa.gov.au

APPENDIX C
Development Plans



SITE GENERAL ARRANGEMENT SCALE 1 : 7500

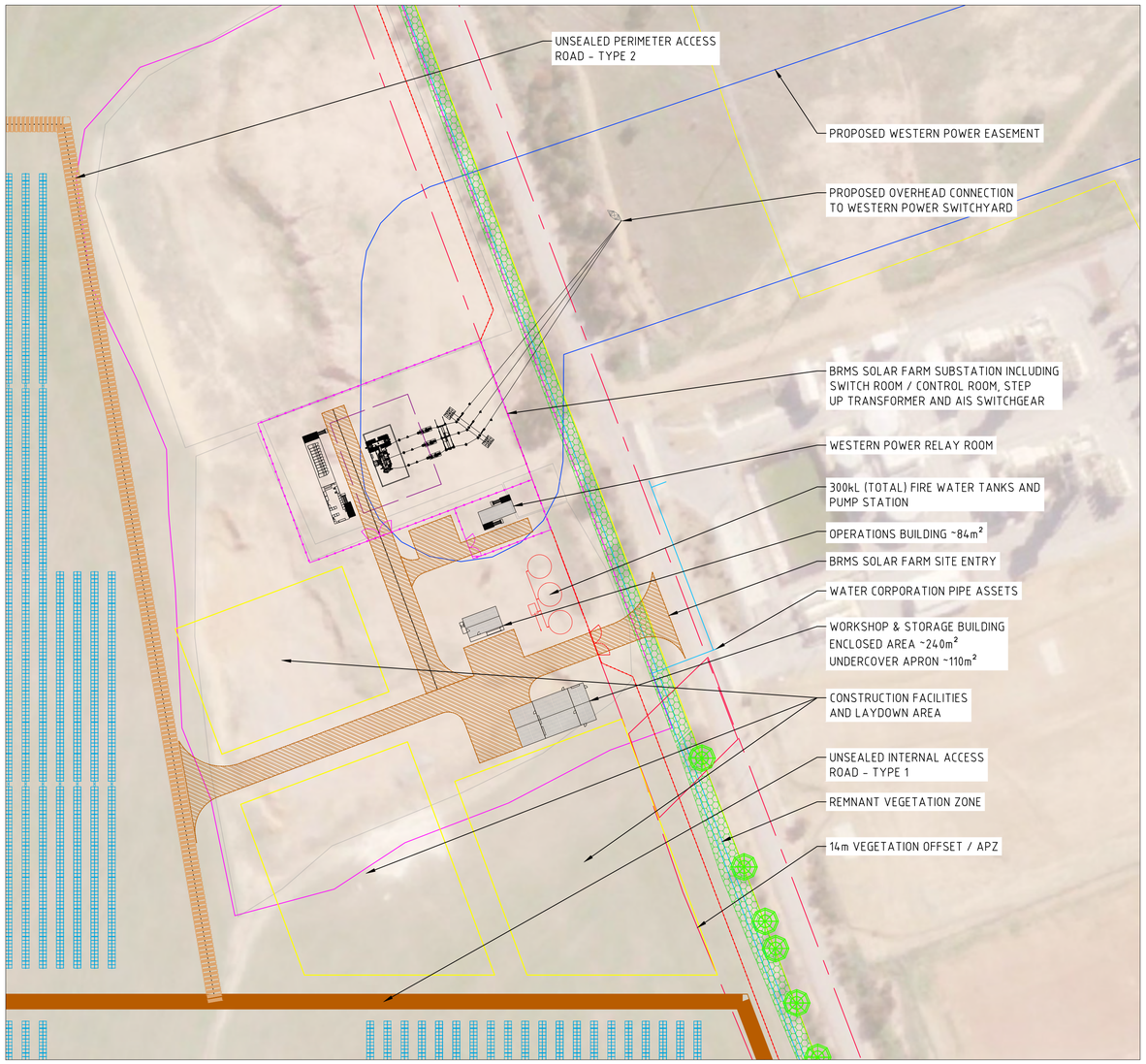
SITE OVERVIEW:

SITE AREA:	~229.5 Ha
FENCED AREA:	~221.6 Ha
SURVEYED VEGETATION AREAS	~1.6 Ha
ASSET PROTECTION ZONE:	14m TBC

SOLAR FARM SYSTEM OVERVIEW:

OVERALL CAPACITY:	
TOTAL PV PLANT (DC):	158.534MWp
TOTAL PV PLANT (AC):	153.450MVA
DC:AC RATIO:	1.033
POWER CONVERSION STATIONS:	
MFR:	SUNGROW
MODEL:	SG 4950UD HV-MV
NAMEPLATE kVA:	4950 kVA
QUANTITY:	31
BATTERY SYSTEM:	
MFR:	SUNGROW
TYPE:	ST 5178 UX
CELL TYPE:	LFP
COOLING:	LIQUID COOLING
CAPACITY (BOL):	5.178MWh
QUANTITY:	124
TOTAL CAPACITY (BOL)	642MWh

PV MODULES:	
MFR:	RISEN
TYPE / MODEL:	TOPCON (RSM132-11-625BNDG)
NAMEPLATE W:	630W (STC FRONTAL)
STRING LENGTH:	28 MODULES
STRING QUANTITY:	8,990
MODULE QUANTITY:	251,720
PV MODULE STRUCTURE:	
TRACKING TYPE:	SINGLE AXIS TRACKER (SAT)
CONFIGURATION:	1 IN PORTRAIT (1P)
MFR:	NEXTRACKER
MODEL:	NX HORIZON
TRACKING RANGE:	+/- 60°
MOTOR POWER SUPPLY:	SELF POWERED (NON PARASITIC)
TRACKER PITCH:	5.80m
TRACKER ORIENTATION:	0.0° AZIMUTH
4 STRING TRACKERS:	1954
3 STRING TRACKERS:	286
2 STRING TRACKERS:	139
1 STRING TRACKERS:	38



SUBSTATION & OPERATIONS AREA SCALE 1 : 1000

SCALE (m) 1 : 7,500 0 20 100 250

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PRELIMINARY

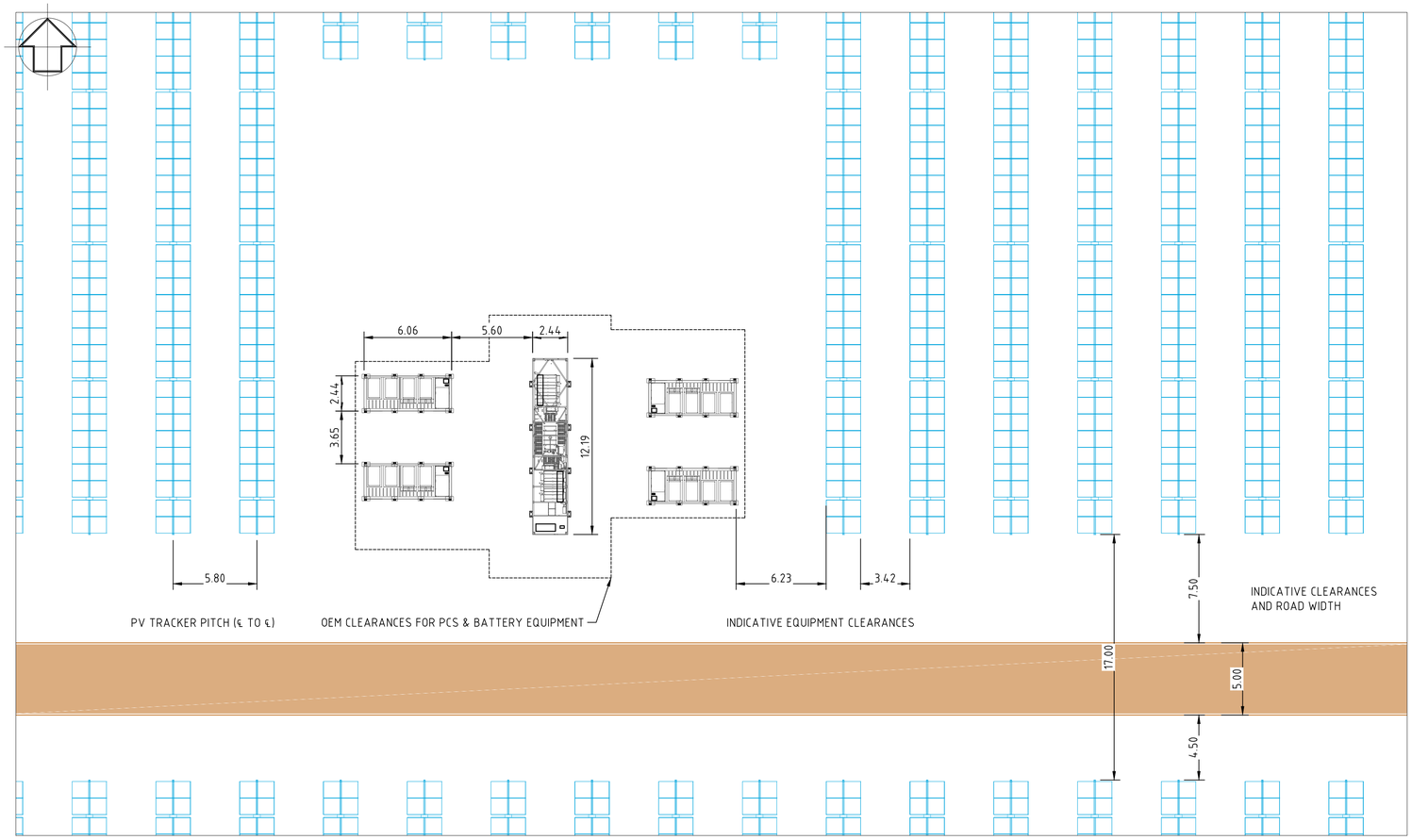
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REFERENCE DRAWINGS	

REV	DATE	DESCRIPTION	DRAWN	CHK'D.	APP'D	CLIENT
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B	24.10.2205	PRELIMINARY CONCEPT REVISED	SS	AS	AS	
A	22.10.2025	PRELIMINARY CONCEPT	SS	AS	AS	

REVISIONS & APPROVALS

PROJECT: BRMS
SITE: MERREDIN W.A.
TITLE: BRUCE ROCK MERREDIN SOLAR & BESS GENERAL ARRANGEMENT

SCALE	SIZE	DRAWING No.	SHEET No.	REV.
1:7500	A1	6682502-G-GAD-001	1 OF 1	C



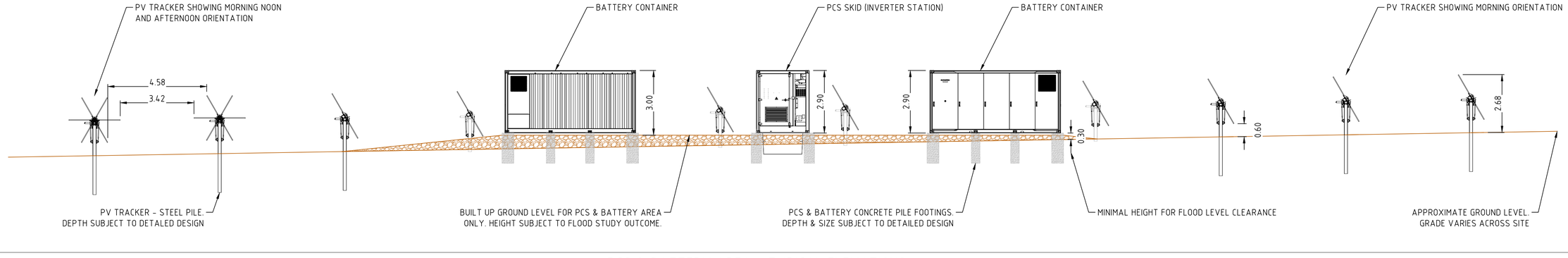
GENERAL ARRANGEMENT - PCS & BATTERY AREA (TYPICAL) SCALE 1 : 200

NOTES:

1. ALL INFORMATION IS PRELIMINARY.
2. EQUIPMENT HEIGHTS ARE SUBJECT TO DETAILED DESIGN ALLOWING FOR FLOODING.
3. TYPICALCONSIDERATION FOR MAJOR EQUIPMENT IS 300mm ABOVE 1:500 YEAR FLOOD LEVEL.
4. PV TRACKER ELEVATION CONSIDERS NOMINAL 600mm AGL TO ALLOW SHEEP GRAZING.

EQUIPMENT HEIGHTS:

- PV TRACKER: 2.68m AGL. TOLERANCE APPROXIMATELY +/- 0.1m FOR VARIATIONS IN GROUND LEVEL ALONG TRACKER LENGTH.
- PCS SKID (INVERTER STATION): 2.9m PLUS FLOOD LEVEL REQUIREMENT
- BATTERY CONTAINERS: 2.9m PLUS FLOOD LEVEL REQUIREMENT



PCS & BATTERY AREA - TYPICAL ELEVATIONS SCALE 1 : 100

SCALE (m) 1 : 100 0 1 2 5

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TEL: 08 9390 6999

PRELIMINARY

DRAWING NUMBER	DRAWING TITLE

REFERENCE DRAWINGS

REV	DATE	DESCRIPTION	DRAWN	CHK'D	APP'D	CLIENT
A	27.10.2025	PRELIMINARY CONCEPT	SS	AS	AS	

REVISIONS & APPROVALS

PROJECT:	SITE:
BRMS	MERREDIN W.A.

TITLE:
BRUCE ROCK MERREDIN SOLAR & BESS
PCS & BATTERY AREA - GENERAL ARRANGEMENT AND ELEVATIONS

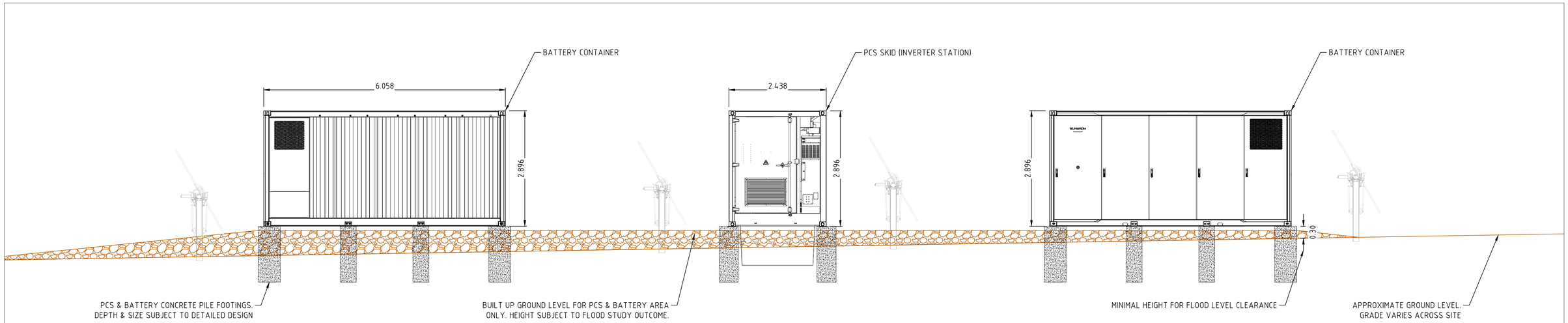
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SHOWN	A1	6682502-G-GAD-002	1 OF 2	A

NOTES:

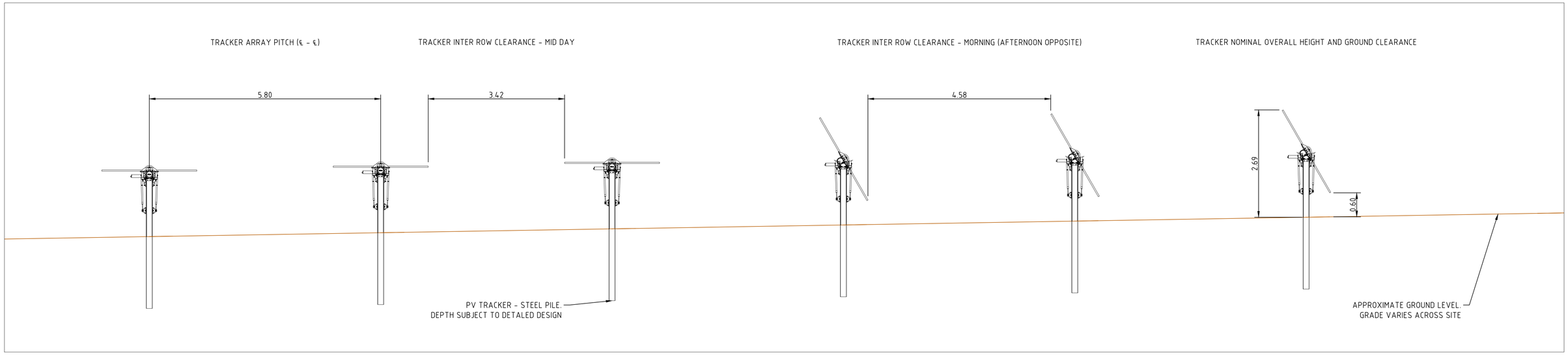
1. ALL INFORMATION IS PRELIMINARY.
2. EQUIPMENT HEIGHTS ARE SUBJECT TO DETAILED DESIGN ALLOWING FOR FLOODING.
3. TYPICALCONSIDERATION FOR MAJOR EQUIPMENT IS 300mm ABOVE 1:500 YEAR FLOOD LEVEL.
4. PV TRACKER ELEVATION CONSIDERS NOMINAL 600mm AGL TO ALLOW SHEEP GRAZING.

EQUIPMENT HEIGHTS:

- PV TRACKER: 2.68m AGL. TOLERANCE APPROXIMATELY +/- 0.1m FOR VARIATIONS IN GROUND LEVEL ALONG TRACKER LENGTH.
- PCS SKID (INVERTER STATION): 2.9m PLUS FLOOD LEVEL REQUIREMENT
- BATTERY CONTAINERS: 2.9m PLUS FLOOD LEVEL REQUIREMENT



PCS & BATTERY AREA - TYPICAL ELEVATIONS SCALE 1 : 50



PV TRACKERS - TYPICAL ELEVATIONS AND DIMENSIONS SCALE 1 : 50

SCALE (m) 1 : 50 0 0.2 0.5 1.0 2.0

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PRELIMINARY

DRAWING NUMBER	DRAWING TITLE
REFERENCE DRAWINGS	

REV	DATE	DESCRIPTION	DRAWN	CHK'D.	APP'D	CLIENT
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REVISIONS & APPROVALS

PROJECT:	SITE:
BRMS	MERREDIN W.A.

TITLE:
BRUCE ROCK MERREDIN SOLAR & BESS
PCS & BATTERY AND PV TRACKERS
ELEVATIONS & DIMENSIONS

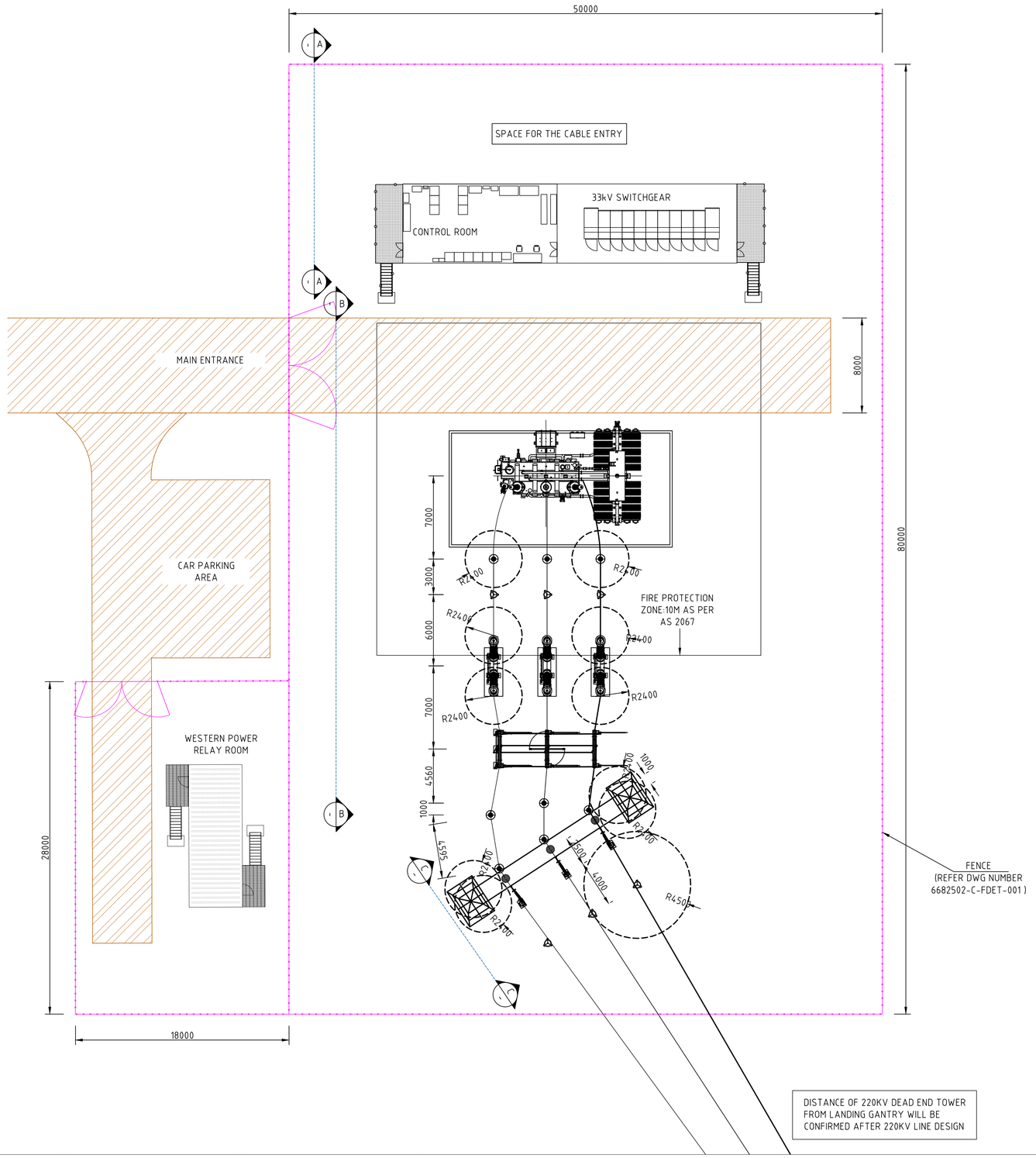
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1 : 50	A1	6682502-G-GAD-002	2 OF 2	A

LEGEND:

SYMBOL	EQUIPMENT
	POWER TRANSFORMER
	BUS POST INSULATORS
	SURGE ARRESTOR
	CAPACITIVE VOLTAGE TRANSFORMER
	HORIZONTAL DOUBLE BREAK DISCONNECTOR WITH DOUBLE EARTH SWITCH
	DEAD TANK CIRCUIT BREAKER
	SUSPENSION INSULATOR
	GANTRY STRUCTURES AND SUPPORTING BEAM
	TENSION INSULATOR

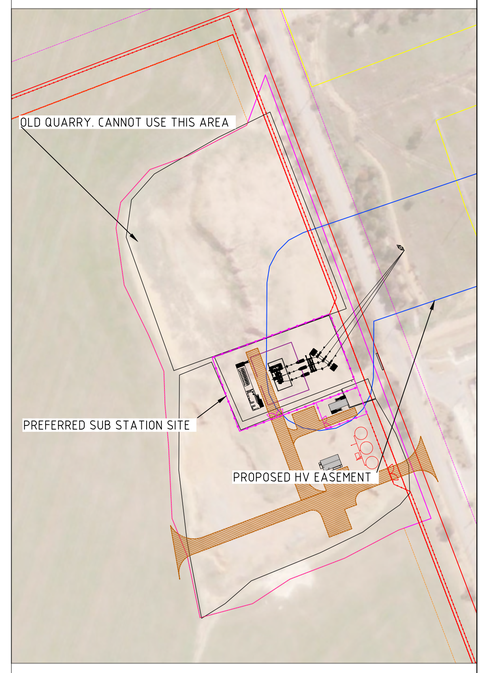
CLEARANCES

S.NO	SYSTEM PARAMETERS	UNITS	33KV SYSTEM	220KV SYSTEM
01	NOMINAL VOLTAGE	kV.r.m.s	33	220
02	HIGHEST VOLTAGE	kV.r.m.s	36	245
03	SHORT DURATION POWER FREQUENCY WITH STAND VOLTAGE	kV.r.m.s	70	460
04	LIGHT IMPULSE WITH STAND VOLTAGE	kVp	170	1050
05	SWITCHING IMPULSE WITH STAND VOLTAGE	MM	–	850
06	MINIMUM PHASE-TO EARTH CLEARANCES	MM	320	2400
07	MINIMUM PHASE-TO PHASE CLEARANCES	MM	370	3100
08	NON FLASH OVER DISTANCE	MM	350	2545
09	GROUND SAFETY CLEARANCES	MM	2440	2440
10	SECTION SAFETY CLEARANCES	MM	2790	4985
11	HORIZANTAL WORK SAFETY CLEARANCES	MM	2250	4445
12	VERTICAL WORK SAFETY CLEARANCES	MM	1690	3885



NOTES:

1. ALL DIMENSIONS ARE IN MM. UNLESS OTHERWISE SPECIFIED.
2. POWER TRANSFORMER GA SHOWN HERE IS TENTATIVE .
3. PLINTH LEVEL FOR EQUIPMENT : 300mm. ABOVE FINISH GROUND LEVEL (FGL).
4. THE TYPE OF TOWERS AND BEAMS SHOWN HERE ARE TENTATIVE, WILL BE FINALIZED DURING DETAILED ENGINEERING.
5. ALL DIMENSIONS ARE INDICATIVE AND ARE SUBJECT TO DETAILED DESIGN.SO AS TO SATISFY ALL SAFETY CLEARANCES. (SECTION,HORIZONTAL,VERTICAL) AND MAINTENANCE CLEARANCES IN ACCORDING WITH AS2067.
6. DETAILED DESIGN TO FURTHER CONSIDER O&M REQUIREMENTS.



SCALE (m) 0 1 5 10
1 : 200

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PRELIMINARY

6682502-C-DET-001	TYPICAL FENCE DETAILS CORNER INTERMEDIATE AND BRACING DETIALS
6682502-E-SLD-001	33/220KV SINGLE LINE DIAGRAM
DRAWING NUMBER	DRAWING TITLE

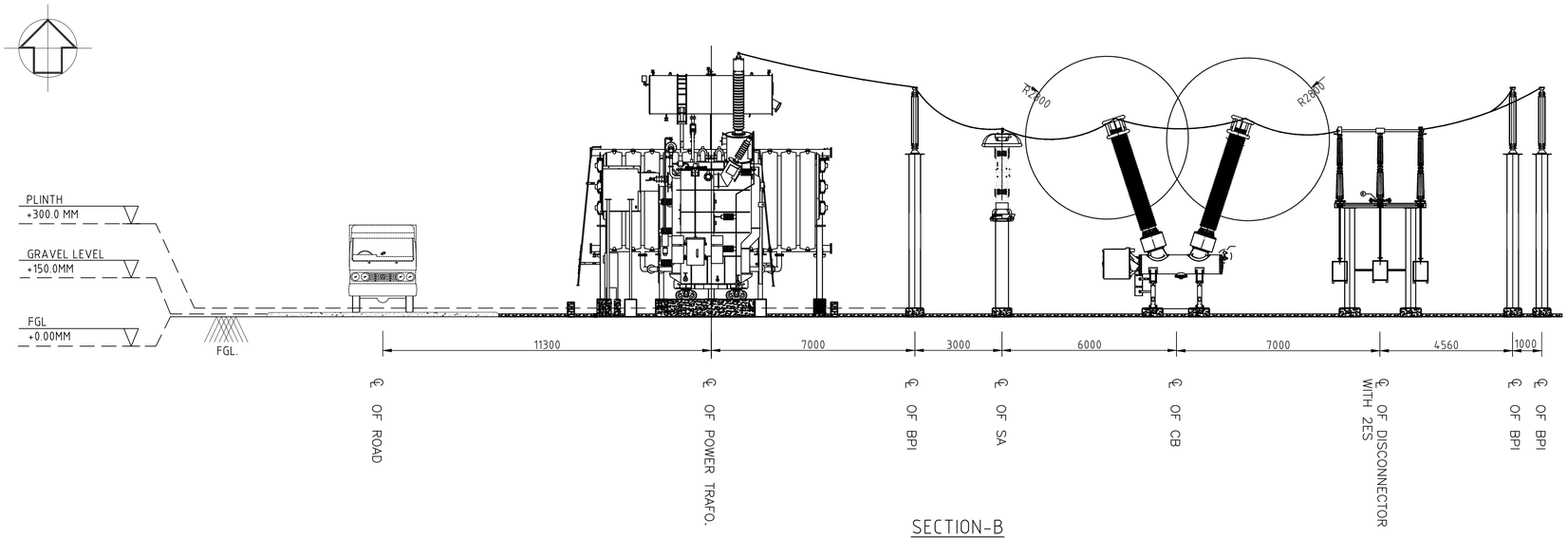
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A	15-10-25	PRELIMINARY	GG	SJ	AS	

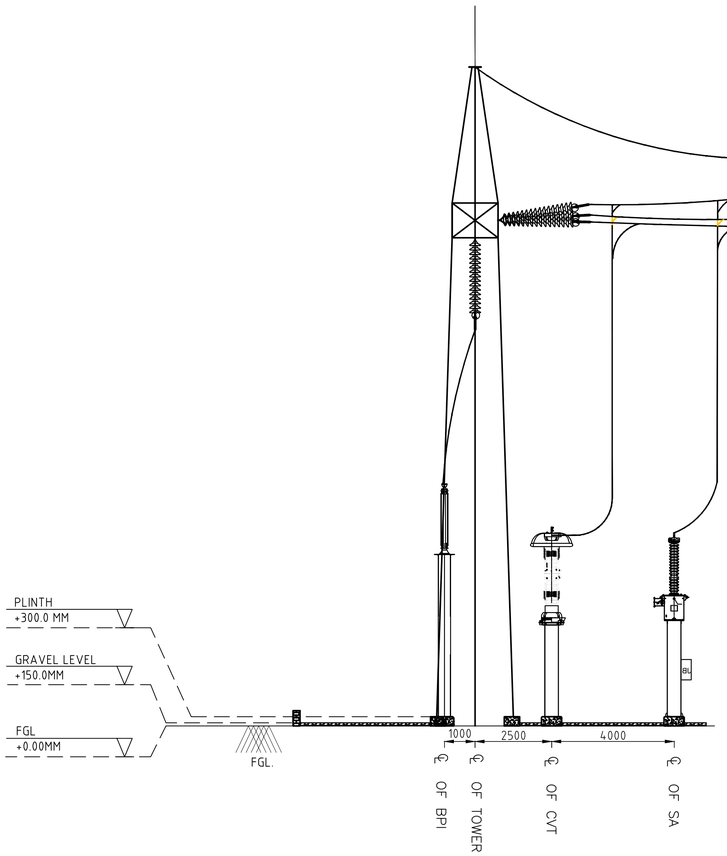
REVISIONS & APPROVALS

PROJECT: BRMS
SITE: MERREDIN, WESTERN AUSTRALIA
TITLE: BRUCE ROCK MERREDIN SOLAR & BESS
33/220KV SWITCHYARD
GENERAL ARRANGEMENT

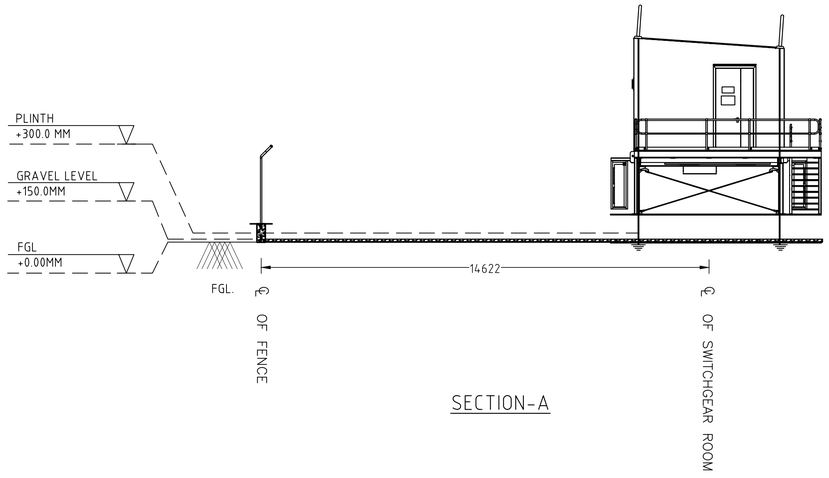
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1:200	A1	6682502-G-GAD-003	1 OF 2	B



SECTION-B



SECTION-C



SECTION-A

NOTES:

1. ALL DIMENSIONS ARE IN MM. UNLESS OTHERWISE SPECIFIED.
2. POWER TRANSFORMER GA SHOWN HERE IS TENTATIVE .
3. PLINTH LEVEL FOR EQUIPMENT : 300mm. ABOVE FINISH GROUND LEVEL (FGL).
4. THE TYPE OF TOWERS AND BEAMS SHOWN HERE ARE TENTATIVE, WILL BE FINALIZED DURING DETAILED ENGINEERING.
5. ALL DIMENSIONS ARE INDICATIVE AND ARE SUBJECT TO DETAILED DESIGN.SO AS TO SATISFY ALL SAFETY CLEARANCES. (SECTION,HORIZONTAL,VERTICAL) AND MAINTENANCE CLEARANCES IN ACCORDING WITH AS2067.

SCALE (m) 0 1 2 5
1 : 100

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PRELIMINARY

DRAWING NUMBER	DRAWING TITLE
6682502-E-SLD-001	33/220KV SINGLE LINE DIAGRAM

REFERENCE DRAWINGS

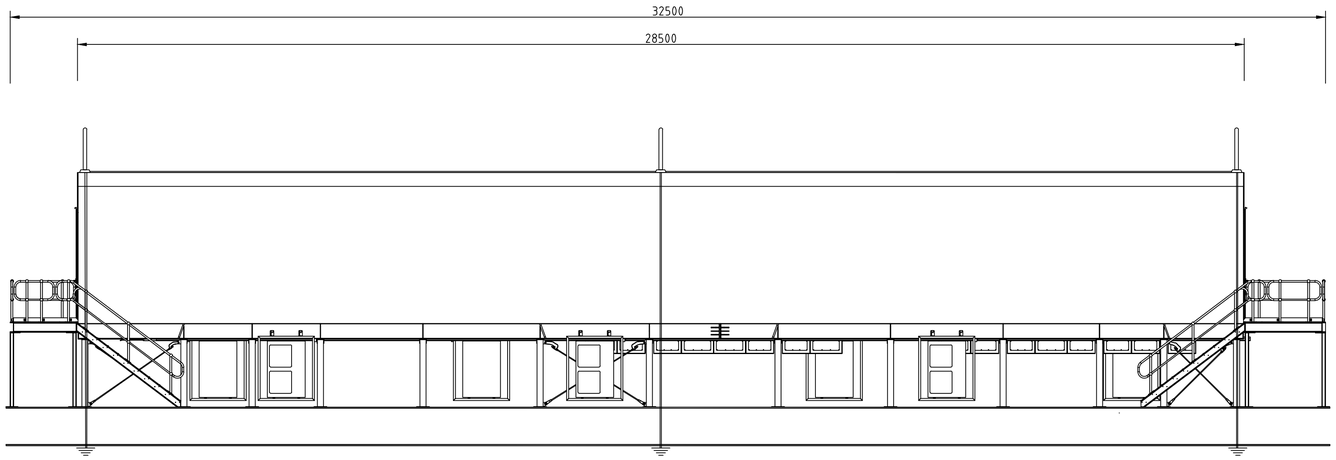
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REVISIONS & APPROVALS

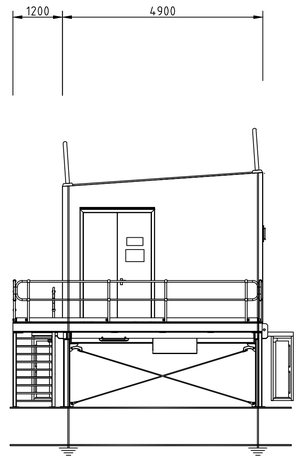
PROJECT: BRMS
SITE: MERREDIN, WESTERN AUSTRALIA

TITLE:
BRUCE ROCK MERREDIN SOLAR & BESS
33/220KV SWITCHYARD
SECTIONAL LAYOUT / ELEVATION

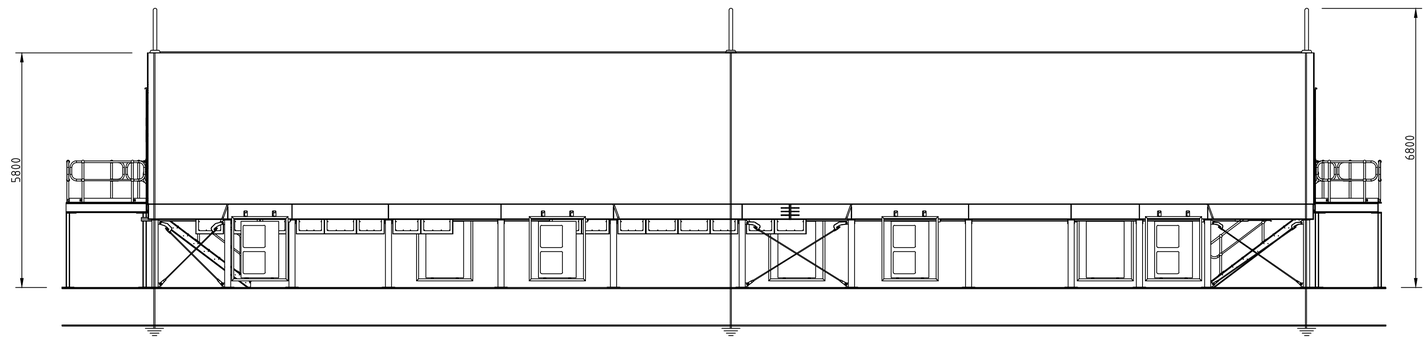
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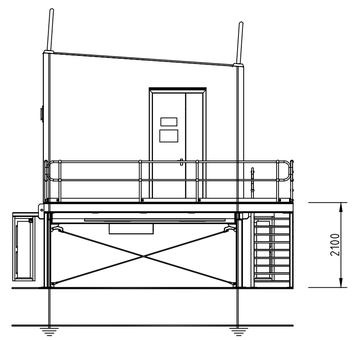
ELEVATION C
1:75



ELEVATION D
1:75



ELEVATION B
1:75



ELEVATION A
1:75

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS (MM) UNLESS OTHERWISE SPECIFIED.
2. THE SWITCHROOM SHOWN HERE IS INDICATIVE ONLY AND WILL BE FINALIZED DURING DETAILED ENGINEERING.

SCALE (m) 0 0.5 1.0 2.0
1 : 75

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BELMONT, WA, 6104
TEL: 08 9390 6999

PRELIMINARY

DRAWING NUMBER	DRAWING TITLE
REFERENCE DRAWINGS	

REV	DATE	DESCRIPTION	DRAWN	CHK'D.	APP'D	CLIENT
A	21-10-25	PRELIMINARY	GG	S.J	AS	

REVISIONS & APPROVALS

PROJECT: BRUCE ROCK MERREDIN SOLAR AND BESS
SITE: MERREDIN, WESTERN AUSTRALIA

TITLE:
SUB STATION SWITCH ROOM
TYPICAL ELEVATION

SCALE	SIZE	DRAWING No.	SHEET No.	REV.
1:75	A1	6682502-G-GAD-005	1 OF 1	A

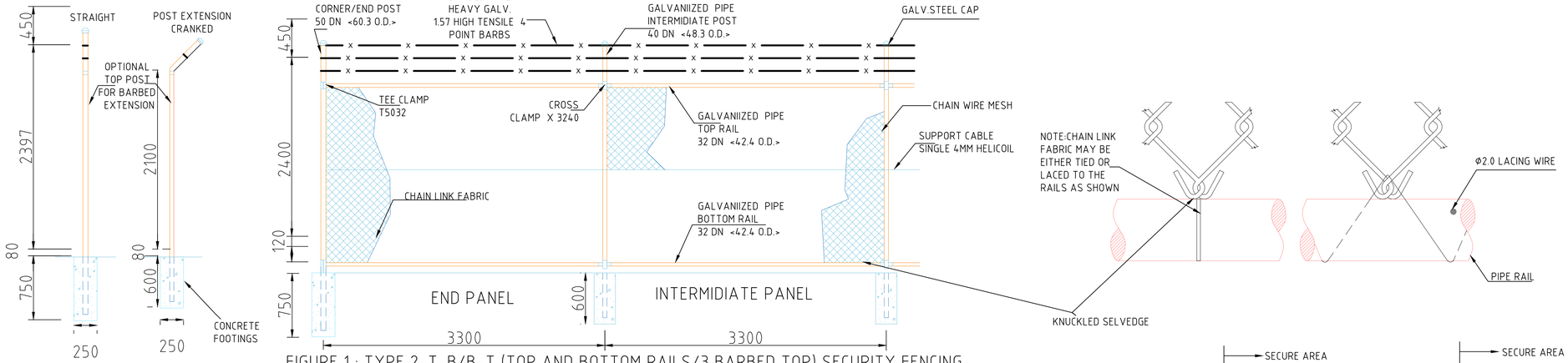
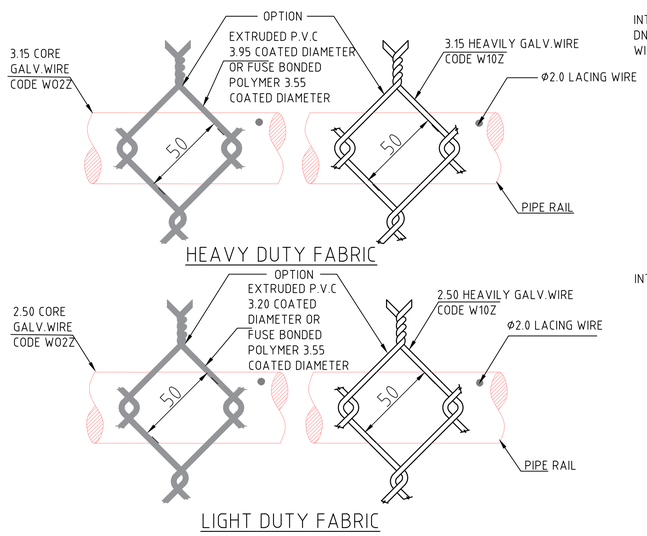
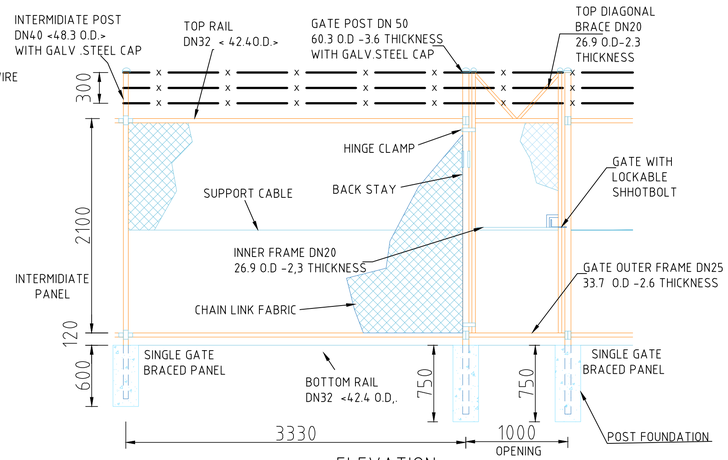


FIGURE 1 : TYPE 2-T-B/B-T (TOP AND BOTTOM RAILS/3 BARBED TOP) SECURITY FENCING



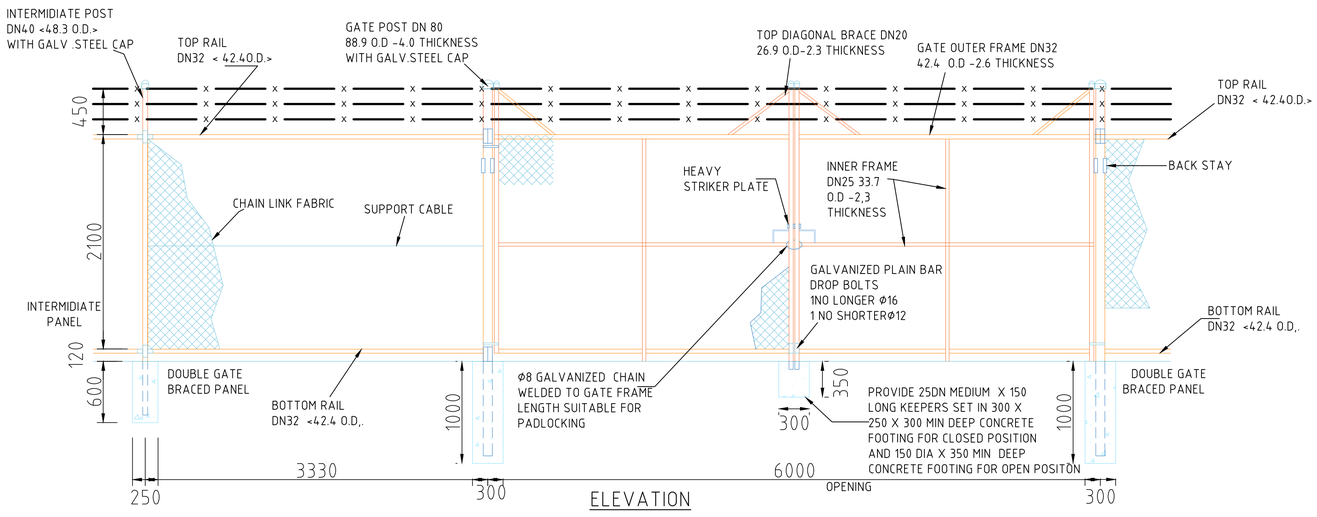
HEAVY DUTY FABRIC

LIGHT DUTY FABRIC



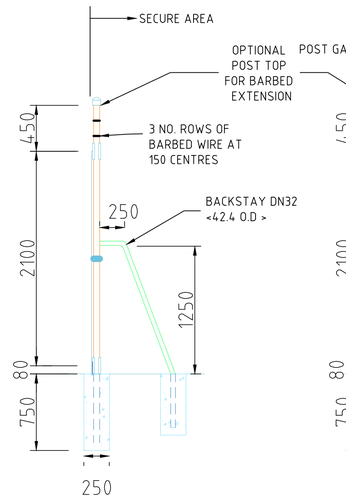
ELEVATION

FIGURE 2 : TYPE 2-T-B/B-T (TOP AND BOTTOM RAILS/3 BARBED TOP) 1000mm OPENING SINGLE GATE

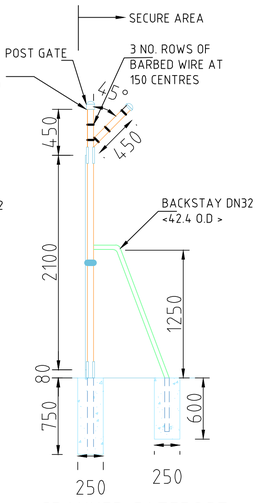


ELEVATION

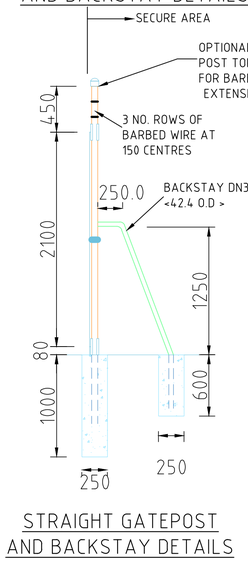
FIGURE 3 : TYPE 2-T-B/B-T (TOP AND BOTTOM RAILS/3 BARBED TOP) 6000mm OPENING DOUBLE GATES



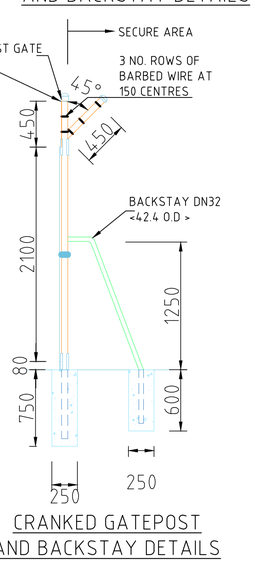
STRAIGHT GATEPOST AND BACKSTAY DETAILS



CRANKED GATEPOST AND BACKSTAY DETAILS



STRAIGHT GATEPOST AND BACKSTAY DETAILS



CRANKED GATEPOST AND BACKSTAY DETAILS

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. PROVISION WILL BE PROVIDED BY FENCING SUPPLIER/MANUFACTURER.
3. THE FENCE WILL BE BONDED AND CONNECTED TO THE SOLAR FARM EARTHING SYSTEM UNLESS OTHER WISE DICTATED BY THE EARTHING STUDY.
4. FABRICATION AND INSTALLATION ARE TO BE IN ACCORDANCE WITH THE REQUIREMENTS OF AS 1725-I-2010
5. PIPE STRENGTH GRADES TO AS 1725-2010: -FENCE :CLASS 1, 250 MPA TO AS/NZS 1163. GATE: CLASS 3, 350 MPA TO AS/NZS 1163.
6. GATES MUST BE IN CLOSED POSITION IN CYCLONIC EVENTS
7. THE FOOTING DESIGN HAS BEEN BASED ON THE ASSUMPTION THAT SOIL AROUND THE PILES ARE TO BE COMPACTED SAND WITH AN ALLOWABLE BEARING PRESSURE OF 150 KPA MINIMUM.

SCALE (m) 1 : 30 — 0 0.3 0.6 1.5

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PRELIMINARY

DRAWING NUMBER	DRAWING TITLE
REFERENCE DRAWINGS	

REV	DATE	DESCRIPTION	DRAWN	CHK'D.	APP'D	CLIENT
A	21-10-25	TYPICAL FENCE DETAILS	GG	S.J.	AS	

REVISIONS & APPROVALS

PROJECT:	BRMS
SITE:	MERREDIN, WESTERN AUSTRALIA
TITLE:	BRUCE ROCK MERREDIN SOLAR & BESS TYPICAL FENCE DETAILS CORNER INTERMEDIATE AND BRACING DETIALS
SCALE	1:30
SIZE	A1
DRAWING No.	6682502-C-DET-001
SHEET No.	1 OF 1
REV.	A

APPENDIX D
Bushfire Management Plan

Bushfire Management Plan Coversheet

Site address:	Lots 19448 and 27381, Robartson Road, Nangeenan						
Site visit / date:	Yes	✓	No		21 November 2025		
Report author or reviewer:	Kathy Nastov						
Not accredited		Level 1 BAL assessor		Level 2 practitioner		Level 3 practitioner	✓
BPAD accreditation number:	27794	Accreditation expiry – month / year		August		2026	
Bushfire Management Plan - version / date:	V1.0	22 December 2025					

If one or more of the following responses are yes, then these should be automatically referred to DFES.	Yes	No
Strategic planning is required to address SPP 3.7 and the Guidelines		✓
The application is a vulnerable land use		✓

If one or more of the following responses are yes, and the decision-maker requires input from DFES, then the application can be referred.	Yes	No
The BAL rating has been calculated by a method other than Method 1 as prescribed by AS 3959	✓	
An outcomes-based approach has been submitted to demonstrate compliance with the bushfire protection criteria		✓

Note: If a subdivision or development application meets all the acceptable solutions and does not otherwise trigger a referral as listed above, seeking advice from DFES on SPP 3.7 or other matters is at the discretion of the decision-maker.

The information provided within this bushfire management plan, to the best of my knowledge, is true and correct:

Dated signature of report author or reviewer:		22 December 2025

BUSHFIRE PRONE PLANNING

Ngaangk Boodja Battery & Solar Farm

Bushfire Management Plan

(PREPARED FOR PLANNING APPLICATION ASSESSMENT PURPOSES)



Compiled in accordance with State Planning Policy 3.7 Bushfire and the Planning for Bushfire Guidelines

Lot 19448 on Plan 22975 and Lot 27381 on Plan 150842
Robartson Road, Nangeenan

Shire of Merredin

Development Application - Commercial/Industrial Development

19 December 2025

Job Reference No: 251119

BPP GROUP PTY LTD T/A BUSHFIRE PRONE PLANNING

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VERSION HISTORY		
Version	Status/Details	Date
1.0	Original	22 December 2025

DISTRIBUTION					
Destination		Version	No. Copies	Hard Copy	Electronic Copy
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LIMITATIONS AND DISCLAIMER

Management of Risks Associated with Bushfire

For the subject planning proposal, the protection measures to be implemented based on information presented in this Bushfire Management Plan, prepared for land-use planning purposes, are the minimum requirements for management of the relevant risks.

The applied protection measures do not guarantee that during a bushfire event, no buildings or infrastructure will be damaged, persons injured, or fatalities occur - either on the subject site or off the site when evacuating.

This is substantially due to the unpredictable nature of fire weather conditions, bushfire behaviour and the actions of landowners and/or operators – including the correct implementation and ongoing maintenance of required and recommended protection measures (including bushfire resistant construction) and complying with public bushfire warnings and directions from emergency services - over which Bushfire Prone Planning has no control.

Provision of Mapping Data

All maps included herein are indicative in nature and are not to be used for accurate calculations. This data has been prepared for bushfire risk management planning purposes only. All depicted areas, contours and any dimensions shown are subject to survey.

Bushfire Prone Planning does not guarantee that this data is without flaw of any kind and disclaims all liability for any errors, loss or other consequence arising from relying on any information depicted.

When the separate provision of Digital Geographic Data (GIS Files) is an agreed project deliverable, these should be used in conjunction with the relevant information presented in the associated report. Areas and/or Dimensions specified in the report will have priority over digital data transmitted and must correspond to the final 'as-built' location of the applicable buildings, other structures or boundaries.

***Bushfire Prone Planning's** Liability*

All surveys, forecasts, projections and recommendations made in this report, associated with the subject planning proposal, are made in good faith based on information available to Bushfire Prone Planning at the time.

Notwithstanding anything contained therein, Bushfire Prone Planning will not, except as the law may require, be liable for any loss or other consequences whether or not due to the negligence of their consultants, their servants or agents, arising out of the services provided by their consultants.

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STATEMENT OF PURPOSE – THE **'PLANNING'** BUSHFIRE MANAGEMENT PLAN

EXPLANATORY INFORMATION

SITE/USE PLANNING

This BMP is produced to present the information necessary for a planning proposal's assessment against the State's bushfire planning requirements. The developed information is to inform and assist decision-making authorities, planners, landowners/proponents and referral agencies in their implementation WA's State Planning Policy 3.7 Bushfire – and where relevant, any supplementary provisions of a local planning scheme or policy.

Policy Document Versions Applied in This BMP	State Planning Policy 3.7 Bushfire (SPP 3.7)	November 2024	Planning for Bushfire Guidelines (supporting SPP 3.7)	November 2024

> The Stated Intent of SPP 3.7 is to *implement effective, risk based land use planning and development which in the first instance avoids bushfire risk, but where unavoidable, manages and/or mitigates the risk to people, property and infrastructure to an acceptable level. The preservation of life and the management of bushfire impact are paramount.*

SITE OPERATIONS

This BMP is not an 'operational' BMP for property and operations management. Such a BMP would apply additional and more specific bushfire protection measures to more comprehensively reduce the level of risks associated with a bushfire event. These being the potential loss of life, injury, or destroyed or damaged assets which results in personal loss and economic loss.

However, this 'planning' BMP does establish certain responsibilities for the implementation and maintenance of the bushfire protection measures that are considered the minimum for bushfire planning decision making.

BUSHFIRE RESISTENT CONSTRUCTION

This 'planning' BMP is not required to consider the requirement to construct certain buildings, in designated bushfire prone areas, to the standard corresponding to the Bushfire Attack Level (BAL) they are subject to. This requirement is dealt with under the State Building Act 2011/Building Regulations 2012 and the referenced Building Code of Australia.

DETERMINED BUSHFIRE ATTACK LEVEL (BAL) RATINGS AND CONSTRUCTION – CAUTION!

For construction purposes a determined (not indicative) BAL rating is required to be known and a BAL Certificate produced for submission with a building application. This establishes the construction design and materials that are to be complied with in accordance with AS 3959 Construction in bushfire prone areas (as amended) and/or NS 300 NASH Standard Steel Framed Construction in Bushfire Areas (as amended).

This 'planning' BMP cannot necessarily determine a BAL rating that will apply to a future building. All variables required for that calculation may not be known at the assessed stage of planning. For example, actual location of a building footprint on a lot and/or any classified vegetation that will remain, at the time of construction, within the lot or on neighbouring lots.

This 'planning' BMP is only required to identify if a viable sized building can be located on a lot and be subject to a BAL rating not exceeding BAL-29, based on certain allowable assumptions. This is a planning requirement not a building requirement and a BAL contour map can be used to illustrate this information as an 'indicative' BAL rating.

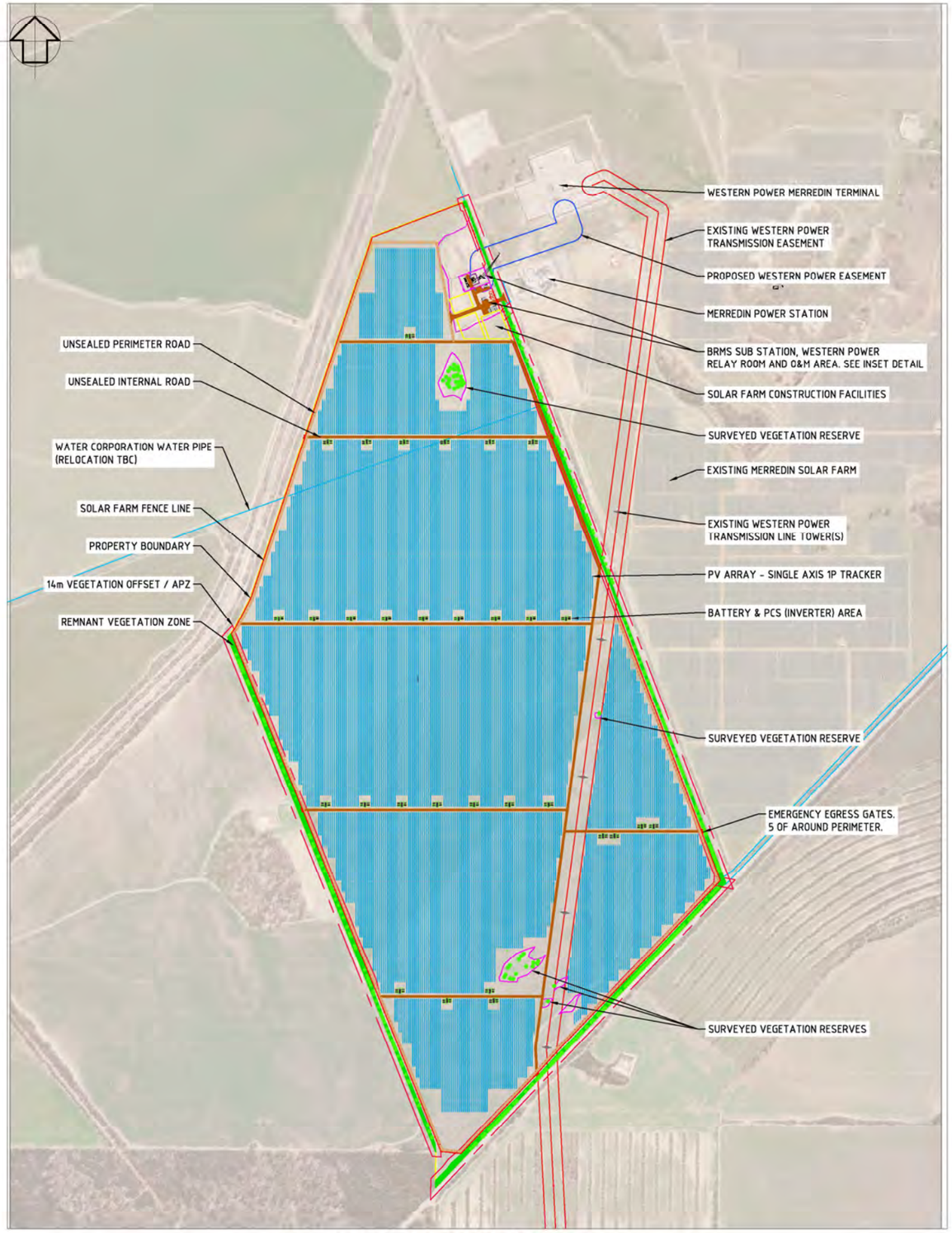
Be aware that typically you cannot derive the determined BAL rating for a future building(s) on a specific lot from a BAL contour map (when presented in a BMP prepared for planning approval purposes). This is only possible in limited circumstances.

Planning assessment requirements are different to building assessment requirements. Refer to explanatory information above and Appendix B1 and B2 for additional information.

1 THE PLANNING PROPOSAL

1.1 Details, Plans and Maps

SUBJECT LAND AND PROPONENT (LANDOWNER)		
Address Details	Lot 19448 on Plan 22975 and Lot 27381 on Plan 150842, Robartson Road, Nangeenan	
Applicable Local Government	Shire of Merredin	
Proponent	BRM Solar Farm Nominee Pty Ltd as Trustee for the BRM Solar Farm Trust	
Entity Commissioning Production of the BMP	Jorge Quezada	
THE PLANNING PROPOSAL STAGE AND TYPE		
Development Application	☑	Construction of a habitable building that is subject to bushfire planning requirements.
DESCRIPTION		
The proposed Ngaangk Boodja Battery & Solar Farm project is located on Robartson Road Merredin and includes an approximately 150MW DC solar facility with decentralised Battery Energy Storage Systems (BESS) clusters of a total 640 MWh capacity integrated throughout the site. Other structures are sited toward the north-eastern extent of the development alongside Robartson Road, which includes Operations and Maintenance buildings (workshops and offices) and substation.		
Primary Proposed or Intended Construction		
EXPLANATORY INFORMATION Note: A habitable building is defined in the WA *Planning and Development (LPS) Regulations 2015* to mean: A permanent or temporary structure on land that: (a) Is fully or partially enclosed; and (b) Has at least one wall of solid material and a roof of solid material; and (c) Is used for a purpose that involves the use of the interior of the structure by people for living, working, studying or being entertained.		
Primary Type(s)	Electricity generation	New Building(s)
BCA Classification	N/A	Class 7b (warehouse/storage/wholesale)
Development Type - Establishing the Applicable Bushfire Protection Criteria		
Commercial and Industrial	Construction of or addition to, a habitable building for commercial or industrial uses. *[Guidelines s7]*	
Assessment Supporting Details: As discussed within Section 1.2, the proposal includes numerous asset and structure types which are not 'Habitable Buildings.' Constructed assets have all been considered 'Habitable Buildings' for the purposes of the assessment against the Bushfire Protection Criteria.		



SITE GENERAL ARRANGEMENT SCALE 1 : 7500

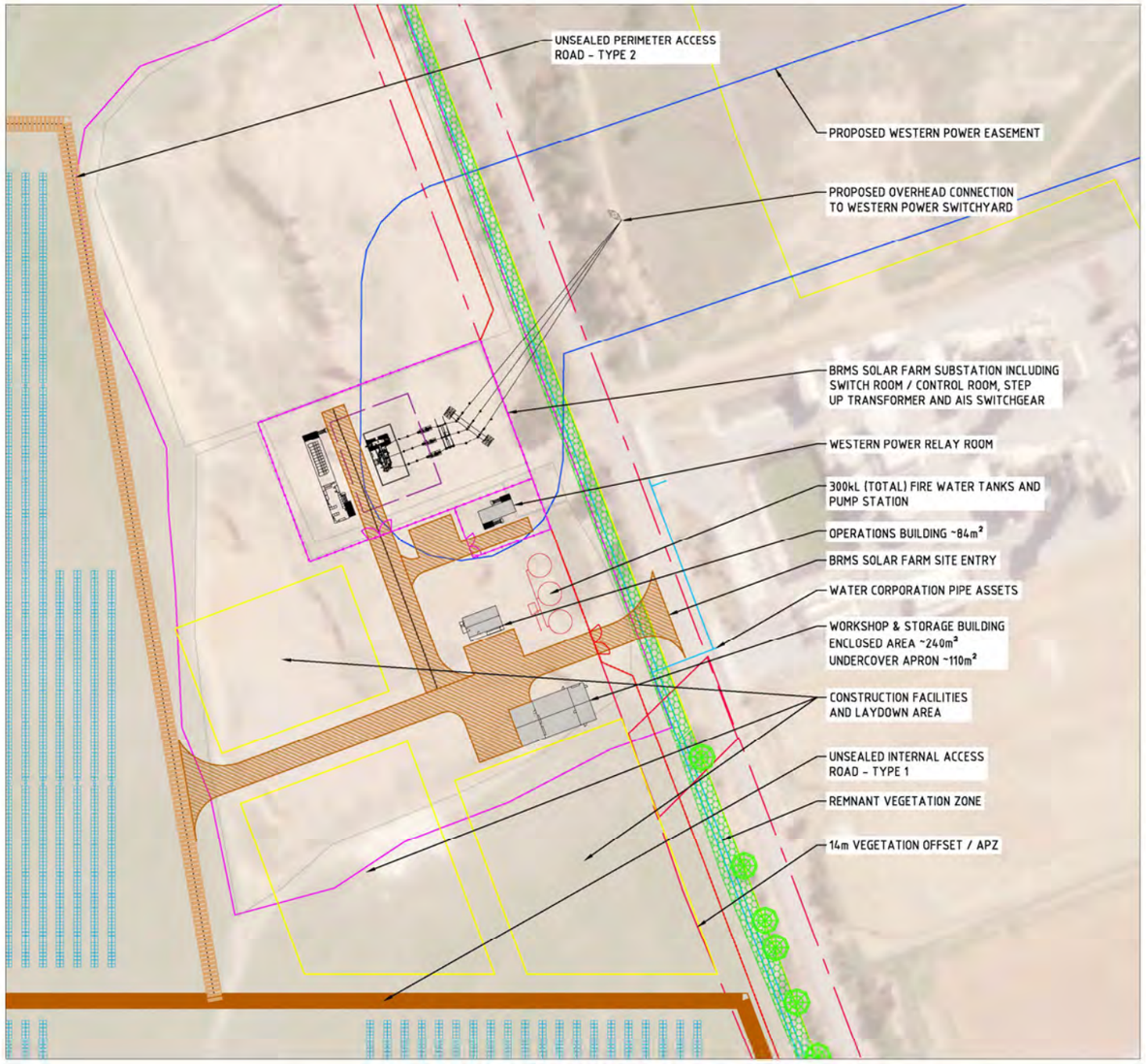
SITE OVERVIEW:

SITE AREA:	~229.5 Ha
FENCED AREA:	~221.6 Ha
SURVEYED VEGETATION AREAS	~1.6 Ha
ASSET PROTECTION ZONE:	14m TBC

SOLAR FARM SYSTEM OVERVIEW:

OVERALL CAPACITY:	
TOTAL PV PLANT (DC):	158.534MWp
TOTAL PV PLANT (AC):	153.450MVA
DC:AC RATIO:	1.033
POWER CONVERSION STATIONS:	
MFR:	SUNGROW
MODEL:	SG 4950UD HV-MV
NAMEPLATE kVA:	4950 kVA
QUANTITY:	31
BATTERY SYSTEM:	
MFR:	SUNGROW
TYPE:	ST 5178 UX
CELL TYPE:	LFP
COOLING:	LIQUID COOLING
CAPACITY (BOL):	5.178MWh
QUANTITY:	124
TOTAL CAPACITY (BOL)	642MWh

PV MODULES:	
MFR:	RISEN
TYPE / MODEL:	TOPCON (RSM132-11-625BNDG)
NAMEPLATE W:	630W (STC FRONTAL)
STRING LENGTH:	28 MODULES
STRING QUANTITY:	8,990
MODULE QUANTITY:	251,720
PV MODULE STRUCTURE:	
TRACKING TYPE:	SINGLE AXIS TRACKER (SAT)
CONFIGURATION:	1 IN PORTRAIT (1P)
MFR:	NEXTRACKER
MODEL:	NX HORIZON
TRACKING RANGE:	+/- 60°
MOTOR POWER SUPPLY:	SELF POWERED (NON PARASITIC)
TRACKER PITCH:	5.80m
TRACKER ORIENTATION:	0.0° AZIMUTH
4 STRING TRACKERS:	1954
3 STRING TRACKERS:	286
2 STRING TRACKERS:	139
1 STRING TRACKERS:	38



SUBSTATION & OPERATIONS AREA SCALE 1 : 1000

SCALE (m) 0 20 100 250
1 : 7,500

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PRELIMINARY

DRAWING NUMBER	DRAWING TITLE

REFERENCE DRAWINGS

REV	DATE	DESCRIPTION	DRAWN	CHK'D.	APP'D	CLIENT
C	30.10.2025	PRELIMINARY CONCEPT REVISED	SS	AS	AS	
B	24.10.2205	PRELIMINARY CONCEPT REVISED	SS	AS	AS	
A	22.10.2025	PRELIMINARY CONCEPT	SS	AS	AS	

REVISIONS & APPROVALS

PROJECT: BRMS
SITE: MERREDIN W.A.
TITLE: BRUCE ROCK MERREDIN SOLAR & BESS GENERAL ARRANGEMENT

SCALE	SIZE	DRAWING No.	SHEET No.	REV.
1:7500	A1	6682502-G-GAD-001	1 OF 1	C

Figure 1.2

Location Map

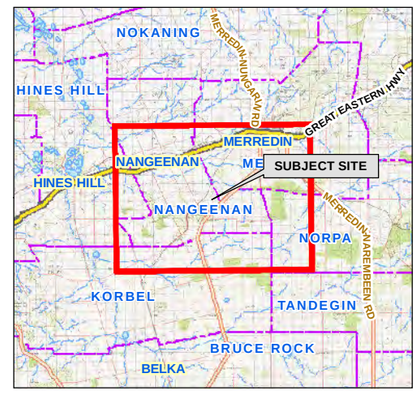
Lot 27381 on Plan 150842 and
Lot 19448 on Plan 229756
Total Area : 229.6718 ha
Robartson Road
NANGEENAN
SHIRE OF MERREDIN

------ LEGEND ------

- Subject Site
- Local Government Authority
- Locality / Suburb
- Reserves

0 1 2 3 4
Kilometers

------ LOCALITY ------



Aerial Imagery : Google Satellite

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre
Map compiled by: Neil Stoney 20/12/2025
Map updated by: Neil Stoney 20/12/2025
A3 Scale 1:62,000

BUSHFIRE PRONE PLANNING

Disclaimer and Limitation: This map has been prepared for bushfire management planning purposes only. All depicted areas, contours and any dimensions shown are subject to survey. Bushfire Prone Planning does not guarantee that this map is without flaw of any kind and disclaims all liability for any errors, loss or other consequence arising from relying on any information depicted.
Map Document Path / Name: C:\Users\Neil\Desktop\Current Projects\251119 merredin\mxds\251119_Fig1-2_LOC.mxd

1.2 The Planning Proposal and its Requirement to Address Bushfire Risk

EXPLANATORY INFORMATION

For the subject planning proposal, the intent of this section is to:

- Identify the relevant statutory bushfire planning provisions that have established its requirement to address bushfire risk;
- Identify the relevant policy/guideline 'triggers' to apply SPP 3.7 Bushfire;
- Identify when a local government, as the decision maker, has established additional 'triggers' to apply defined bushfire planning assessments; and
- Identify the consideration of any relevant exemptions from application of SPP 3.7 Bushfire.

Relevant Terms

Development means the development or use of any land, including (a) any demolition, erection, construction, alteration of or addition to any building or structure on the land (b) the carrying out on the land of any excavation or other works (Planning and Development Act 2005, Part1, s.4; and

Habitable building means a permanent or temporary structure on land that:

(a) is fully or partially enclosed; and

(b) has at least one wall of solid material and a roof of solid material; and

(c) is used for a purpose that involves the use of the interior of the structure by people for living, working, studying or being entertained;

Specified building means a structure of a kind specified in this Scheme as a kind of structure to which this Part applies in addition to its application to habitable buildings.

Development site means that part of a lot on which a building that is the subject of development stands or is to be constructed - Planning and Development (LPS) Regulations 2015, s.78A.

Construction of a building includes the erection, assembly or placement of a building but does not include the renovation, alteration, extension, improvement or repair of a building;

1.2.1 Applied Statutory Bushfire Provisions Requiring a Planning Application

A PLANNING APPLICATION IS TO BE SUBMITTED TO WAPC FOR DETERMINATION

The proposed development (construction and/or use) is a category for which WAPC is the decision maker rather than the local government.

Determination will be made under the Planning and Development Act 2005, its relevant subsidiary legislation and associated State Planning Policies.

As the subject site is wholly or partly within a designated bushfire prone area (Map of Bushfire Prone Areas), due regard must be given to State Planning Policy 3.7 Bushfire.

Assessment Supporting Details:

The subject Development Application does not technically trigger any bushfire assessment under the current *State Planning Policy 3.7 Bushfire* (WAPC November 2024).

The *Planning and Development (Local Planning Schemes) Regulations 2015* Section 78B describes the development types within a Bushfire Prone Area subject to the *Regulations* Part 10A – Bushfire risk management. These are:

- Single houses or ancillary dwellings on lots with an area of >1,100m2;
- Habitable buildings other than a single house or ancillary dwelling, or;
- Specified buildings.

State Planning Policy 3.7 Bushfire (WAPC November 2024) and the associated *Planning for Bushfire Guidelines* (WAPC November 2024) aligns with these definitions and reference 'Habitable Buildings' and 'Specified Buildings' requiring application of the Policy.

The subject Development Application does not propose to locate any 'Habitable Buildings' within a Bushfire Prone Area.

'Specified Buildings' are those which are specifically designated in the Local Government's Local Planning Scheme as being subject to Part 10A of the *Planning and Development (Local Planning Schemes) Regulations 2015*. To date, no Local Planning Schemes have identified a 'Specified Building.'

The *Planning and Development (Local Planning Schemes) Regulations 2015* Clause 67.2 requires due regard be given to:

> "*(q) the suitability of the land for the development taking into account the possible risk of flooding, tidal inundation, subsidence, landslip, bush fire, soil erosion, land degradation or any other risk;*
>
> *(r) the suitability of the land for the development taking into account the possible risk to human health or safety;"*

The proposal is for a major infrastructure asset in a bushfire prone area, and the potential may exist for the site to either instigate or have hazardous interactions with a bushfire. The decision maker must have due regard to Subclauses q) and r) despite the limited scope of SPP 3.7.

Policy can never fully capture appropriate bushfire protection measures for all development types. This is particularly in the case of very large proposals, complex sites, emerging technologies, or complex/hazardous uses. BPP note this development is technically exempt from SPP3.7 and the Guidelines; but there are still relevant parameters contained within these documents that can inform the project and the planning determination.

To assist the decision maker of all the necessary considerations to make an informed, robust decision regarding bushfire risks, BPP's approach is to:

a) Apply a precautionary approach and assess relevant assets (as identified by the Bushfire Planning Practitioner) to be 'Habitable Buildings' for the purposes of initial assessment;

b) Conduct a Risk Assessment (provided in a separate report) to comprehensively assess the proposal and determine appropriate bushfire protection measures applicable to the specific development, and;

c) Produce a Bushfire Management Plan (this document) for planning consideration, which establishes the specific bushfire protection measures for this particular proposal.

In aligning with SPP 3.7 and the Guidelines, the outcome is to meet the intent of the Bushfire Protection Criteria by establishing relevant bespoke Criteria applicable to the development.

1.2.2 Applied Triggers to Apply State Planning Policy 3.7 Bushfire

EXPLANATORY INFORMATION

State Planning Policy 3.7 Bushfire (SPP 3.7) provides broad objectives and high-level guidance for how planning proposals and development applications within bushfire prone areas should be considered. Implementation is supported by more detailed instructions within the *Planning for Bushfire Guidelines*.

The following table identifies the guidance that has resulted in the planning proposal being required to apply SPP 3.7.

Inconsistent Information (as of December 2024):

- There are inconsistences between the provisions of the applicable legislation (Planning and Development (LPS) Regulations 2015), the clauses of the associated policy (SPP 3.7 Bushfire) and its associated guidance (Planning for Bushfire Guidelines Nov. 2024).
- This has resulted in inconsistencies in the establishment of the 'triggers' to lodge proposals, plans and applications for planning approval sourced from these documents.

Until legislation/policy/guideline amendments are completed, the advice from WAPC/DPLH is that the decision maker should apply SPP 3.7 and the Guidelines as they deem necessary. *(Source: Explanatory Note SPP 3.7, DPLH, 25/11/24)*

B**ushfire Prone Planning's** Current Approach:

- To apply the 'triggers' for application of SPP 3.7/Guidelines in accordance with the current version of the Guidelines (Planning for Bushfire Guidelines, November 2024), in Sections 6, 7 and 8 - as this is best aligned with the current version (3 Nov 2024) of the LPS Regulations 2015; unless
- The relevant decision maker has determined, and confirmed in writing to the proponent, that SPP 3.7/Guidelines is to be applied.

SPP 3.7 AND THE GUIDELINES - ESTABLISHING THE NEED TO GIVE DUE REGARD TO SPP 3.7		APPLICABLE
1	THE LAND SUBJECT TO THE PLANNING PROPOSAL IS:	
	Designated bushfire prone and 'Area 1 (Urban)' on the Map of Bushfire Prone Areas (refer to Figure 1.4); or	No
	Designated bushfire prone and 'Area 2' on the Map of Bushfire Prone Areas (refer to Figure 1.4).	Yes
AND		
2	THE PLANNING PROPOSAL WILL:	
	Result in the intensification of development (or land use); or	Yes
	Result in an increase of visitors, residents or employees; or	Yes
	Adversely impact or increase the bushfire risk to the subject or surrounding site(s).	Yes
AND		
3	THE PLANNING PROPOSAL IS A: (Source: Guidelines s.7) A development application for construction of or additions to a habitable building for commercial or industrial uses in an area subject to a pre-development radiant heat impact exceeding 29kW/m² (BAL-40 or BAL-FZ) and designated as Area 1 (Urban) or Area 2 on the Map of BPA. Note: An application for additions to a habitable building to which SPP 3.7 and these Guidelines apply, is required to address the bushfire protection criteria for the entire site. It should be noted that there are no requirements under SPP 3.7 or the Guidelines to retrofit existing buildings to the appropriate bushfire construction standard, or any requirement for these existing buildings to be located within an area with a radiant heat impact not exceeding 29 kW/m2 (BAL-29).	

1.2.3 Identified Exemptions

EXPLANATORY INFORMATION
The following situations provide for an exemption from the application of SPP 3.7/Guidelines. They are established by the stated sources and are presented below as: • Evidence they have been considered when relevant; and • Justification for the application of SPP 3.7/Guidelines despite a relevant exemption applying to part or all of the planning proposal.

EXEMPTION SCENARIOS	APPLICABLE
(Source: LPS Regulations 2015 Part 10A - Bushfire risk management) Does not apply to land where there is no existing local planning scheme or where a local planning scheme has ceased to have legal effect.	No
(Source: Guidelines s1.2.1) For a structure plan or subdivision application, for proposed lot(s) that: • Are not designated as bushfire prone; • Or where there is no increase in the development potential and therefore no intensification of land use or bushfire risk, such as a boundary realignment, that does not restrict the ability to establish or maintain an APZ; and • does not restrict vehicular access to any existing or future habitable building.	No
(Source: Guidelines s1.2.1) - For incidental non- habitable buildings or structures located not less than six metres from the habitable building, including but not limited to private garages, carports, patios, storage sheds, outbuildings, swimming pools, spa pools and fences.	No
(Source: Guidelines s1.2.1) - For a change of use, minor renovations, extensions, alterations, improvements or repair of an existing habitable building where: • The application does not result in an increase of occupants onsite; and/or • There is no increase in the bushfire risk, such as an extension being further away from the bushfire hazard, or the extension does not restrict vehicular access or the provision of water for the development.	No
Assessment Supporting Details: None Required.	

Figure 1.3

Bushfire Prone Area

Lot 27381 on Plan 150842 and
Lot 19448 on Plan 229756
Total Area : 229.6718 ha
Robartson Road
NANGEENAN
SHIRE OF MERREDIN

------ LEGEND ------

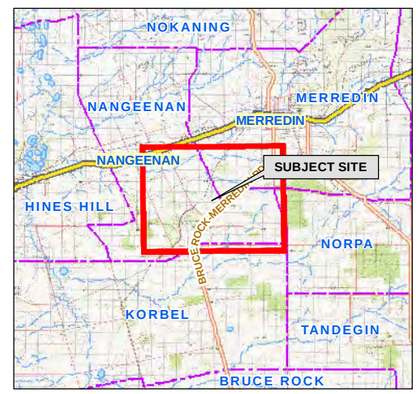
Subject Site

Bushfire Prone Area OBRM-023

Bushfire Prone Area 2

0 1 2
Kilometers

------ LOCALITY ------



Aerial Imagery : Google Satellite

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre
Map compiled by: Neil Stoney 20/12/2025
Map updated by: Neil Stoney 20/12/2025
A3 Scale 1:35,000

BUSHFIRE PRONE PLANNING

Disclaimer and Limitation: This map has been prepared for bushfire management planning purposes only. All depicted areas, contours and any dimensions shown are subject to survey. Bushfire Prone Planning does not guarantee that this map is without flaw of any kind and disclaims all liability for any errors, loss or other consequence arising from relying on any information depicted.
Map Document Path / Name: C:\Users\Neil\Desktop\Current Projects\251119 merredin\mxds\251119_Fig1-3_BPA.mxd

1.3 Required **'Bushfire Planning'** Assessments and Documents

INFORMATION **PRESENTED IN THIS 'PLANNING' BMP (OR THE BEP)** - PROVIDED TO ACCOMPANY **THE PROPONENT'S** PLANNING SUBMISSION						
The requirements are established by SPP 3.7 Part 4, Guidelines Section 1.2, 4.4, 5.5, 6.4, 7.2, 8.3 and A1.2. The green highlighted column identifies the required information for the subject planning proposal.		Strategic Planning Document		Structure Plan / Subdivision Application		Development Application
Required Information	Details	Map of Bushfire Prone Areas Designation				
		Area 1 (Urban)	Area 2	Area 1 (Urban)	Area 2	Areas 1 & 2
Environment - Identification of environmental, biodiversity or conservation values on subject site(s)	Presented in the BMP. Identifies how proposal siting and design avoids and/or minimises clearing of native vegetation in applying required bushfire protection measures.	BUSHFIRE PLANNING ASSESSMENTS ARE NOT REQUIRED	✓	✓	✓	✓
BLA - Broader Landscape Assessment (see note below)	Presented in the BMP. Considers subject site suitability based on exposure to bushfire hazards, potential for landscape scale bushfire, road network and suitable evacuation destinations.		✓	-	✓	-
BHL - Bushfire Hazard Level Assessment (pre-development)	Presented in the BMP. Can include detail of treatments required to achieve BHL of moderate and/or low.		✓	-	-	-
BAL - Bushfire Attack Level Assessment	Presented in the BMP in BAL contour map format as a requirement and in table format as an additional option.		-	✓	✓	-
	Presented in the BMP in table format and/or BAL contour map format – dependant on which is more efficient and effective at presenting the results (e.g. BAL contour map for multiple buildings).		-	-	-	✓
BPC - Assessment against the relevant Elements (E1 – E4) of the Bushfire Protection Criteria	Presented in the BMP. Strategic planning will necessarily focus on Element 1: Location. Can demonstrate compliance using acceptable solutions and/or an outcomes-based approach.		✓	✓ Excluding E1	✓	✓ Excluding E1
BEP - Bushfire Emergency Plan	For vulnerable land uses only. Provided as a separate document or an addition / modification to an existing BEP or site Emergency Management Plan.		-	-	-	-
LMP – Landscape Management Plan	For vulnerable land uses only. Provided as a separate document or an addendum to the BMP.					
Note: Where a relevant planning proposal (e.g. subdivision) was previously assessed and approved under the SPP 3.7/Guidelines 2015, it is likely that a BLA will not be required. Also, if an application (e.g. subdivision) is compliant with a structure plan and/or a local planning scheme amendment, which were assessed and approved under the 2015 SPP/Guidelines, it is likely that a BLA will not be required. Confirmation from a relevant DPLH officer may be required (DPLH advice to BPP 20/2/2025).						

1.4 Other Documents Relevant to Preparing the BMP

EXPLANATORY INFORMATION

This section identifies any known assessments, reports or plans that have been conducted and prepared previously, or are being prepared concurrently, and are relevant to the subject planning proposal.

They may have implications for the assessment of bushfire hazard threats and the identification and implementation of the bushfire protection measures that are established by this BMP.

RELEVANT DOCUMENTS

Document	Relevant	Exists	To Be Concurrently Developed	Title
Bushfire Risk Report	Yes	No	Yes	251119 – Ngaakgk Boodja Battery and Solar Farm (BRR) v1.0 (Bushfire Prone Planning, January 2026).
Implications for the BMP: The Bushfire Risk Report prepared alongside this BMP identifies the appropriate measures to reduce the risk of onsite and/or offsite ignition, asset damage, and harm to persons, environment, and community. Additional Bushfire Protection Measures to meet or exceed the intent of the Acceptable Solutions of Elements 2-4 of the Bushfire Protection Criteria have been provided within the Section 5.3 Assessment Statements. These are measures which are considered relevant to the planning process.				
Environmental Survey	Yes	Unknown	Unknown	To be advised
Implications for the BMP: An environmental survey may have been previously or concurrently developed. Isolated pockets of vegetation within the development footprint have been retained in the project layout. These areas are excludable under AS 3959 clause 2.2.3.2(b) in the post-development condition. See Figures 3.1.3 and 3.1.4.				

2 ENVIRONMENTAL CONSIDERATIONS – NATIVE VEGETATION

EXPLANATORY INFORMATION

Some bushfire prone areas also have high biodiversity values. SPP3.7 objective 5.4 prioritises the retention of native vegetation for biodiversity conservation, environmental protection and landscape amenity.

Clearing or modification of native vegetation for the purpose of land use or development is assessed under State Planning Policy 2: Environment (SPP 2), State Planning Policy 2.8: Bushland policy for the Perth Metropolitan Region (SPP 2.8) and relevant environmental legislation. A key objective of these polices is to avoid development that may result in unacceptable environmental damage.

Any 'modification' or 'clearing' of vegetation to reduce bushfire risk is considered 'clearing' under the *Environmental Protection Act 1986* (EP Act) and requires a clearing permit under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations) – unless for an exempt purpose.

Clearing native vegetation is an offence, unless done under a clearing permit or the clearing is for an exempt purpose. Exemptions are contained in the EP Act or are prescribed in the Clearing Regulations (note: these exemptions do not apply in environmentally sensitive areas).

The *Department of Water and Environmental Regulation* (DWER) is responsible for issuing 'clearing' permits and the framework for the regulation of clearing. Approvals under other legislation, from other agencies, may also be required, dependent on the type of flora or fauna present.

Local Planning Policy or Local Biodiversity Strategy: Natural areas that are not protected by the above Act and Regulation (or any other National or State Acts) may be protected by a local planning policy or local biodiversity strategy. Permission from the local government will be required for any modification or removal of native vegetation in these Local Natural Areas (LNA's). Refer to the relevant local government for detail.

For further Information refer to Native vegetation clearing permits | Western Australian Government, the Planning for Bushfire Guidelines (as amended) and the Bushfire and Vegetation Factsheet - WAPC, Dec 2021.

2.1 Biodiversity or Conservation Values Identified

EXPLANATORY INFORMATION

The required information, relevant to bushfire planning and informing the production of this BMP, is sourced and presented as indicated below.

Note that where a 'desktop' assessment has been conducted, this should not be considered a replacement for a full Environmental Impact Assessment. It is a summary of potential biodiversity or conservation values at the subject site, inferred from information contained in public available datasets and/or reports, which are only current to the date of last modification.

The information provided in the BMP should be considered indicative where the subject site has not previously been subject to a site-specific environmental assessment by an appropriate professional.

The required information is sourced from the environmental/planning consultant report developed for the subject site and provided to the bushfire consultant (details below when applicable). The information it contains is not repeated in this BMP as it will accompany the planning submission. The implications for the subject planning proposal and this BMP are stated below when relevant.	No Report Available / Provided
The required information is sourced by the bushfire consultant as a 'desktop' assessment from publicly available data bases and/or a local government's local biodiversity strategy or local planning strategy. When applicable, this information is presented on the following pages of this BMP.	Yes - Fully

IDENTIFICATION OF RELEVANT BIODIVERSITY OR CONSERVATION VALUES							
Dataset	Relevant to Subject Planning Proposal	Influence on Bushfire Threat Levels and / or Application of Bushfire Protection Measures	Information Source(s) Applied				Further Action Required by Proponent
			WA Govt. Agency Dataset (ID)		Landowner or Developer Statements	Environmental Asset or Vegetation Survey Report	
Department of Biodiversity, Conservation and Attractions (DBCA) Datasets							
Conservation Category Wetlands and Buffer (geomorphic wetlands – relevant area)	No	-	☒	DBCA-012	☐	☐	None
RAMSAR Sites (wetlands of international importance)	No	-	☒	DBCA-010	☐	☐	None
Threatened and Priority Flora	No	-	Restricted Scale of Data Available (security)	DBCA-036	☐	☐	None
Threatened Ecological Communities	No	-		DBCA-038	☐	☐	None
Legislated Lands and Waters (national/conservation parks, nature/crown reserves, state forest)	No	-	☒	DBCA-011	☐	☐	None
Department of Planning, Lands and Heritage (DPLH) Datasets							
Bush Forever Areas 2000	No	-	☒	DPLH-019, 022 and MRS Bush Forever	☐	☐	None
Department of Water and Environmental Resources (DWER) Datasets							
Clearing Regulations – Environmentally Sensitive Areas	No	-	☒	DWER-046	☐	☐	None
Swan Bioplan Regionally Significant Natural Areas 2010	No	-	☒	DWER-070	☐	☐	None

2.2 Response of the Planning Proposal to Protection of Native Vegetation

The protection of native vegetation is to be prioritised by avoiding areas that would require clearing or modification of native vegetation, specifically for the purpose of bushfire mitigation (BMP Manual, November 2024 DPLH).

SOLUTIONS APPLIED TO MINIMISE NATIVE VEGETATION REMOVAL / MODIFICATION	
Clearing and/or modification of native vegetation is proposed and necessary.	Yes
Proposed Clearing: Land within the Project site is fully associated with agricultural practices and is generally degraded from its natural state with the exception of scattered trees. No clearing of native vegetation is proposed. Where any clearing is required, it will be limited to a small number (<5) individual trees.	
Conservation Response	
The proposal reserves native vegetation for conservation, recreation or environmental protection purpose. These can include ecological linkage, local natural area, waterway, or foreshore area or wetland buffer.	Not required
Siting / Design / Construction Responses	
Reduction in the proposed intensification of land use or development potential.	Not required
Containing or clustering areas of intensification of land use to reduce clearing requirements.	Not required
Consideration of locating proposed development to have greater initial vegetation separation distances from bushfire hazards by utilising non-vegetated interfaces.	Not required
Modification or redesign of the proposed areas of intensification of land use to avoid areas with high environmental, biodiversity or conservation values.	Considered and applied
Assessment Comments: Isolated pockets of vegetation within the development footprint have been retained in the project layout. These areas are excludable under AS 3959 clause 2.2.3.2(b) in the post-development condition. See Figures 3.1.3 and 3.1.4.	
The proposal has applied a reduction in the intensification of land use or development potential (e.g. reduced lot yield or smaller building footprints), to ensure the retention of greater areas of native vegetation while achieving the required vegetation separation distances to limit exposure to unacceptable levels of potential bushfire impact.	N/A
The proposal situates required non-vegetated elements (e.g. footpaths, paved areas, roads, parking, open drainage channels, and major services delivery installed in common corridors), between bushfire hazards and elements at risk – to effectively achieve required vegetation separation distances with less vegetation clearing and/or modification.	N/A
The proposal applies building envelopes, and these have located to minimise the requirement to clear and/or modify native vegetation.	N/A
The proposal utilises the clustering habitable buildings to reduce requirements for native vegetation clearing and/or modification.	N/A

The proposal aligns roads and pathways to work around trees and other vegetation, preserving their ecological values.	N/A
The proposal establishes requirements for the construction of building(s) to satisfy the requirements corresponding to higher BAL ratings to ensure a reduced vegetation separation distance requirement.	N/A

2.3 Vegetation Management Plans with Implications for the BMP

EXPLANATORY INFORMATION

This section identifies the area(s) of land (supporting vegetation), within or near the subject site (i.e. onsite or offsite) to which one or more of the following scenarios and their corresponding management actions applies.

If none of these scenarios is relevant to the subject planning proposal, this is stated.

1. Area(s) subject to a LANDSCAPE PLAN THAT RESULTS IN RELEVANT ELEMENTS AT RISK BEING EXPOSED TO A LOW BUSHFIRE THREAT LEVEL from existing or planned area(s) of vegetation and establishes the following management actions:

    (a) To apply landscaping design (including the modification and/or establishment of plants/shrubs/trees), that will enable the area(s) to be excluded from classification under AS 3959 BAL determination methodology;

    (b) To actively manage the area(s) to maintain the low bushfire threat level in perpetuity. Thereby ensuring the applicable bushfire protection measures, applied in accordance with the BMP, remain effective;

    (c) To achieve and maintain the low threat state through using a combination of mechanisms including:

        (i) Minimising vegetation fuel loads through design and ongoing management;

        (ii) Using low flammability and/or higher moisture content species;

        (iii) Incorporating non-vegetated elements; and

    (d) To identify the entity responsible for ensuring the landscape plan is complied with in perpetuity and when required, will contain written confirmation of their acceptance of the responsibility.

2. Area(s) subject to a LANDSCAPE PLAN THAT RESULTS IN RELEVANT ELEMENTS AT RISK BEING EXPOSED TO A REDUCED BUSHFIRE THREAT LEVEL from existing or planned area(s) of vegetation and establishes the following management actions:

    (a) To apply landscaping design involving the removal and/or modification of existing vegetation that will enable the area(s) to be classified as a lower threat class under AS 3959:2018 BAL determination methodology;

    (b) To actively manage the area(s) to maintain the reduced bushfire threat level in perpetuity. Thereby ensuring the applicable bushfire protection measures, applied in accordance with the BMP, remain effective;

    (c) To identify the entity responsible for ensuring the landscape plan is complied with in perpetuity and when required, will contain written confirmation of their acceptance of the responsibility.

3. Area(s) subject to a REVEGETATION PLAN THAT MAY RESULT IN RELEVANT ELEMENTS AT RISK BEING EXPOSED TO AN ADDITIONAL BUSHFIRE HAZARD AND/OR AN INCREASED BUSHFIRE THREAT LEVEL from an existing area(s) of vegetation and establishes the following information:

    (a) The location of the areas to be revegetated (as distinct from natural regeneration which is accounted for in the vegetation classification under AS 3959 BAL determination methodology); and

    (b) A description of the planned design regarding density and species of plants/shrubs/trees to inform the bushfire consultant's classification of the vegetation under AS 3959:2018 BAL determination methodology.

Relevance of the Stated Scenarios to the Subject Planning Proposal	Only Scenario 3 is relevant.

2.3.1 Revegetation Plan – Additional Bushfire Hazard

PLANNED REVEGETATION – ADDITIONAL BUSHFIRE HAZARD	
Assessment Details	Relevant
The area of land that is to be subject to a revegetation plan is within the subject site (onsite).	Possible
The area of land that is to be subject to a revegetation plan is outside the subject site (offsite).	No
The revegetation plan will introduce a bushfire hazard that doesn't currently exist.	No
The area of land subject to the revegetation plan will introduce a bushfire hazard with a greater bushfire threat level than currently exists. its classification under AS 3959 (as amended) BAL determination methodology will be changed to a higher threat level classification.	Possible
Identification of the Area(s) of Land Subject to a Revegetation Plan	
The possibility exists for planted visual screening to be applied at the perimeter of the development area. Where this occurs, the vegetation will either: • Be designed, planted, and managed to allow exclusion following AS 3959-2018 clause 2.2.3.2(f), or; • Be sited with sufficient separation to ensure bushfire impacts on the development site do not exceed those applied in this BMP. Measures 1.9 and 6.4 of the associated Bushfire Risk Report requires any such revegetation plan to be reviewed by a suitable bushfire consultant.	
Implications for the BMP	
Table 6.1, Responsibility 5 states: "*The advice of an accredited Bushfire Planning Practitioner must be sought where revegetation within the lease area is proposed. Revegetation may require a Landscape Management Plan, and update to this Bushfire Management Plan, or Addendum to this Bushfire Management Plan.*"	

3 THE BUSHFIRE HAZARD – POTENTIAL IMPACT - LANDSCAPE AND VEGETATION DATA

3.1 Bushfire Attack Level (BAL) Assessment Summary (Contour Map Format)

EXPLANATORY INFORMATION

Caution! Future building works require a 'determined' BAL rating for building permit applications. When a BAL contour map is being used for planning assessment purposes, (as opposed to a building assessment purpose), the required 'determined' BAL rating typically is not able to be derived from the map (there are only limited scenarios where this is possible).

The BAL ratings identified from the map will more likely be only 'indicative' of what can be achieved – with planning compliance for this factor being achieved when BAL-29 is indicated.

Otherwise, an additional assessment of the site data for building application purposes is required, and potentially approval will need to be obtained for native vegetation modification and/or removal from the relevant authority.

Refer to Appendix B2 for additional information and guidance regarding interpretation of the BAL Contour Map.

3.1.1 BAL Determination Methodology and Location of Data and Results

<table>
<tr><th colspan="6">LOCATION OF DATA & RESULTS</th></tr>
<tr><th colspan="2">BAL Determination Methodology</th><th colspan="3">Location of the Site Assessment Data</th><th>Location of the Results</th></tr>
<tr><th rowspan="2">AS 3959:2018</th><th rowspan="2">Applied to Assessment</th><th rowspan="2">Classified Vegetation and Topography Map(s)</th><th colspan="2">Calculation Input Variables</th><th rowspan="2">Assessed Bushfire Attack Levels and/or Radiant Heat Levels</th></tr>
<tr><th>Summary Data</th><th>Detailed Data with Explanatory and Supporting Information</th></tr>
<tr><td>Method 1 (Simplified)</td><td>Yes</td><td rowspan="2">Figures 3.1.1-3.1.4</td><td rowspan="2">Table 3.2</td><td>Appendix A1</td><td rowspan="2">Table 3.1
Table 3.3 / BAL Contour Map</td></tr>
<tr><td>Method 2 (Detailed)</td><td>Yes</td><td>Appendix A2</td></tr>
<tr><td colspan="6">Reasons for the Application of the Method 2 Procedure</td></tr>
<tr><td>1.</td><td colspan="5">A more specific result is sought.</td></tr>
<tr><td colspan="6">Identification of the specific issues associated with the site and/or proposed development that have necessitated the use of the Method 2 procedure:
A 10kW/m2 APZ (calculated at 1090K Flame Temperature) has been applied as an appropriate maximum acceptable heat flux exposure for BESS / PCS clusters.</td></tr>
</table>

3.1.2 BAL Ratings Derived from the Contour Map

Table 3.1: Indicative and determined BAL(s) for existing and/or proposed building works.

BUSHFIRE ATTACK LEVEL FOR EXISTING/PLANNED BUILDINGS/STRUCTURE [1]			
Building/Structure Description	Indicative BAL [2]	Determined BAL [2]	Radiant Heat Flux Stated as kW/m^2
HV Substation.	BAL-12.5	BAL-FZ	n/a
Solar Arrays and Associated Infrastructure.	BAL-29	BAL-FZ	n/a
BESS Cabinets and Associated Infrastructure. Operations and Maintenance Buildings Workshop and Storage Western Power Relay Room Water Tanks Laydown Areas (temporary)	BAL-12.5	BAL-FZ	<10kW/m2
[1] The assessment data used to derive the BAL ratings is sourced from Table 3.1 and Figure 3.2 'BAL Contour Map'. [2] Refer to the start of Section 3 for an explanation of indicative versus determined BAL ratings.			

3.1.3 Site Assessment Data Applied to Construction of the BAL Contour Map(s)

RELEVANT CLASSIFIED VEGETATION	
Identification of Classified Vegetation that is Relevant to the Production of the BAL Contour Map(s)	Relevant Vegetation Map
The relevant vegetation for the post-development BAL contour map will be any area of classified vegetation - both within the subject site (onsite) and external to the subject site (offsite) - that will remain at the intended end state of the subject development once earthworks, any clearing and/or landscaping and re-vegetation have been completed.	Figure No. 3.2.1 and 3.2.2
Supporting Assessment Details: None Required	

Table 3.2: Calculation inputs applied to deriving the vegetation separation distances corresponding to different levels of potential radiant heat transfer.

DATA APPLIED TO CALCULATE THE SITE SPECIFIC VEGETATION SEPARATION DISTANCES CORRESPONDING TO POTENTIAL RADIANT HEAT TRANSFER LEVELS [1]												
Applied BAL Determination Method		METHOD 1 - SIMPLIFIED PROCEDURE (AS 3959:2018 CLAUSE 2.2) AND METHOD 2 - DETAILED PROCEDURE (AS 3959:2018 APPENDIX B)										
The Calculation Input Variables - Corresponding to the Applied BAL Determination Method [2]												
Methods 1 and 2		Method 1			Method 2							
Vegetation Classification		FDI	Effective Slope		Site Slope	FFDI or GFDI	Flame Temp.	Elevation of Receiver	Flame Width	Fireline Intensity	Flame Length	Modified View Factor
			Applied Range	Measured								
Area	Class		degree range	degrees	degrees		K	metres	metres	kW/m	metres	% Reduction
1	(B) Woodland	80	d/slope >0-5	Varies	upslope 5	80	Default					
2	(D) Scrub	80	d/slope >0-5	Varies	upslope 5	80						
3	(G) Grassland	80	d/slope >0-5	Varies	upslope 5	110						

Note 1: The values used to indicate levels of potential radiant heat transfer (from fire in bushfire prone vegetation to exposed elements at risk), will be stated in subsequent tables as either as a bushfire attack level (BAL) and/or as kilowatts per square metre (kW/m2), as relevant to the application of the value and the type and use of the element at risk.

Note 2: All data and information supporting the determination of the classifications and values stated in this table is presented in Appendix A. Where the values are stated as 'default' these are either the values stated in AS 3959:2018, Table B1 or the values calculated as intermediate or final outputs through application of the equations of the AS 3959:2018 BAL determination methodology. They are not values derived by the assessor.

Table 3.3: Vegetation separation distances corresponding to the stated levels of potential radiant heat transfer.

THE CALCULATED (SITE SPECIFIC) VEGETATION SEPARATION DISTANCES CORRESPONDING TO THE STATED LEVEL OF POTENTIAL RADIANT HEAT TRANSFER (METRES) [1]								
Vegetation Classification		Maximum Radiant Heat Transfer (Flux)						
		>40 kW/m²	40 kW/m²	29 kW/m²	19 kW/m²	12.5 kW/m²	N/A [2]	10 kW/m²
		Bushfire Attack Levels						
Area	Class	BAL-FZ	BAL-40	BAL-29	BAL-19	BAL12.5	BAL-LOW	
1	(B) Woodland	<13	13-<17	17-<25	25-<35	35-<100	>100	43.2
2	(D) Scrub	<11	11-<15	15-<22	22-<31	31-<100	>100	37.9
3	(G) Grassland	<7	7-<9	9-<14	14-<20	20-<50	>50	25

Note 1: The calculated results are illustrated in Figure 3.2 as a BAL Contour Map and/ or additional defining lines as necessary. All applied calculation input variables are presented in Table 3.2. A copy of the radiant heat calculator output for each area of classified vegetation is presented in Appendix A3.

Note 2: The BAL-LOW rating does not represent a maximum level of radiant heat transfer. The rating is applied when the separation distance is at least 100m from all classified vegetation except Grassland, for which 50m applies.

Figure 3.1.1

Topography & Classified Vegetation (North)

Lot 27381 on Plan 150842 and
Lot 19448 on Plan 229756
Total Area : 229.6718 ha
Robartson Road
NANGEENAN
SHIRE OF MERREDIN

------ LEGEND ------

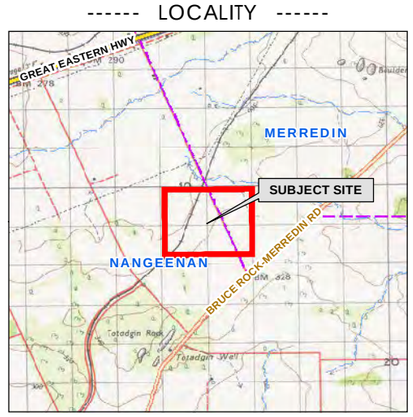
- Subject Site
- Other Lots
- Photo & Direction
- 150m from Subject Site

Classified Vegetation

- Class (D) Scrub
- Class (G) Grassland
- Excluded 2.2.3.2 (e)
- Excluded 2.2.3.2 {f)

0 100 200 300 400
Metres

------ LOCALITY ------



Aerial Imagery : Google Satellite

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre
Map compiled by: Neil Stoney 20/12/2025
Map updated by: Neil Stoney 20/12/2025
A3 Scale 1:6,000

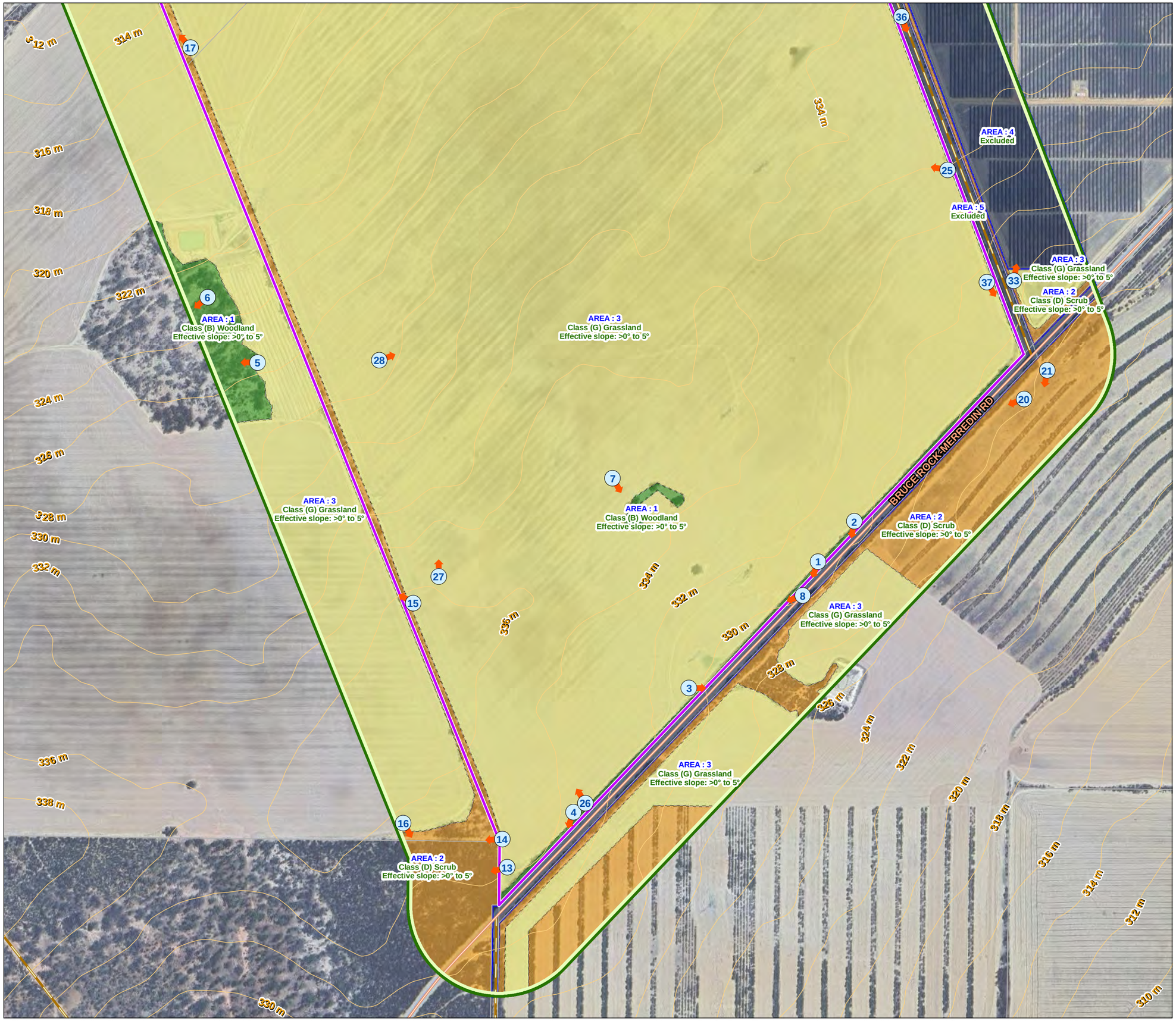
BUSHFIRE PRONE PLANNING

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Map Document Path / Name: C:\Users\Neil\Desktop\Current Projects\251119 merredin\mxds\251119_Fig3-1-1_VEG-N.mxd

Figure 3.1.2

Topography & Classified Vegetation (South)

Lot 27381 on Plan 150842 and
Lot 19448 on Plan 229756
Total Area : 229.6718 ha
Robartson Road
NANGEENAN
SHIRE OF MERREDIN



------ LEGEND ------

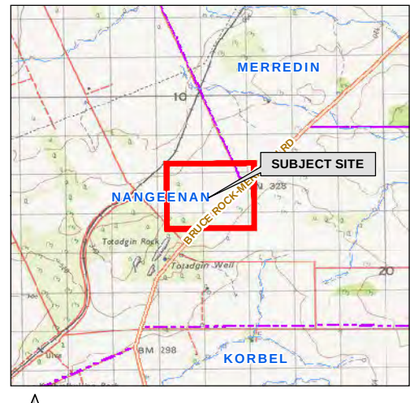
- Subject Site
- Other Lots
- Photo & Direction
- 150m from Subject Site

Classified Vegetation

- Class (B) Woodland
- Class (D) Scrub
- Class (G) Grassland
- Excluded 2.2.3.2 (e)
- Excluded 2.2.3.2 {f)

0 100 200 300 400
Metres

------ LOCALITY ------



Aerial Imagery : Google Satellite

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre
Map compiled by: Neil Stoney 20/12/2025
Map updated by: Neil Stoney 20/12/2025
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Figure 3.1.3

Topography & Classified Vegetation (North-Post Development)

Lot 27381 on Plan 150842 and
Lot 19448 on Plan 229756
Total Area : 229.6718 ha
Robartson Road
NANGEENAN
SHIRE OF MERREDIN

------ LEGEND ------

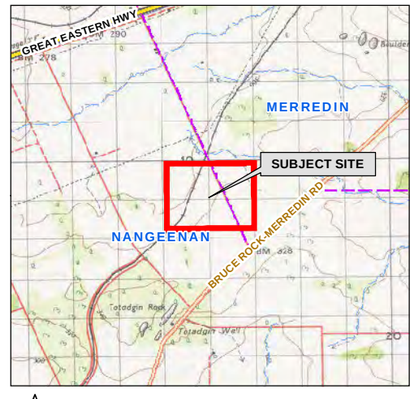
- Subject Site
- Other Lots
- 150m from Subject Site
- BESS
- On-Site Substation
- Solar Arrays
- Operations & Maintenance
- Class 7b
- Terminal Substation
- Water Tank
- Laydown Area

Classified Vegetation

- Class (D) Scrub
- Class (G) Grassland
- Excluded 2.2.3.2 (a),(b),(c) and (d)
- Excluded 2.2.3.2 (e)
- Excluded 2.2.3.2 {f)

0 100 200 300 400
Metres

------ LOCALITY ------



Aerial Imagery : Google Satellite

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre
Map compiled by: Neil Stoney 22/12/2025
Map updated by: Neil Stoney 22/12/2025
A3 Scale 1:6,000

BUSHFIRE PRONE PLANNING

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Figure 3.1.4

Topography & Classified Vegetation (South-Post Development)

Lot 27381 on Plan 150842 and
Lot 19448 on Plan 229756
Total Area : 229.6718 ha
Robartson Road
NANGEENAN
SHIRE OF MERREDIN

------ LEGEND ------

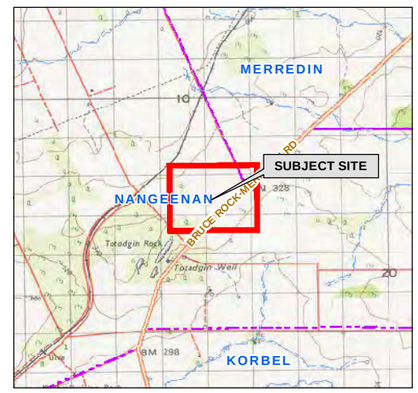
- Subject Site
- Other Lots
- 150m from Subject Site
- BESS
- Solar Arrays

Classified Vegetation

- Class (B) Woodland
- Class (D) Scrub
- Class (G) Grassland
- Excluded 2.2.3.2 (a),(b),(c) and (d)
- Excluded 2.2.3.2 (e)
- Excluded 2.2.3.2 {f)

0 100 200 300 400
Metres

------ LOCALITY ------



Aerial Imagery : Google Satellite

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre
Map compiled by: Neil Stoney 22/12/2025
Map updated by: Neil Stoney 22/12/2025
A3 Scale 1:6,000

BUSHFIRE PRONE PLANNING

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Figure 3.2.1

BAL Contour Map (North)

Lot 27381 on Plan 150842 and
Lot 19448 on Plan 229756
Total Area : 229.6718 ha
Robartson Road
NANGEENAN
SHIRE OF MERREDIN

AREA 2
AREA 3
AREA 4
AREA 5
AREA 6
AREA 7
ROBARTSON RD

------ LEGEND ------

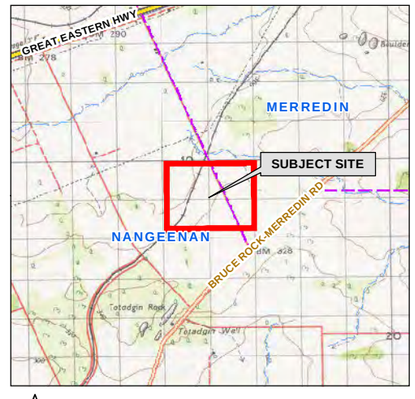
- Subject Site
- Other Lots
- 100m from Subject Site
- BESS
- On-Site Substation
- Solar Arrays
- Operations & Maintenance
- Workshop & Storage
- Western Power Relay Room
- Water Tank
- Laydown Area

Indicative Bushfire Attack Levels

- BAL FZ
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5
- BAL LOW
- <10kw Zone

0 100 200 300 400
Metres

------ LOCALITY ------



Aerial Imagery : Google Satellite

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre
Map compiled by: Neil Stoney 20/12/2025
Map updated by: Neil Stoney 20/12/2025
A3 Scale 1:6,000

BUSHFIRE PRONE PLANNING

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Figure 3.2.2

BAL Contour Map (South)

Lot 27381 on Plan 150842 and
Lot 19448 on Plan 229756
Total Area : 229.6718 ha
Robartson Road
NANGEENAN
SHIRE OF MERREDIN

AREA 1
AREA 2
AREA 3
AREA 4
AREA 5
AREA 6
AREA 7
BRUCE ROCK-MERREDIN RD

------ LEGEND ------

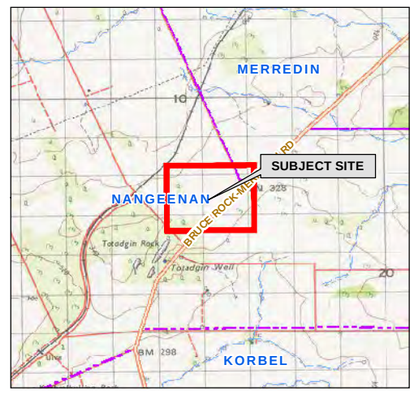
- Subject Site
- Other Lots
- 100m from Subject Site
- BESS
- Solar Arrays

Indicative Bushfire Attack Levels

- BAL FZ
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5
- BAL LOW
- <10kw Zone

0 100 200 300 400
Metres

------ LOCALITY ------



Aerial Imagery : Google Satellite

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre
Map compiled by: Neil Stoney 20/12/2025
Map updated by: Neil Stoney 20/12/2025
A3 Scale 1:6,000

BUSHFIRE PRONE PLANNING

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Map Document Path / Name: C:\Users\Neil\Desktop\Current Projects\251119 merredin\mxds\251119_Fig3-2-2_BAL-S.mxd

4 IDENTIFICATION OF BUSHFIRE HAZARD ISSUES

EXPLANATORY INFORMATION

Section Content Guidance (DPLH/WAPC)

'Bushfire Hazard Issues' is a section of the Bushfire Management Plan (BMP) in accordance with guidance presented in the BMP Manual (DPLH/WAPC, November 2024).

The Manual indicates the intent of applying its guidance with the following statement:

> *"The standardisation of BMP's improves efficiencies in decision making at local and state government level by promoting the clear and succinct presentation of information required under SPP 3.7 and the Guidelines."*

Bushfire Prone Planning's Approach

In complying more broadly with the above efficiency intentions, Bushfire Prone Planning (BPP) will also seek to:

- Improve the efficiency of BMP development by its consultants; and
- Ensure the readability and understanding of the BMP by persons who will need to read the document.

Key to achieving these efficiency and comprehension outcomes is the design and quality of the explanatory and assessment content of the BMP. This includes the effective use of Section 4 by not repeating content and assessment summaries that are presented in other sections of the BMP.

Typically, bushfire hazard issues will be appropriately addressed in Sections 2 and 3 of the BMP which identify:

- The required environmental considerations; and
- The assessment of potential levels of bushfire impact and their justification.

Limitation on Section 4 Content

As a consequence of the above considerations, content in this section will be limited to raising decision maker awareness regarding additional site specific matters that otherwise may not be a component of the standard BMP bushfire hazard assessment.

Additional information is provided on an 'as necessary' basis for the following scenarios:

1. When local governments have provided jurisdiction specific bushfire hazard assessment and/or management guidance that needs to be addressed. How these have been considered by the bushfire consultant in conducting their bushfire hazard assessments will be discussed.
2. When, due to difficult site conditions, additional explanation and justification of the bushfire hazard assessment process undertaken by the bushfire consultant would assist decision making.
3. Matters are identified when they are either not considered or are only partially considered, under the bushfire hazard assessments conducted in accordance with SPP 3.7/Guidelines. These include matters that would potentially reflect poorly on the bushfire consultant's professional integrity if ignored.

Endorsed regional or local variations to the acceptable solutions apply to the assessments against the Bushfire Protection Criteria for the planning proposal?	No

5 ASSESSMENT AGAINST THE BUSHFIRE PROTECTION CRITERIA (BPC)

EXPLANATORY INFORMATION

State Planning Policy 3.7 Bushfire (SPP 3.7) establishes policy outcomes (cl. 6) that "specify the role of planning and development in contributing to the overall objectives" of the policy.

The policy outcomes are incorporated into the four elements of the bushfire protection criteria established in the Planning for Bushfire Guidelines (Guidelines).

CONSEQUENTLY, TO SATISFY THE OBJECTIVES AND POLICY OUTCOMES OF SPP 3.7, A PLANNING PROPOSAL IN A DESIGNATED BUSHFIRE PRONE AREA IS REQUIRED TO DEMONSTRATE THAT COMPLIANCE WITH THE BUSHFIRE PROTECTION CRITERIA CAN BE ACHIEVED.

The Guidelines in Section 2.2.1 establish two pathways to demonstrate compliance:

1. The deemed to comply pathway - in which compliance is able to be demonstrated with all relevant acceptable solutions associated with each Element, for a specific planning stage or use; or
2. An alternative pathway when all relevant acceptable solutions cannot be fully achieved, which utilises either:
   (a) The outcomes-based approach (established in SPP 3.7 cl. 6) alone; or
   (b) A combination of the outcomes-based approach and the acceptable solutions.

For the subject planning proposal:

- The assessment applying the deemed to comply pathway assessment is presented in Section 5.3.
- When an assessment applying the alternative pathway is necessary, the required additional information is presented in Section 5.4.

5.1 Local Government Variations to Apply

EXPLANATORY INFORMATION

1. Local governments may add to or modify the acceptable solutions contained within the Guidelines to recognise special local or regional circumstances that reinforce the SPP 3.7 objectives and outcomes. This is achieved through regional or local variations that form part of a local planning strategy and/or local planning scheme via a scheme amendment or special control area.

   This could include acceptable solutions that address topography, vegetation or climate to the satisfaction of the Western Australian Planning Commission (WAPC) that the modifications comply with the corresponding SPP 3.7 objectives and outcomes. (Planning for Bushfire Guidelines, s. 3.4, 2024).
2. Under the relevant state legislation (LPS Regulations 2015), SPP 3.7 does not apply to hosted or unhosted short-term rental accommodation. However, the local government under its Local Planning framework (i.e. Strategy / Scheme and Policy as applicable), may require that certain bushfire protection measures or variations to the measures (the bushfire protection criteria), established by SPP 3.7 and the Guidelines, are to be applied.

Endorsed regional or local variations to the acceptable solutions apply to the assessments against the Bushfire Protection Criteria for the planning proposal?	No
The proposed land use for hosted or unhosted short-term rental accommodation, and the local government requires certain bushfire protection measures, contained within the BPC, to be applied, that under the LPS Regulations 2015, would otherwise not be required?	No

5.2 Assessment Summary

PATHWAY APPLIED TO DEMONSTRATE ACHIEVING POLICY OUTCOMES OF SPP 3.7 BUSHFIRE [1] **INCLUDES SUMMARY OF THE PROPOSAL'S ASSESSMENT AGAINST THE BPC ACCEPTABLE SOLUTIONS**			
DEVELOPMENT – COMMERCIAL AND INDUSTRIAL			
The Acceptable Solutions Corresponding to the Policy Outcomes of SPP 3.7 Bushfire as Incorporated into the Elements of the Bushfire Protection Criteria (Guidelines)	Acceptable Solutions Pathway Compliance Status	Alternative Pathway [2] Outcomes-Based Approach Only	Alternative Pathway [2] Combination of Pathways
ELEMENT 2: SITING AND DESIGN:	Fully Compliant	-	-
A2.1a Siting and design	Fully Compliant		
A2.1b Siting in an area with a radiant heat impact exceeding 29 kW/m² (BAL-40 or BAL-FZ)	Not Applicable		
A2.2 Asset Protection Zone (APZ)	Fully Compliant		
A2.3 Clearing of native vegetation	Fully Compliant		
A2.4 Storage of hazardous, flammable and/or combustible materials	Not Applicable		
ELEMENT 3: VEHICULAR ACCESS:	Fully Compliant	-	-
A3.1 Private Driveways	Fully Compliant		
ELEMENT 4: WATER SUPPLY:	Fully Compliant	-	-
A4.1 Water supply	Fully Compliant		
Note 1: Achieving the objectives and policy outcomes of SPP 3.7 Bushfire can be demonstrated through either the acceptable solutions pathway, the outcomes- based approach only, or a combination of both pathways (refer to Guidelines s 2.2.1). Note 2: When applied, the required additional assessment details are provided in Section 5.4 of this BMP. The content and comprehensiveness of the assessment will vary dependant on the specific conditions of the broader landscape, the development site, its use and the degree to which any relevant acceptable solutions cannot be complied with.			

5.3 BPC 7: Development – Commercial and Industrial - Acceptable Solutions Assessment

5.3.1 Element 2: Siting and Design

ELEMENT 2: SITING AND DESIGN (DEVELOPMENT - COMMERCIAL/INDUSTRIAL)
EXPLANATORY INFORMATION Refer to Appendices B1 and B3 of this BMP for additional information and to *the bushfire protection measure implementation checklist in Section 6 for the APZ dimensions applicable to this planning proposal.* The Planning Assessment and the APZ This assessment is a 'planning assessment' being conducted for planning approval purposes only. All details of acceptable solution requirements are established in the Planning for Bushfire Guidelines (Guidelines) – WA Department of Planning, Lands and Heritage (DPLH, as amended). *Note the assessment is not conducted for building approval purposes. The derivation of 'determined' BAL ratings for building permit applications is not the intended outcome of this planning assessment. However, in limited situations, the presented indicative BAL rating might also be considered as 'determined'.* To comply with the relevant acceptable solutions contained in the 'Bushfire Planning Guidelines', the subject planning proposal must demonstrate that the required minimum sized asset protection zone (APZ) - subject to location constraints and allowances established by the Guidelines - can be installed surrounding a habitable or specified building. **Approved BMP's and the APZ Dimensions to be Implemented** An approved BMP, unless stated otherwise, is only approving the installation of an APZ comprised of: • The minimum dimensions that ensure the radiant heat impact of a bushfire (on building works) does not exceed 29 kW/m² (BAL-29); or • For specific 'vulnerable' land uses, the minimum dimensions that ensures the radiant heat impact of a bushfire (on building works) does not exceed the level of radiant heat exposure stated in the applicable acceptable solution; or • The specific minimum dimensions that may be applied through the application of an outcomes-based approach. Consequently, the 'minimum' dimensions of the approved APZ are also the 'maximum' approved dimensions when installation of the APZ will require the modification/removal of native vegetation. Installing a larger dimensioned APZ, to lower the determined BAL rating of specific building works, will need additional approval from the relevant planning authority. The following bushfire planning policy and guidance potentially limit installed APZ dimensions: • SPP 3.7 Bushfire, Policy Objectives, cl. 5.5 states – "Prioritise the retention of native vegetation for biodiversity conservation, environmental protection and landscape amenity. • SPP 3.7 Bushfire, Policy Outcomes, cl. 6.2 - establishes that clearing of native vegetation is to be avoided or minimised in managing or mitigating bushfire risk. • The Guidelines, Appendix B2, B.2.1 states - "clearing or modification of native vegetation to reduce the radiant heat impact below 29 kW/m² is generally not supported."

	The Outcome of State Planning Policy 3.7 Bushfire (and the BPC) to be Achieved
O2	Ensure siting and design solutions: • Manage or mitigate the bushfire risk to people, property and infrastructure; and • Avoid, or where unavoidable, minimises the clearing of native vegetation. (SPP 3.7, 6.2)
	Acceptable Solutions Pathway - Compliance Statement
E2	The planning proposal is fully compliant with all applicable acceptable solutions and therefore achieves the required outcomes of this element.
	Alternative Pathway Applied to Demonstrate Ability to Achieve SPP 3.7 Outcomes
	N/A

ACCEPTABLE SOLUTIONS - ASSESSMENT STATEMENTS				
Check Box Legend:	☑ Relevant & met	☒ Relevant & not met	⃠ Not relevant	
A2.1a Siting and design	Applicable:	Yes	Compliant:	Yes
☑ ☐ ☐	Every habitable building achieves a radiant heat impact not exceeding 29 kW/m² (BAL-29).			
☐ ☐ ⃠	A2.1a is not applicable to the subject planning proposal as it cannot be complied with and an alternative acceptable solution A2.1b (dealing with the same protection measure), is provided and establishes a higher level of radiant heat impact that will be considered for planning approval, if it can be satisfactorily demonstrated that the allowable constraints apply to the subject development site.			
Assessment Supporting Details: The installation of an APZ is required for structures to be subject to a radiant heat impact not exceeding 29 kW/m² (BAL-29). Acceptable Solution A2.2 applies.				
A2.1b Siting in an area with a radiant heat impact exceeding 29 kW/m² (BAL-40 or BAL-FZ)	Applicable:	No	Compliant:	-
☑ ☐ ☐	A2.1b is not applicable to the subject planning proposal because A2.1a can be complied with.			
A2.2 Asset Protection Zone (APZ)	Applicable:	Yes	Compliant:	Yes
☑ ☐ ☐	A2.2 is not applicable to the subject planning proposal because it is a requirement associated with the compliant application of A2.1a. Given A2.1a is not applicable to the subject planning proposal, A2.2 is also not applicable.			
Where a habitable building(s) cannot be wholly within an area with a radiant heat impact not exceeding 29 kW/m² (BAL-29) in its pre-development state, an indicative APZ is to be provided and meet the following requirements for width, location and management:				
☑ ☐ ☐	APZ Width: The APZ, when measured from any external wall or supporting post or column, is of sufficient size to ensure the radiant heat impact of a bushfire does not exceed 29 kW/m² (BAL-29) to any part of the building, in all circumstances.			
☑ ☐ ☐	APZ Location – Option 1: The indicative 'Planning BAL-29' APZ can be contained solely within the boundaries of the lot.			

☐ ☐ ⊘	APZ Location – Option 2: The indicative 'Planning BAL-29' APZ cannot be contained solely within the boundaries of the lot. However, the relevant vegetation on the adjoining land / lot(s) is, and will continue to be, on an ongoing basis in perpetuity, low threat as per: • Clause 2.2.3.2 of AS 3959 (including non-vegetated land such as a sealed or unsealed road, or a water body); or • The requirements of the Guidelines Appendix B.2, Table 9 – APZ technical requirements; or • The alternative standard in the local planning scheme (when it exists).
☑ ☐ ☐	APZ Management: The APZ is (or can and will be) managed in accordance with the requirements established in the Guidelines, Appendix B.2 or the alternative standard in the gazetted local planning scheme (when it exists).

Assessment Supporting Details:

The APZ will be contained wholly within the subject lot for the Development Application and therefore will be enforceable in perpetuity. APZs will be managed in accordance with Appendix B of the Guidelines.

The associated Bushfire Risk Report has identified the appropriate APZ dimension for relevant assets. The following setback requirements have been applied:

HV Substation Solar Arrays[1]	<19kW/m2 (BAL-19)
Operations and Maintenance Buildings Workshop and Storage Western Power Relay Room Water Tanks Laydown Areas (temporary)	<29kW/m2 (BAL-29)
BESS Cabinets and Associated Infrastructure	<10kW/m2 (calculated at 1090K Flame Temperature)

[1] Some solar arrays toward the perimeter of the development footprint are subject to ratings of BAL-29. This meets the planning requirement above.

The screening vegetation impacting the solar arrays are narrow and do not pose the assumed threat modelled by AS 3959. The Bushfire Risk Report determines the BAL-29 setback to be appropriate for this lower hazard vegetation structure.

A2.3 Clearing of native vegetation	Applicable:	Yes	Compliant:	Yes

☑ ☐ ☐	The development avoids, or where unavoidable, minimises the clearing of native vegetation.

Assessment Supporting Details:

No clearing is proposed.

A2.4 Storage of hazardous, flammable and/or combustible materials	Applicable:	No	Compliant:	-

☐ ☐ ⊘	The proposed land use does not include the storage of hazardous, flammable and/or combustible materials as part of its ongoing day to day operations. Therefore, A2.6 is not applicable to the subject planning proposal.

☑ ☐ ☐	The proposed land use will include the storage of hazardous, flammable and/or combustible materials as part of its ongoing day to day operations. These will be a quantity that trigger the requirement for a licence under the *Dangerous Goods Safety Act 2004* or the *Environmental Protection Act 1986*. Consequently, the requirements under the above legislation will establish the storage requirements and therefore A2.6 is not applicable to the subject planning proposal.
☐ ☐ ⊘	The proposed development will include the storage of hazardous, flammable and/or combustible materials as part of its ongoing day to day operations. These are not at a quantity that trigger the requirement for a licence under the *Dangerous Goods Safety Act 2004* or the *Environmental Protection Act 1986*. Consequently, the following established storage area requirements can and will be applied:
☐ ☐ ⊘	• The storage area Is subject to a radiant heat impact not exceeding 29 kW/m^2 (BAL-29); and
☐ ☐ ⊘	• The construction of the storage area is non-combustible and shields the materials to reduce their exposure to radiant heat from the bushfire to levels significantly lower than 29 kW/m^2 and prevents the entry of debris and embers; and
☐ ☐ ⊘	• The construction of the storage area limits to the degree necessary and practical, the escape of sources of ignition from the stored materials into bushfire prone vegetation.
Assessment Supporting Details: BESS components use lithium-ion technology and transformer oil is used within adjacent infrastructures. The development will be subject to compliance with Schedule 1 – quantities of dangerous goods of the *Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007*. Section 7.1.1 of the Guidelines states the Acceptable Solution is not applicable. However, as discussed A2.2 Assessment, all assets will be subject to no greater than 29kW/m2 radiant heat flux (BAL-29).	

5.3.2 Element 3: Vehicular Access

ELEMENT 3: VEHICULAR ACCESS (DEVELOPMENT - COMMERCIAL/INDUSTRIAL)					
All details of acceptable solution requirements are established in the Planning for Bushfire Guidelines (Guidelines) – WA Department of Planning, Lands and Heritage (DPLH, as amended). When relevant, the 'Bushfire Management Plan Guidance for the Dampier Peninsula' (DPLH, 2021 Rev B), is also referenced. The technical construction requirements for access types and components are established in the Guidelines Appendix B.3, Table 10 (certain information is copied and presented in Appendix C of this BMP). The local government will advise the proponent where different requirements are to apply and when any additional specifications such as those for signage and gates are to apply. These are included as an appendix if requested by the local government. *Note:* *The following understanding of what constitutes a 'road', and the stated definitions can be important considerations for assessments against an acceptable solution for Element 3.* • *Guidelines Appendix B3: Vehicular Access, identifies a 'road' as being either a public road (that includes a no-through road) or a perimeter road. All other access types (i.e. emergency access ways, fire service access routes, battle-axes and private driveways) are considered a different class of access i.e. they are not 'roads'.* • *SPP 3.7 defines 'no-through road' as "a cul-de-sac or dead end road".* • *SPP 3.7 defines 'two-way access' as "vehicular access from a site in two different directions to at least two different suitable destinations". This allows for required access to potentially be provided by an emergency access way.*					
O3	The Outcome of State Planning Policy 3.7 Bushfire (and the BPC) to be Achieved				
	Ensure the design and capacity of vehicular access and egress provide: • For efficient and effective evacuation to a suitable destination(s); and/or • As a contingency measure for vulnerable land uses, an on-site shelter, where demonstrated appropriate, as a last resort option. (SPP 3.7, 6.3)				
E3	Acceptable Solutions Pathway - Compliance Statement				
	The planning proposal is fully compliant with all applicable acceptable solutions and therefore achieves the required outcomes of this element.				
	Alternative Pathway Applied to Demonstrate Ability to Achieve SPP 3.7 Outcomes				
	N/A				
ACCEPTABLE SOLUTIONS - ASSESSMENT STATEMENTS					
Check Box Legend:	☑ Relevant & met	☒ Relevant & not met	⃠ Not relevant		
A3.1 Private driveways			Applicable:	Yes	Compliant: Yes
☐ ☐ ⃠	The subject lot is serviced by reticulated water, and the private driveway is no greater than 70 metres in length between the most distant external part of the habitable building and the public road. For these conditions, no private driveway technical requirements are prescribed by the Guidelines.				
☑ ☐ ☐	In circumstances where the above conditions are not met, the private driveway is to meet the following requirements:				

	• The private driveway meets (or can and will meet) the technical requirements (Guidelines Appendix B3, Table 10) for minimum horizontal clearance (6 metres) or where not required to comply with the Guidelines width, it meets (or can and will meet) the requirements of the Residential Design Codes and Development Control Policy 2.2 Residential Subdivision; and
☑ ☐ ☐	• The private driveway meets (or can and will meet) the technical requirements (Guidelines Appendix B3, Table 10) for minimum vertical clearance (4.5 metres), minimum weight capacity (15 tonnes - includes bridges, culverts) and minimum inner radius of road curves (8.5 metres); and
☑ ☐ ☐	• The private driveway meets (or can and will meet) the technical requirements (Guidelines Appendix B3, Table 10) for the gradients of different surfaces and dips; and
☑ ☐ ☐	• Passing bays are (or can and will be) installed every 200 metres with a minimum length of 20 metres and a minimum additional carriageway width of 2 metres i.e. the combined carriageway width of the passing bay and constructed private driveway will be a minimum 6 metres; and
☑ ☐ ☐	• The turnaround area/head meets (or can and will meet) the design and location (within 30m of main habitable building) requirements established by the Guidelines (refer to Figures 30 and 38).

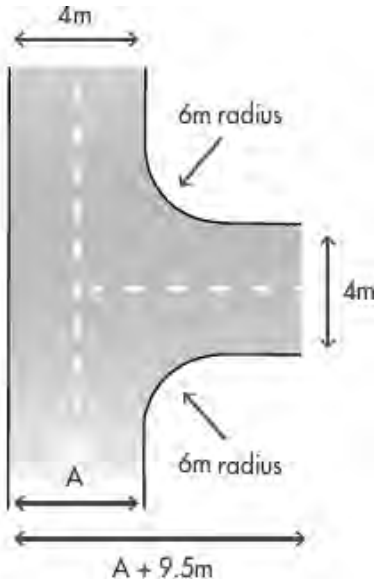
Assessment Supporting Details:

The subject site is bounded in the East by Robartson Road, and Bruce Rock-Merredin Road to the South.

The submitted layout includes a primary access to the northeast and multiple external emergency access gates. See Figure 1.1.

The layout includes a perimeter road and internal roads between each row of decentralised BESS clusters.

Multiple turnaround areas will be present within the site. At a minimum, the internal junctions within the submitted layout meet the requirements provided in Figure 30 of the Guidelines. See below.



The internal roads form a loop design, meeting the required turnaround area through a '*circular and loop driveway design*' (Guidelines B3.8).

Internal access roads will be constructed to 6m trafficable width. All internal roads will meet or exceed the technical construction requirements as outlined in Table 10 of the Guidelines and Appendix C of this document. Access roads will be constructed to allow for the delivery of heavy equipment to the project site, which exceeds the 15t weight capacity specified in Table 10.

There are no constraints to all components of the project meeting the required access.

5.3.3 Element 4: Water Supply

ELEMENT 4: WATER SUPPLY (DEVELOPMENT - COMMERCIAL/INDUSTRIAL)					
All details of acceptable solution requirements are established in the Planning for Bushfire Guidelines (Guidelines) – WA Department of Planning, Lands and Heritage (DPLH, as amended). When relevant, the 'Bushfire Management Plan Guidance for the Dampier Peninsula' (DPLH, 2021 Rev B), is also referenced.					
O4	The Outcome of State Planning Policy 3.7 Bushfire (and the BPC) to be Achieved				
	Ensure that sufficient water is available and accessible for emergency services, to enable people, property and infrastructure to be defended from bushfire. (SPP 3.7, 6.4)				
E4	Acceptable Solutions Pathway - Compliance Statement				
	The planning proposal is fully compliant with all applicable acceptable solutions and therefore achieves the required outcomes of this element.				
	Alternative Pathway Applied to Demonstrate Ability to Achieve SPP 3.7 Outcomes				
	N/A				
ACCEPTABLE SOLUTIONS - ASSESSMENT STATEMENTS					
Check Box Legend:	☑ Relevant & met	☒ Relevant & not met	⃠ Not relevant		
A4.1 Water supply		Applicable:	Yes	Compliant:	Yes
☐ ☐ ⃠	Evidence is provided that a reticulated water supply, available for firefighting purposes, exists or can be provided. Hydrant connection(s) will be provided in accordance with the specifications established by the relevant water supply authority (refer also to hydrant location information in Appendix D of this BMP).				
☑ ☐ ☐	The provision of or the specifications of a reticulated water supply cannot be met. Evidence is provided that a sufficient, sustainable and accessible non-reticulated water supply, dedicated to firefighting purposes, can and will be provided in accordance with the specifications established in the Guidelines, Appendix B4: Water Supply:				
☑ ☐ ☐	• The planning proposal is for commercial/industrial development. For each habitable building a water supply, dedicated to firefighting purposes, will be stored in tanks at 10,000 litres of water per 1,500 m^2 of floor area up to 50,000 litres in total; and				
☑ ☐ ☐	• The above ground water supply tank(s), dedicated to firefighting purposes (and tank stand(s) when applicable), will be constructed of non-combustible material and as necessary, will comply with AS/NZS 3500.1(as amended). This includes not using the same water supply for both domestic use and firefighting purposes. If a combined use tank(s) is to be used, it will separate the storage compartments in accordance with the provisions of the standard (i.e. internal installation of double partition walls); and				
☑ ☐ ☐	• The planning proposal is for a commercial/industrial land use. The tank(s) water outlet connection fitting will be 125 mm Storz; and				
☐ ☐ ⃠	• All above-ground, exposed water supply pipes and fittings will be metal and positioned facing away from the source of bushfire hazard and/or shielded against potential bushfire impact – to allow access by emergency services; and				
☑ ☐ ☐	• The planned provision of the water supply tank(s) will consider locations relative to the bushfire hazard. Location of the tank(s) and management of vegetation will ensure vegetation will not				

	exist over or against the tank(s) and that sufficient separation exists to limit the potential bushfire impact. Due consideration will also be given to the provision of sufficient separation from vegetation and/or shielding for the protection of firefighters accessing the water supply; and
☑ ☐ ☐	• An unobstructed, hardened ground surface, for emergency services vehicle access, can and will be installed within 4 metres of the water supply outlet (refer to Figure 39, Guidelines); and
☐ ☐ ⊘	• It is proposed for a water supply tank outlet(s) is to be remote from the tank, the local government and DFES will have been consulted regarding the application and location. The determined requirements are presented as an Addendum in this BMP; and
☐ ☐ ⊘	• Planned below ground water supply tank(s), dedicated to firefighting purposes, will have at least a 200 mm diameter access hole – or a suitable inspection opening - to allow tankers or emergency services vehicles to refill direct from the tank, with the outlet location clearly marked on the surface. As necessary, the tanks(s) will comply with AS/NZS 3500.1 (as amended).
☐ ☐ ⊘	The planning proposal intends that a suitable static water supply is to be provided by a dam or river that complies with the DFES guidelines for acceptable sources of water for firefighting purposes. Evidence is provided that: • Demonstrates that the water level will be maintained above the top of the highest fire brigade suction point; and • Approval has been obtained from the decision maker in consultation with the emergency services and is presented as an Addendum in this BMP.
☐ ☐ ⊘	The BPC Explanatory Notes in Appendix B.4: Water Supply introduce additional measures as best practice but voluntary. The following measure is adopted by the planning proposal: The subject site is in a non-reticulated area. Pumping equipment is installed and will be powered by means other than the electricity network such as an appropriately powered and capacity petrol/diesel or onsite generator/electricity, driven pump, and be shielded against potential bushfire impact.
☐ ☐ ⊘	The BPC Explanatory Notes in Appendix B.4: Water Supply introduce additional measure as best practice but voluntary. The following measure is adopted by the planning proposal: The subject site will have a <u>reticulated</u> water supply but is in an area designated as Area 2 on the Map of BPA and/or the local government area has known issues with water supply or pressure. Water supply tank(s) and fittings dedicated to firefighting purposes (noting that combining drinking and firefighting uses of water is not recommended and may be contrary to relevant provisions), that satisfy the construction and design requirements established in the Guidelines, Appendix B4: Water Supply, will be provided.
☐ ☐ ⊘	The BPC Explanatory Notes in Appendix B.4: Water Supply introduce additional measure as best practice but voluntary. The following measure is adopted by the planning proposal: The subject site is serviced by reticulated water. However, the distance from the public road (along which the fire hydrant is located) to the farthest part of the habitable building is greater than 70 metres, exceeding the reach of a hose reel. A water supply tank will be installed within the lot.

<u>Assessment Supporting Details:</u>

The *Planning for Bushfire Guidelines* do not establish a firefighting water requirement for uses other than Class 1-9 buildings. The associated Bushfire Risk Report has identified the aggregate firefighting water requirements, exceeding the requirements of the Guidelines. The water supply applied aligns with the Victorian Country Fire Authority's *Design Guidelines and Model Requirements – Renewable Energy Facilities* v4.4.

<u>Access</u>

- Firefighting water access points (hydrants, hard suction, or drafting) must be clearly identifiable, visible from internal roads, and unobstructed.
- Signage must be provided at each vehicle entrance to the facility, indicating the direction to the nearest firefighting water access point.

- An all-weather hardstand turnaround area meeting the requirements of the *Planning for Bushfire Guidelines* (Figure 30) must be provided within 4 metres static water storage tank(s) and any independent hard suction points (hydrants).
- Site Operating Procedures must include that access routes must be unobstructed at all times.

Siting and Capacity

- The number and capacity of water tanks will apply one of the following:
    - A water tank is sited within 120m of the entirety of all BESS cabinets. This may result in water tanks being strategically sited throughout the site. Each water tank will have a minimum capacity of 50,000L. OR:
    - Or as agreed in consultation with the Decision Maker and/or DFES. This may include advice from a suitable Fire Engineer.
- An additional 50,000L water tank is required adjacent to the primary vehicle access point.
- Water tanks should apply a BAL-29 dimensioned APZ at a minimum.

Construction

- Static water storage tanks must be an above-ground water tank constructed of concrete or steel.
- An external water level indicator must be installed on static water storage tanks and be visible from internal roads and the adjoining turnaround area.
- Signage indicating 'FIRE WATER' and the tank capacity must be fixed to each tank.
- Couplings at hard suction points are required to be 125mm Storz fittings (*Guidelines B.4.1.2.* The local emergency services should be contacted for input on appropriate couplings and adaptors.

5.4 Required Additional Bushfire Protection Measures

EXPLANATORY INFORMATION

The following bushfire protection measures are additional to, or a variation of, those established by the relevant acceptable solutions of the bushfire protection criteria and applied to the planning proposal within Section 5.3 of this BMP.

The intent of their application is to improve the bushfire performance of the future development/use and reduce, for persons and property, the residual levels of the risks associated with a bushfire event.

The development of these additional and/or varied bushfire protection measures can originate from the following sources (not exhaustive). Their application to the subject planning proposal is indicated below and detailed within this section.

The implementation and maintenance responsibility for these additional protection measures is established in Section 6: Responsibility Checklists.

Source of the Required Additional Bushfire Protection Measures	Applicable to the Subject Planning Proposal
1. When the assessments within the BMP have applied an outcomes-based approach and established additional protection measures.	No
2. When the subject planning proposal is to be assessed against BPC 7: Development – Commercial and Industrial but it is also considered a vulnerable land use.	No
3. The operational documents generated through the process of developing a Bushfire Risk Report (Assessment and Management).	Yes
Section 4.2 of the associated Bushfire Risk Report includes a full list of Additional Bushfire Protection Measures identified by the Risk Assessment process. Many of these measures relate to operating procedures, emergency planning, or detailed design/construction which do not form part of the planning assessment process. Additional Bushfire Protection Measures to meet or exceed the intent of the Acceptable Solutions of Elements 2-4 of the Bushfire Protection Criteria have been provided within the Section 5.3 Assessment Statements. These are measures which are relevant to the planning process.	
4. The operational documents generated through the process of developing a Bushfire Emergency Plan.	No
5. From a local government including: a. Variations to acceptable solutions; and/or b. Additional protection measures to be implemented, including through 'Conditions' which may be applied to a 'Planning Approval' or a 'Notice of Determination.	No
6. Any additional bushfire planning guidance documents or position statements issued by the WA Department of Planning, Lands and Heritage.	No
7. The application of a radiant heat barrier.	No

6 RESPONSIBILITY CHECKLISTS

EXPLANATORY INFORMATION

This section of the BMP sets out the responsibilities of the relevant entity or person for:

- The initial implementation of the required bushfire protection measures and their timing; and
- The ongoing maintenance of the required bushfire protection measures to ensure their continued effectiveness.

Note: Protection measures that may be recommended by the bushfire consultant in the BMP section titled "Additional Recommended Bushfire Protection Measures' are not included in the Responsibility Checklists (at least initially).

The reason for this is the additional measure(s) are either:

- Provided as additional risk management advice to the proponent and it is up to them to choose to apply; or
- Part of an outcomes-based approach being applied to satisfy the required outcomes of SPP 3.7. Consequently, the need for their application (which would create a responsibility) is currently subject to assessment and approval by the decision maker.

  When their application is established by planning approval, the responsibility checklists in this BMP will be required to be updated.

6.1 Protection Measure Implementation Checklists

TABLE 6.1
PROPONENT/LANDOWNER RESPONSIBILITIES PRIOR TO SALE/OCCUPANCY/OPERATION

No.	IMPLEMENTATION OF BUSHFIRE PROTECTION MEASURES Measures Established Under SPP 3.7 / Guidelines
1	Install an Asset Protection Zone (APZ) surrounding assessed assets. The APZ must establish the minimum separation distances detailed below between the asset and each vegetation area. The APZ must: 1. Consist of non-vegetated areas and low bushfire threat vegetation, able to be maintained in perpetuity in a low threat state, by complying with the established APZ technical requirements (refer to the Guidelines Appendix B2 and Appendix B3 of this BMP); and 2. Be located within the boundaries of the lot except for any allowable variances allowed and discussed in the assessment against the bushfire protection criteria in Section 5, Element 2: Siting and design, and the relevant APZ acceptable solution. (Refer also to the illustrated APZ on the Property Bushfire Management Statement in Section 6.3); and 3. Establish the minimum separation distances between the relevant asset and each vegetation area, as shown in the insert table below.
2	Construct the private driveways / internal vehicular access to comply with the technical requirements stated and/or referenced in Section 5.3 of the BMP at Element 3: Vehicular access, A3.1 Private driveways.

THE MINIMUM (SITE SPECIFIC) VEGETATION SEPARATION DISTANCES ESTABLISHING APZ DIMENSIONS [1]

Building / Structure	Vegetation Classification [2]		Potential Bushfire Impact	Minimum Distances (metres)
HV Substation.	1	(B) Woodland	BAL-19	25
	2	(D) Scrub		22
	3	(G) Grassland		14
Solar Arrays Operations and Maintenance Buildings Workshop and Storage Western Power Relay Room Water Tanks Laydown Areas (temporary)	1	(B) Woodland	BAL-29	17
	2	(D) Scrub		15
	3	(G) Grassland		9
BESS Cabinets and Associated Infrastructure.	1	(B) Woodland	10kW/m² 1090K Flame Temperature	43.2
	2	(D) Scrub		37.9
	3	(G) Grassland		25

Note 1: Will include the application of the radiant heat barrier when applicable to the proposal.

Note 2: Refer to the Vegetation and Topography Map in Section 3.1

Note 3: The Shire of Merredin Fire Break Order imposes a minimum 20m APZ dimension. This exceeds the APZ dimensions for some vegetation classes and BALs.

3	Install the firefighting water supplies, including fittings and the required hardstand/access, to comply with the technical requirements stated and/or referenced in Section 5.3 of the BMP at Element 4: Water supply.
4	A purchaser, occupier and/or operator of the site must be made aware of the existence of this approved BMP and provided with access to a copy and be informed of their ongoing responsibilities it contains.
5	The advice of an accredited Bushfire Planning Practitioner must be sought where revegetation within the lease area is proposed. Revegetation may require a Landscape Management Plan, and update to this Bushfire Management Plan, or Addendum to this Bushfire Management Plan.
IMPLEMENTATION OF BUSHFIRE PROTECTION MEASURES Measures Established by this BMP as a Required Additional Measure in Section 5.5	
6	Prior to operation, review and implement the 'Required or Recommended Additional Bushfire Protection Measures' discussed in Section 5.4 of this BMP. The Measures are detailed in Section 4.2 of the associated Bushfire Risk Report *251119 – Ngaakgk Boodja Battery and Solar Farm (BRR) v1.0 (Bushfire Prone Planning, January 2026).* (Bushfire Prone Planning January 2025).
IMPLEMENTATION OF BUSHFIRE PROTECTION MEASURES Measures Established by a Local Government's Section 33 Notice Under the Bush Fires Act 1954	
7	Install the required firebreaks, providing emergency access within the lot, to the stated specifications established by the Shire of Merredin Fire Break Order.
IMPLEMENTATION OF BUSHFIRE PROTECTION MEASURES Measures Established by the Building Code of Australia (Vol. 1 and 2 of the National Construction Code)	
8	Inform builders engaged to construct dwellings/additions and/or other relevant structures on the subject lot of the existence of this approved Bushfire Management Plan (BMP). The BMP identifies that the development site is within a designated bushfire prone area and states the indicative (or determined) BAL rating(s) that may (or will) be applied to buildings/structures. A BAL assessment report may be required to confirm determined ratings and will be required when stated ratings are only indicative. BAL certificates will need to be produced to accompany building applications. The associated Bushfire Risk Report establishes that Class 1-9 buildings are required to construct to their assessed BAL under AS 3959, to a minimum of a BAL-12.5 construction standard. Compliance with the current Building Code of Australia (Volumes 1 and 2 of the National Construction Code), will require certain bushfire resistant construction requirements be applied to residential buildings in bushfire prone areas (i.e., Class 1, 2 and 3 and associated Class 10a buildings and decks) and certain Class 9 buildings. Other classes of buildings may also be required to comply with these when established by the relevant authority or if identified as a 'Required Additional Bushfire Protection Measure' bushfire protection measure within the BMP. The deemed to satisfy solutions that will meet the relevant bushfire performance requirements are found in AS 3959 – Construction of Building in Bushfire Prone Areas (as amended) and the NASH Standard - Steel Framed Construction in Bushfire Areas (as amended).

6.2 Protection Measure Maintenance Checklist

TABLE 6.2 LANDOWNER/OCCUPIER – MAINTENANCE OF BUSHFIRE PROTECTION MEASURES	
No.	MAINTENANCE OF BUSHFIRE PROTECTION MEASURES Measures Established Under SPP 3.7 / Guidelines
1	Annually review and enact the following maintenance responsibilities established in this approved BMP for the development site prior to the bushfire season.
2	Maintain the Asset Protection Zone (APZ) around habitable buildings (and other structures as required) that consists of: 1. Non-vegetated areas and low bushfire threat vegetation maintained in perpetuity in a low threat state by complying with established APZ technical requirements; and 2. The required zone dimensions that are established by the required separation distances from any areas classified vegetation. These distances should in most situations correspond to either: • The determined BAL rating for a relevant building(s) / structure(s); or • The maximum acceptable level of radiant heat transfer that is to apply. These distances will account for the specific site conditions. This ensures the building's/structure's constructed bushfire resistance continues to align with its calculated potential exposure to flame and radiant heat. IMPORTANT: 1. REFER TO THE APPLICABLE APZ DIMENSIONS IN TABLE 6.1. 2. REFER TO APPENDICES B3, B4 AND B5 FOR APZ TECHNICAL REQUIREMENTS AND DIMENSION GUIDANCE.
3	Maintain the private driveways / internal vehicular access to comply with the technical requirements stated and/or referenced in Section 5.3 of the BMP at Element 3: Vehicular access, A3.1 Private driveways.
4	Maintain the fighting water supplies, including fittings and the required hardstand/access, in good working condition. Ensure the tanks are maintained at full capacity.
5	When the property changes ownership or occupancy, to assist with the ongoing maintenance of the implemented bushfire protection measures, ensure that the relevant person(s) is aware of the BMP, and the responsibilities it contains. Provide access to a copy of the BMP and Bushfire Risk Report (BRR).
MAINTENANCE OF BUSHFIRE PROTECTION MEASURES Measures Established by this BMP as a Required Additional Measure in Section 5.5	
6	Maintain the 'Required or Recommended Additional Bushfire Protection Measures' discussed in Section 5.4 of this BMP. The Measures are detailed in Section 4.2 of the associated Bushfire Risk Report *Bushfire Risk Report 251119 – Ngaakgk Boodja Battery and Solar Farm (BRR) v1.0 (Bushfire Prone Planning, January 2026)*

	MAINTENANCE OF BUSHFIRE PROTECTION MEASURES Measures Established by a Local Government's Section 33 Notice Under the Bush Fires Act 1954
7	Maintain the required firebreaks, providing emergency access within the lot, to the stated specifications established by the Shire of Merredin Fire Break Order.
	MAINTENANCE OF BUSHFIRE PROTECTION MEASURES Measures Established by the Building Code of Australia (Vol. 1 and 2 of the National Construction Code)
8	Prior to any future building work, inform the builder of the existence of this approved Bushfire Management Plan (BMP). The BMP identifies that the development site is within a designated bushfire prone area and states the indicative (or determined) BAL rating(s) that may (or will) be applied to buildings/structures. A BAL assessment report may be required to confirm determined ratings and will be required when stated ratings are only indicative. BAL certificates will need to be produced to accompany building applications. The BMP may also establish, as a 'Required Additional Bushfire Protection Measure', that bushfire construction requirements to be applied must be those corresponding to a specified higher BAL rating. Compliance with the current Building Code of Australia (Volumes 1 and 2 of the National Construction Code), will require certain bushfire resistant construction requirements be applied to residential buildings in bushfire prone areas (i.e., Class 1, 2 and 3 and associated Class 10a buildings and decks) and certain Class 9 buildings. Other classes of buildings may also be required to comply with this construction when established by the relevant authority or if identified as a 'Required Additional Bushfire Protection Measure' bushfire protection measure within the BMP. The deemed to satisfy solutions that will meet the relevant bushfire performance requirements are found in AS 3959 – Construction of Building in Bushfire Prone Areas (as amended) and the NASH Standard - Steel Framed Construction in Bushfire Areas (as amended).

APPENDIX A: DETAILED BAL ASSESSMENT DATA AND SUPPORTING INFORMATION

A1: BAL Assessment Inputs Common to the Method 1 and Method 2 Procedures

A1.1: FIRE DANGER INDICES (FDI/FDI/GFDI)

When using Method 1 the relevant FDI value required to be applied for each state and region is established by AS 3959:2018, Table 2.1. Each FDI value applied in Tables 2.4 – 2.7 represents both the Forest Fire Danger Index (FFDI) and a deemed equivalent for the Grassland Fire Danger Index (GFDI), as per Table B2 in Appendix B. When using Method 2, the relevant FFDI and GFDI are applied.

The values may be able to be refined within a jurisdiction, where sufficient climatological data is available and in consultation with the relevant authority.

Relevant Jurisdiction:	WA	Region:	Whole State	Method 1	Applied FDI:	80
				Method 2	Applied FFDI:	80
					Applied GFDI:	110

A1.2: VEGETATION ASSESSMENT AND CLASSIFICATION

Vegetation Types and Classification

In accordance with AS 3959:2018 Clauses 2.2.3 and C2.2.3.1, all vegetation types within 100 metres of the 'site' (defined as "the part of the allotment of land on which a building stands or is to be erected"), are identified and classified. Any vegetation more than 100 metres from the site that has influenced the classification of vegetation within 100 metres of the site, is identified and noted. The maximum excess distance is established by AS 3959: 2018 Clause 2.2.3.2 and is an additional 100 metres.

Classification is also guided by the Visual Guide for Bushfire Risk Assessment in WA (WA Department of Planning February 2016) and any relevant FPA Australia practice notes.

Modified Vegetation

The vegetation types have been assessed as they will be in their natural mature states, rather than what might be observed on the day. Vegetation destroyed or damaged by a bushfire or other natural disaster has been assessed on its expected re-generated mature state. Modified areas of vegetation can be excluded from classification if they consist of low threat vegetation (refer to Appendix B) and that any required active management can be expected to continue in perpetuity, and this can be adequately justified.

The Influence of Ground Slope

Where significant variation in effective slope exists under a consistent vegetation type, these will be delineated as separate vegetation areas to account for the difference in potential bushfire behaviour, in accordance with AS 3959:2018 Clauses 2.2.5 and C2.2.5.

THE INFLUENCE OF VEGETATION GREATER THAN 100 METRES FROM THE SUBJECT SITE	
Vegetation area(s) within 100m of the site whose classification has been influenced by the existence of bushfire prone vegetation from 100m – 200m from the site:	None
Assessment Statement:	No vegetation types exist close enough, or to a sufficient extent, within the relevant area to influence classification of vegetation within 100 metres of the subject site.

VEGETATION AREA 1						
Classification	B. WOODLAND					
Types Identified	Woodland B-05					
Effective Slope	Measured	d/slope 5 degrees	Applied Range (Method 1)	Downslope >0-5 degrees		
Foliage Cover (all layers)	<30%	Shrub/Heath Height	<2m	Tree Height	Up to 30m	
Justification Comments:	Treed areas with sparse or grassy understory, inconsistent canopy, and limited extent. Joined canopies are present but with overall cover <30%. The vegetation has varying effective slopes, but does not exceed 5 degrees on any aspect. 5 degrees has been applied as a standard effective slope. The road verge at the southern boundary varies between Class D Scrub and Class B Woodland. Class B Woodland has been applied, being the higher threat category.					
Post Development Assumptions:	The vegetation is expected to remain in its current condition.					



PHOTO ID: 1



PHOTO ID: 2



PHOTO ID: 3



PHOTO ID: 4



PHOTO ID: 5



PHOTO ID: 6



PHOTO ID: 7



PHOTO ID: 8

VEGETATION AREA 2						
Classification	D. SCRUB					
Types Identified	Closed scrub D-13 Open scrub D-14					
Effective Slope	Measured	d/slope 5 degrees	Applied Range (Method 1)	Downslope >0-5 degrees		
Foliage Cover (all layers)	30-70%	Shrub/Heath Height	Up to 6m	Tree Height	N/A	
Justification Comments:	Tall shrubs and/or stunted trees, generally up to 3 metres in height but up to 6m in some locations. Trees are present but with <10% overall canopy cover. The vegetation has varying effective slopes, but does not exceed 5 degrees on any aspect. 5 degrees has been applied as a standard effective slope.					
Post Development Assumptions:	The vegetation is expected to remain in its current condition.					



PHOTO ID: 9



PHOTO ID: 10



PHOTO ID: 11



PHOTO ID: 12



PHOTO ID: 13



PHOTO ID: 14



PHOTO ID: 15



PHOTO ID: 16



PHOTO ID: 17



PHOTO ID: 18



PHOTO ID: 19



PHOTO ID: 20



PHOTO ID: 21

VEGETATION AREA 3						
Classification	G. GRASSLAND					
Types Identified	Tussock grassland G-22 Sown pasture G-26					
Effective Slope	Measured	d/slope 5 degrees	Applied Range (Method 1)	Downslope >0-5 degrees		
Foliage Cover (all layers)	>30%	Shrub/Heath Height	N/A	Tree Height	Up to 30m	
Justification Comments:	Pasture or cropland consistent with the region. Pasture areas display regular grazing. The vegetation has varying effective slopes, but does not exceed 5 degrees on any aspect. 5 degrees has been applied as a standard effective slope.					
Post Development Assumptions:	The vegetation is expected to remain in its current condition.					



PHOTO ID: 22



PHOTO ID: 23



PHOTO ID: 24



PHOTO ID: 25

	
PHOTO ID: 26	PHOTO ID: 27
	
PHOTO ID: 28	PHOTO ID: 29

VEGETATION AREA 4	
Exclusion Clause	2.2.3.2 (e) Non-vegetated area
Justification Comments:	Area 4 includes non-vegetated areas including hardstand, structures, roads, and dams.
Post Development Assumptions:	The vegetation is expected to remain in its current condition.



PHOTO ID: 30



PHOTO ID: 31



PHOTO ID: 32



PHOTO ID: 33

VEGETATION AREA 5	
Exclusion Clause	2.2.3.2 (f) Low threat vegetation - reduced flammability.
Justification Comments:	Area 5 designates narrow bands of vegetation approximately 5m wide which have been considered as windbreaks. These follow the eastern boundary within the road reserve of Robartson Road. Wider road reserves have been classified as Class B Woodland or Class D Scrub. Note that assets are positioned >18m from Area 5. Classification as Class B Woodland or Class D Scrub would result in ratings not exceeding BAL-29.
Post Development Assumptions:	The vegetation is expected to remain in its current condition.



PHOTO ID: 34



PHOTO ID: 35



PHOTO ID: 36



PHOTO ID: 37



PHOTO ID: 38

VEGETATION AREA 6	
Exclusion Clause	2.2.3.2 (e) Non-vegetated areas and (f) Low threat vegetation - minimal fuel condition.
Justification Comments:	Vegetation Area 6 identifies a portion of Area 3 (pasture) will be modified to APZ standard.
No photos are provided as the vegetation does not yet exist.	

VEGETATION AREA 7	
Exclusion Clause	2.2.3.2 (b) Single area <1ha & >100m from other classified vegetation
Justification Comments:	Isolated pockets of vegetation within the development footprint which will be retained. These areas are >100m from the development boundary and <1ha in size, and have been excluded under AS 3959 clause 2.2.3.2(b) in the post-development condition. See Figures 3.1.3 and 3.1.4.
See Photos 7, 18, and 19 for pre-development photos of the relevant vegetation.	

A1.3: EFFECTIVE SLOPE

EXPLAINING THE ASSESSMENT METHODOLOGY APPLIED BY BUSHFIRE PRONE PLANNING

DEFINITION: Effective slope is "the slope under that classified vegetation which most influences the bushfire attack" (AS 3959:2018, Clause 1.5.11).

"The effective slope under the classified vegetation is not the same as the average slope for the land surrounding the site of the proposed building. The effective slope is that slope which most significantly influences bushfire behaviour" (AS 3959:2018, Clause CB4).

The slope is described as upslope, flat or downslope when viewed from an exposed element (e.g., building) and looking towards the vegetation. It is measured in degrees.

[Note: Additional relevant guidance provided by AS 3959:2018 and NSW RFS, Planning for Bushfire Protection (2019) is incorporated into the applied assessment methodology and is presented at the end of this explanation.]

COMPOUND SLOPES UNDER VEGETATION AND DETERMINING SLOPE SIGNIFICANCE

Non-Linear Slopes: When the slope of ground under the vegetation out to the distance to be assessed (100 m or further if necessary), is not a straight line or nearly straight line slope, then it is made up of several different slopes i.e., it is a compound slope. The different slope angles and lengths must be factored into the determination of the effective slope value to be applied. Different slopes will potentially influence the bushfire rate of spread and intensity, both increasing and decreasing it.

Significant Slope: The AS 3959:2018 bushfire attack level determination methodology, with default inputs, models a fully developed bushfire. Therefore, a 'significant' slope is one that will significantly influence bushfire behaviour. To be 'significant' the length of the slope must be 'sufficient' to support a fully developed fire on that slope. The angle of a significant slope could be the determined effective slope for the area of classified vegetation if it is the one that 'most influences the bushfire attack'.

Sufficient Slope Length: Is a slope that will, as a minimum, allow the entire flame depth (flaming zone) of a fully developed fire (100m flame width) to exist on that slope.

The expected flame depth of a fully developed bushfire is a function of the length of time the flaming phase will exist on a section of the fuel bed (the 'residence time') and the bushfire's 'rate of spread'. For a given rate of spread, longer residence times result in greater flame depths. Greater flame depths are correlated with greater flame temperatures and greater flows of radiant heat.

The primary factors that will increase the residence time are:

- Heavier fine fuel loads of grass, leaf litter, twigs, bark etc less than 6mm in width and existing within the surface and near surface layers (and elevated fuel layers when contiguous with the base layers); and
- A greater percentage of larger fine fuels within the fuel load.

The primary factors that increase the rate of spread (apart from fire weather factors), include finer fuels, drier fuels, horizonal continuity of fuel and steeper upward ground slope in the direction of fire travel.

Example values:

- Residence Time: Grassfire 5 – 15 seconds, Forest fire 25 -50 seconds.
- Rate of Spread: Grassfires of a few km/hr are considered fast moving, 5-10 km/hr is common and fastest in the order of 25km/hr. Forest fire typically recorded in metres/hour with 1-1.5 km/hr being considered fast moving and fastest in the order of 3–4 km/hr.
- Flame Depth: More typically, a few metres for grasses to tens of metres for forest fires.

An Isolated Slope: For scenarios where there is a single significant slope (based on the above criteria) additional consideration would need to be given to the time and distance consumed by a bushfire still in its 'developing' phase. This will require due consideration be given to how it is potentially ignited i.e., from a single or multiple points, as this will influence the time and distance required to fully develop. For such scenarios, a normally significant slope may not be sufficiently long. It may be necessary to determine the potential bushfire impact more accurately by

justifying the application of a lesser effective slope, or a lower threat vegetation classification, or calculating a reduced head fire width (using short fire run modelling).

Determined Effective Slope: Only a 'significant' slope can potentially be the effective slope by itself. In which case, for a defined area of classified vegetation area, the worst significant slope under that vegetation is to apply.

The table below presents Bushfire Prone Planning's considerations applied to assessing short and/or compound slopes in determining the effective slope.

Slope Length (m)	Considered a Significant Slope	Considerations in Determining the Effective Slope
< 5	No	Where these short slopes exist as part of a compound slope under an area of classified vegetation, they can be ignored as they will not influence the fire behaviour in that vegetation.
5-20	Will Vary	These slopes will have a range of influence on fire behaviour from very little to a degree of influence that must be accounted for to some extent by the effective slope value that is applied (i.e., with a greater length - apply to a greater extent). But the actual slope of these shorter slopes is less likely to be applied as it is not a 'significant' length.
20-30	Possibly - Likely	The same considerations applied to the 5-20m slope lengths should be applied here. However, more justification would need to be presented to support an assessment of not 'significant'. For these slope lengths, consideration must be given more broadly to the potential level of risks associated with a bushfire event in this location. The risk level will be a function of the bushfire hazard threat levels (direct attack mechanisms) within the immediate and broader assessment area as influenced by local topography, vegetation extents and types and the exposure and vulnerability of persons and/or buildings/structures to these threats. Higher consequent risk levels require greater precaution meaning these length slopes should be considered 'significant', and vice versa. Consider the potential for a bushfire on adjoining or nearby land be a source of ignition and/or pre-heating to vegetation on the subject slope. Consider if vegetation on the slope is likely be ignited by a single ignition point or is multipoint ignition possible from bushfire an adjoining slopes or the surrounding area. Single point ignition will require a fire to travel further before being fully developed (DFES considers less than 100m fire runs may be considered a short fire run for forest, woodland and scrub vegetation classifications, RFS NSW applies 150m). Isolated slopes of this length are less likely to be considered significant as compared to when part of a compound slope.
>30	Yes	Likely to always be a significant slope unless isolated (i.e., exists alone) – in which case, justifying the application of a lesser effective slope, or a lower threat vegetation classification, or calculating a reduced head fire width, are approaches that may justifiably be applied.

BPP Approach - Slope Variation Within Areas of Vegetation

When multiple 'significant' slope lengths with large differences in degrees of effective slope (or different applicable slope ranges when AS 3959:2018 Method 1 is applied), exists under a single vegetation classification, these will be delineated as separate vegetation areas of classified vegetation to account for the difference in potential bushfire behaviour and impact, in accordance with AS 3959:2018 clauses 2.2.5 and C2.2.5.

Effective Slope Variation Due to Multiple Development Sites

When the effective slope, under a single area of bushfire prone vegetation, will vary significantly relative to multiple proposed development sites (exposed elements), then the effective slopes corresponding to each of the different

locations, are separately identified. The relevant (worst case) effective slope is determined in the direction corresponding to the potential directions of fire spread towards the subject building(s).

AS 3959:2018 EFFECTIVE SLOPE DETERMINATION - GUIDANCE

The Standard presents a broad set of guidance statements that indicate the intent of deriving an effective slope value for use in calculations, rather than detailing the 'in the field' determination process. These include:

- Highlighting the importance of the value by stating "The slope of the land under the classified vegetation has a direct influence on the rate of fire spread, the severity of the fire and the ultimate level of radiant heat flux" (Clause C2.2.5). [Note: A common rule of thumb is that for every 10 degrees of upslope, a fire will double its rate of spread if moving in the direction of the prevailing wind].
- "It may be necessary to consider the slope under the classified vegetation for distances greater than 100 m in order to determine the effective slope for that vegetation classification) ... (i.e. the vegetation within 100 m) (Clause C2.2.5).
- "Where there is more than one slope within the classified vegetation, each slope shall be individually assessed, and the worst case Bushfire Attack Level shall apply" (Clause 2.2.5).

NSW RFS 2019, PLANNING FOR BUSHFIRE PROTECTION - APPENDIX A1.5 - ADDITIONAL DETERMINATION GUIDANCE

- "In identifying the effective slope - it may be found that there are a variety of slopes covering different distances within the vegetation. The effective slope is considered to be the slope under the vegetation which will most significantly influence the bushfire behaviour for each aspect. This is usually the steepest slope. In situations where this is not the case, the proposed approach must be justified".
- "Vegetation located closest to an asset may not necessarily be located on the effective slope".

SITE ASSESSMENT DETAILS - EXPLANATION & JUSTIFICATION

The effective slopes determined from the site assessment are recorded in Table 3.2 of this Bushfire Management Plan.

A1.4: SEPARATION DISTANCE

Measuring

The separation distance is the distance in the horizontal plane between the receiver (building/structure or area of land being considered) and the edge of the classified vegetation (AS 3959:2018, clause 2.2.4)

The relevant parts of a building/structure from which the measurement is taken is the nearest part of an external wall or where a wall does not exist, the supporting posts or columns. Certain parts of buildings are excluded including eaves and roof overhangs.

The edge of the vegetation, for forests and woodlands, will be determined by the unmanaged understorey rather than either the canopy (drip line) or the trunk (AS 3959:2018, clause C2.2.5).

Measured Separation Distance as a Calculation Input

If a separation distance can be measured because the location of the building/structure relative to the edge of the relevant classified vegetation is known, this figure can be entered into the BAL calculation. The result is a determined BAL rating.

Assumed Separation Distance as a Calculation Input

When the building/structure location within the lot is not known, an assumed building location may be applied that would establish the closest positioning of the building/structure relative to the relevant area of vegetation.

The assumed location would be based on a factor that puts a restriction on a building location such as:

- An established setback from the boundary of a lot, such as a residential design code setback or a restrictive covenant; or
- Within an established building envelope.

The resultant BAL rating would be indicative and require later confirmation (via a Compliance Report) of the building/structure actual location relative to the vegetation to establish the determined BAL rating.

Separation Distance as a Calculation Output

With the necessary site specific assessment inputs and using the AS 3959:2018 bushfire modelling equations, the range of separation distances that will correspond to each BAL rating (each of which represents a range of radiant heat flux), can be calculated. This has application for bushfire planning scenarios such as:

- When the separation distance cannot be measured because the exact location of the exposed element (i.e., the building, structure or area), relative to classified vegetation, is yet to be determined.

  In this scenario, the required information is the identification of building locations onsite that will correspond to each BAL rating. That is, indicative BAL ratings can be derived for a variety of potential building/structure locations; or

- The separation distance is known for a given building, structure or area (and a determined BAL rating can be derived), but additional information is required regarding the exposure levels (to the transfer of radiant heat from a bushfire), of buildings or persons, that will exist at different points within the subject site.

The calculated range of separation distances corresponding to each BAL rating can be presented in a table and/or illustrated as a BAL Contour Map – whichever is determined to best fit the purpose of the assessment.

For additional information refer to the information boxes in Section 3 'Bushfire Attack Levels (BAL) - Understanding the Results and Section 3.2. 'Interpretation of the BAL Contour Map'.

SITE ASSESSMENT DETAILS - EXPLANATION & JUSTIFICATION

BPP: apply these words when BAL results are presented in contour map format. For the subject development/use the applicable separation distances values are derived from calculations applying the assessed site data. They are an output value, not an input value and therefore are not presented or justified in this appendix.

The derived values are presented in Section 3, Table 3.1 and illustrated as a BAL contour map in Figure 3.2.

A2: BAL Assessment Inputs Applied Using the Method 2 Procedure

STATING AND JUSTIFYING THE METHOD 2 CALCULATION INPUT VARIABLES APPLIED

As 3959:2018 Bal Determination Procedures: AS 3959:2018 establishes the official methodology to determine the radiant heat flux (RHF) a receiver (e.g., a building, structure, person or specified location), will potentially be exposed to from a fully developed bushfire within any adjacent classified vegetation. The methodology accounts for the configuration of a specific site and its surrounds.

The model calculations are complex. Consequently, AS 3959:2018 establishes two pathways to apply the methodology - a simplified procedure (Method 1) and a detailed procedure (Method 2).

Method 1: This procedure has limitations to both its scope and the degree to which site specific conditions can be applied. However, it requires minimal site assessment inputs and provides a standardised output that is satisfactory for many situations.

A moderate level of justification for some of the assessed inputs applied is required. This will demonstrate how the procedure detailed within AS 3959:2018 for Method 1(Section 2) has been followed.

Method 2: This procedure is used when the site conditions are out of the scope of Method 1 or when it is necessary to produce a more specific result. Higher levels of justification will be required for many of the input variables that are able to be modified using Method 2 (AS 3959:2018 Appendix B).

Section A2.1 below identifies the input variables that have been assessed for the proposed development and indicates the level of justification required for their application. The information contained within this Appendix will provide this justification information to the degree necessary.

A2.1: SUMMARY OF CALCULATION INPUTS APPLIED AND THE LEVEL OF JUSTIFICATION REQUIRED

AS 3959:2018 BUSHFIRE ATTACK LEVEL (BAL) DETERMINATION PROCEDURES INPUT VARIABLES FOR THE FIRE BEHAVIOUR AND RADIATION MODELS						
✓	Indicates which site specific variables have been assessed and applied to the assessment of the proposed development/use.	IDENTIFICATION OF THE CALCULATION INPUT VARIABLES ASSESSED AND/OR MODIFIED FOR THE PROPOSED DEVELOPMENT/USE				
	Indicates an AS 3959 methodology or jurisdiction default variable (or a methodology calculated variable in the case of EOR or flame angle). No justification required.					
	Indicates a variable that either must or can have an assessor value applied. Requires justification.					
	Indicates a variable that can have an assessor value applied. Requires detailed justification.	Using Method 1		Using Method 2		
ASSESSOR QUALIFICATION REQUIRED [1]		BPAD Level 1		BPAD Level 3		
LEVEL OF JUSTIFICATION REQUIRED TO APPLY [2]		None	Moderate	None	Moderate	High
Fire weather	Fire danger index (FDI/FFDI/GFDI)			✓		
	Wind speed					
	Ambient temperature					
	Relative humidity					
Bushfire Prone Vegetation and slope of the land it grows on	Vegetation classification [3]				✓	
	Effective slope				✓	
	Understorey and total fuel loads [4]					
	Vegetation height					
	Fuel age					
	Fuel moisture					
Receiver (building) positioning parameters	Site slope				✓	
	Separation distance				✓	
	Elevation of the receiver (EOR).					
Bushfire flame parameters	Flame temperature [5]					
	Flame width					
	Flame angle					
	Flame emissivity					
	Heat of combustion					
INTERMEDIATE OUTPUT FROM THE FIRE BEHAVIOUR AND RADIATION MODELS						
Rate of Spread - derived from fuel loads, fuel type, fuel height, FDI, effective slope and wind speed.						
Fire Intensity – derived from fuel loads, rate of spread and heat of combustion [6]						
Path Length – derived from flame angle and separation distance.						
Transmittance – derived from ambient temperature and relative humidity.						
View Factor – derived from flame length, flame width, flame angle, separation distance, elevation of receiver and site slope.						
FINAL OUTPUT OF THE FIRE BEHAVIOUR AND RADIATION MODELS						
Flame Length – derived from fuel loads, ROS (for Forest, Woodland) and fire intensity (for Scrub, Shrubland, Grassland) [6]						
Radiant Heat Flux and the Corresponding Bushfire Attack Level (BAL) – derived from view factor, flame emissivity, flame temperature, transmittance and corresponding to the worst possible flame angle.						
TABLE NOTES (see next page)						

[1] Authority to Use Method 2: Within WA, use of this procedure is restricted to bushfire practitioners who hold the BPAD Level 3 accreditation as issued by the Fire Protection Association Australia (FPAA) through their Bushfire Planning and Design Accreditation Scheme (BPAD Scheme) that complies with the Western Australian Bushfire Accreditation Framework.

[2] Level of Justification Required in Applying Method 2: AS 3959:2018 Appendix B establishes the detailed procedure for the Method 2 determination of BAL(s) as consisting of 10 steps. When justification is required for an assessed variable value to be applied, the required level of justification can vary. The level definitions used in this table are:

Moderate: Requires the provision of readily available and understood argument and evidence such as when:

1. The methodology step requires or allows for an input variable to be a site assessed value; or
2. A methodology step requires a jurisdictionally determined value which the relevant authority may change for different land use scenarios; or

High: Requires a detailed argument, appropriate evidence and justification when:

1. The variable is derived from the methodology step that applies an AS 3959:2018 default value or determines an intermediate output value (i.e. the result of applying a step's equations).

[3] Applying a Different Vegetation Classification: This approach may be justified when certain characteristics of the site's local vegetation complex align with the broad based descriptions of AS 3959:2018, but expert knowledge identifies characteristics that would result in the applied AS 3959 bushfire behaviour model not being properly representative of a fire in the local vegetation. This potential outcome is in part due to the ecological classification of vegetation that is used in AS 3959 rather than a classification more aligned with fuel structure/fire behaviour.

The justification of using a different classification is predicated on the fact that the intent of classifying vegetation in the BAL determination methodology of AS 3959:2018, is to identify the most appropriate fire behaviour model equations to apply.

For example, with respect to contribution to potential fire behaviour, it is often more important to consider vegetation structure rather than canopy cover, yet canopy cover is a key classification factor applied in AS 3959:2018.

Also findings from more recent bushfire behaviour research is not yet incorporated into the current version of the Standard. Certain currently applied bushfire behaviour models within As 3959:2018 are outdated and may under or over predict radiant heat flux and flame length.

[4] Modifying Fuel Loads: Potential steady state maximum fuel loads at a specific site for a given vegetation classification may vary significantly (above and below) from those that are to be applied as the default values in AS 3959:2018.

The Standard only provides the single set of ecological descriptors and corresponding fuel loads that are to be applied to vegetation complexes across Australia, hence its accuracy for all situations will be questionable. The relevant authority for a jurisdiction can establish different fuel loads to be applied.

However, fuel loads for the purposes of determining expected fire behaviour have not currently been determined to the degree necessary in WA, which results in the default values both over and underestimating fuel loads for WA vegetation types. WA DFES in providing advice to decision makers, will currently not accept any assessment and subsequent variation of the default fuel loads. If any variation was to be applied in an assessment, it would need to be argued for based on appropriate evidence and the development of a merit based case to the satisfaction of the decision maker.

The one circumstance where Bushfire Prone Planning will reduce fuel loads is in the calculations associated with a short fire run in forest type vegetation – in which the developing fire will not crown. Therefore, most bark and all canopy fuels can justifiably be excluded from total fuel load.

Note [5] - Flame Temperature: The Guidelines (DPLH, November 2024) establish the requirement to apply 1200 K as the flame temperature to determine an on-site shelter's maximum exposure to radiant heat flux and the corresponding vegetation separation distance, when an on-site shelter is required for vulnerable land use proposals (refer to Guidelines, Appendix B5.2.3 and BPC 8, A2.5). The requirement refers to the guidance presented in the ABCB Design and Construction of Community Bushfire Refuges Handbook 2014 to support the requirement.

Note [6] – Fireline Intensity and Flame Length: These values are determined as intermediate and final outputs of the AS 3959:2018 modelling. Changing these values would not be a valid use of the methodology for a fully developed fire. However, for the circumstance of a developing fire in small patches or corridors of vegetation, there may be justification when an authoritative source is identified to provide an override value.

A2.3: SITE SLOPE

SITE SLOPE
DETERMINING
Site slope is the 'line of sight' slope between the 'site' and the edge of the relevant area of classified vegetation (AS 3959:2018 clause B5). The 'site' being "the part of the allotment of land on which a building stands or is to be erected" (AS 3959:2018 clause 1.5.30). That is, it is the straight line slope that ignores any changes in slope or any other physical obstructions between these two points. The slope direction is considered from the receiver to the vegetation with upslope entered as negative degrees and downslope as positive degrees.
PURPOSE
Site slope is applied to position the potential receiver of radiant heat (typically a structure) relative to the modelled bushfire (the radiant heat panel as a black body of evenly distributed heat) at the edge of the vegetation. This enables the use of the view factor radiant heat model in the AS 3959:2018 BAL determination methodology, to calculate of the level of radiant heat that will potentially flow from the bushfire to the structure.
SLOPE LIMITS
AS 3959:2018 clause B1 limits site slope to 20^0 but explains that this limitation due to the considered impracticality of maintaining relevant vegetation in a low threat state in perpetuity on steeper slopes. This is likely to result in an inability to maintain the assessed separation distance between the building and the classified vegetation. Consequently, where the maintenance of vegetation is not a limiting factor, the application of a greater site slope can be justified to position the building relative to the bushfire more accurately.
AS 3959:2018 METHOD 1 AND METHOD 2 – DIFFERENCES IN APPLYING SITE SLOPE
Method 2 allows for the input of the site slope as the actual measured or calculated slope (not a range or the highest value of a range), that exists for the subject site. The slope can be upslope (entered as negative degrees), flat or downslope (entered as positive degrees). This differs from the Method 1 procedure for which site slope is not independent of effective slope and assumes the site slope to be the same as the effective slope that is applied (i.e., zero, 5, 10, 15 or 20 degrees, as applicable).

A site slope inverse to the effective slope has been applied. For example, a 5 degree downslope effective slope applies a -5 degree site slope.

This results in the worst-case scenario modelling applying the Method 2 procedure.

A3: BAL Calculator – Copy of Input/Output Values

DETERMINING 10 kW/m² SEPARATION DISTANCES

Vegetation Classification	B. WOODLAND
5 Degrees Downslope	

FLAMESOL
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Calculated September 13, 2024, 11:37 am (MDc v4.9)

Minimum Distance Calculator - AS3959-2018 (Method 2)

Inputs		Outputs	
Fire Danger Index	80	Rate of spread	2.03 km/h
Vegetation classification	Woodland	Flame length	16.21 m
Understorey fuel load	15 t/ha	Flame angle	49 °, 58 °, 66 °, 70 °, 71 ° & 77 °
Total fuel load	25 t/ha	Elevation of receiver	7.34 m, 8.5 m, 9.720000000000001 m, 10.82 m, 11.44 m & 16.66 m
Vegetation height	n/a	Fire intensity	26,263 kW/m
Effective slope	5 °	Transmissivity	0.868, 0.848, 0.821, 0.796, 0.783 & 0.723
Site slope	-5 °	Viewfactor	0.6027, 0.4476, 0.3037, 0.2064, 0.1674 & 0.0454
Flame width	100 m	Minimum distance to < 40 kW/m²	13.9 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	18.5 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	26.5 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	36.7 m
		Minimum distance to < 10 kW/m²	43.2 m

Rate of Spread - Wicanthus, 1973 & Noble et al., 1980
Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980
Elevation of receiver - Douglas & Tan, 2005
Flame angle - Douglas & Tan, 2005
Radiant heat flux - Drysdale, 1999, Sullivan et al., 2001, Douglas & Tan, 2005

Vegetation Classification	D. SCRUB
5 Degrees Downslope	

FLAMESOL
FPA AUSTRALIA

Calculated April 23, 2025, 11:12 am (MDc v4.9)

Minimum Distance Calculator - AS3959-2018 (Method 2)

Inputs		Outputs	
Fire Danger Index	80	Rate of spread	5.88 km/h
Vegetation Classification	Scrub	Flame length	13.62 m
Understorey fuel load	25 t/ha	Flame angle	50 °, 59 °, 67 °, 71 °, 72 ° & 78 °
Total fuel load	25 t/ha	Elevation of receiver	6.25 m, 7.22 m, 8.26 m, 9.24 m, 9.789999999999999 m & 14.61 m
Vegetation height	m	Fire intensity	75,987 kW/m
Effective slope	5 °	Transmissivity	0.873, 0.855, 0.83, 0.805, 0.792 & 0.729
Site slope	-5 °	Viewfactor	0.6016, 0.4444, 0.2999, 0.2037, 0.1655 & 0.045
Flame width	100 m	Minimum distance to < 40 kW/m²	11.7 m
Windspeed	45 km/h	Minimum distance to < 29 kW/m²	15.7 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	22.8 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	32 m
		Minimum distance to < 10 kW/m²	37.9 m

Vegetation Classification	G. GRASSLAND
5 Degrees Downslope	

FLAMESOL
FPA AUSTRALIA

Calculated July 1, 2024, 6:21 pm (MDc v.4.9)

Minimum Distance Calculator - AS3959-2018 (Method 2)

Inputs		Outputs	
Grassland Fire Danger Index	110	Rate of spread	20.19 km/h
Vegetation classification	Grassland	Flame length	8.16 m
Understorey fuel load	4.5 t/ha	Flame angle	51 °, 60 °, 68 °, 73 °, 75 ° & 80 °
Total fuel load	4.5 t/ha	Elevation of receiver	3.8 m, 4.38 m, 5.03 m, 5.71 m, 6.13 m & 9.9 m
Vegetation height	n/a	Fire intensity	46,945 kW/m
Effective slope	5 °	Transmissivity	0.884, 0.872, 0.854, 0.832, 0.819 & 0.748
Site slope	-5 °	Viewfactor	0.5914, 0.4357, 0.2914, 0.1969, 0.1601 & 0.0438
Flame width	100 m	Minimum distance to < 40 kW/m²	7.1 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	9.6 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	14.2 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	20.7 m
		Minimum distance to < 10 kW/m²	25 m

Rate of Spread - Noble et al. 1980
Flame length - Purton, 1982
Elevation of receiver - Douglas & Tan, 2005
Flame angle - Douglas & Tan, 2005
Radiant heat flux - Dryodale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

B1: Understanding Bushfire Attack Level (BAL) Ratings

BUSHFIRE ATTACK LEVEL

IMPORTANT

It is not the purpose of this 'planning' BMP to derive a 'determined' BAL rating (and associated minimum APZ dimensions), that will apply to an existing or future habitable or specified building, for the purpose of establishing its bushfire resistant construction requirements in accordance with the Building Code of Australia (contained in the NCC).

However, in limited situations a 'determined' BAL can be an incidental outcome of the planning assessment.

BUSHFIRE ATTACK LEVEL (BAL)

The potential transfer (flux/flow) of radiant heat from a bushfire to a receiving object is measured in kW/m^2. The AS 3959:2018 Bushfire Attack Level (BAL) determination methodology establishes the ranges of radiant heat flux that correspond to each bushfire attack level.

These ranges of radiant heat transfer are titled BAL-LOW, BAL-12.5, BAL-19, BAL-29, BAL-40 and BAL-FZ.

For certain classes of building/structure the bushfire performance requirements and the associated deemed to satisfy solutions are established by the Building Code of Australia (Vol. 1 & 2 of the NCC). For most jurisdictions the relevant building classes are 1, 2, 3, 9 and associated 10a.

The assessed BAL rating that applies to a specific building/structure determines the bushfire resistant construction requirements for those works in accordance with AS 3959:2018 - *Construction of buildings in bushfire prone areas,* or for Class 1 buildings, the NASH Standard – *Steel framed construction in bushfire areas (NS 300 2021),* as the recognised deemed to satisfy solutions.

DETERMINED BAL RATINGS

A BAL can only be classed as 'determined' and therefore apply to an existing or future building/structure when:

1. The building/structure final design and position on the lot are known and the stated separation distance from classified bushfire prone vegetation exists and can justifiably be expected to remain in perpetuity; or
2. The building/structure will always remain subject to the same BAL regardless of:
    (a) The retention of all existing classified vegetation either onsite or offsite; and
    (b) Its design or position on the lot - including, as relevant and necessary, accounting for any regulatory or enforceable building setbacks from lot boundaries (i.e. R-codes, restrictive covenants and defined building envelopes).

Consequently, a BAL Certificate may be able to be issued for a BAL stated in the BMP when it can be considered 'determined'. However, this is not the typical outcome but an incidental one.

If the BMP can derive determined BAL(s), the BAL Certificate(s) required for submission with building applications could potentially be provided, using the BMP as the supporting assessment data.

INDICATIVE AND CONDITIONAL BAL RATINGS

An 'Indicative BAL' indicates the highest BAL rating that exists for the applied set of parameters that have been applied to the site's assessment. Because the potential remains for these parameters to be varied, they are unable to be considered a 'determined' BAL.

A 'Conditional BAL' establishes the BAL rating that will be considered as a 'Determined BAL' once the stated requirements (i.e. the conditions), which may require approval by the relevant authority, are implemented and subsequently confirmed as being met.

Relevant conditions that may need to be met include:

- The location of future development sites being identified accurately and/or modified; and/or
- Classified vegetation being modified or removed (after obtaining any required approvals from the relevant authority), to establish the required vegetation separation distances.

A BAL Certificate cannot be issued for an indicative or conditional BAL rating – only for a 'Determined BAL'.

BAL RATINGS FOR BUILDING VERSUS PLANNING PURPOSES – ASSESSMENT & REPORTING REQUIREMENTS ARE DIFFERENT

Building Permit Applications

The relevant requirements are established in accordance with the WA Building Act 2011 and Building Regulations 2012 which reference the application of the Building Code of Australia (within the National Construction Code).

The required BAL rating is a 'determined' BAL rating (stated on a BAL Certificate) and supported by the requisite assessment details. Typically, this will be a Bushfire Attack Level (BAL) Report produced specifically for this purpose.

The required supporting assessment information may be derived from a Bushfire Management Plan (BMP) when a 'determined' BAL can be derived for a planning proposal. This is possible when the specific conditions discussed under 'Determined BAL Ratings' above, can be met, as an incidental outcome.

Planning Proposal Applications

The relevant requirements are established in accordance with the Planning and Development Act 2005, LPS Regulations 2015, SPP 3.7 Bushfire and the associated Guidelines.

To comply with the relevant acceptable solutions contained in the Guidelines, the subject planning proposal must demonstrate that the required minimum sized asset protection zone (APZ) - subject to location constraints and allowances established by the Guidelines - can be installed surrounding a habitable or specified building.

The minimum dimensions are those that ensure the potential radiant heat impact on the relevant buildings does not exceed 29 kW/m^2 from fire in any surrounding types of classified vegetation. This is the upper limit of the range of radiant heat flux corresponding to the BAL-29 rating.

Consequently, the BAL ratings identified in a Bushfire Management Plan (BMP) only need to be 'indicative' - although 'determined' ratings may be derived as an incidental outcome when relevant conditions are met (discussed under 'Determined BAL Ratings' above).

The indicative BAL-29 dimensioned APZ is not necessarily the APZ that will be required to be implemented and maintained surrounding any subject building/structure that exists as per an approved planning proposal. Refer to Appendix B3 in this BMP for additional information.

B2: BAL Contour Map Interpretation

THE BAL CONTOUR MAP

The Bushfire Attack Level (BAL) contour map is a diagrammatic representation of the outcome of the bushfire attack level assessment that has been conducted.

The map presents six shaded radiant heat contours extending out from each area of classified vegetation. Each coloured contour represents a different BAL rating (BAL-LOW, BAL-12.5, BAL-19, BAL-29, BAL-40 and BAL-FZ) and corresponds to a set range of potential radiant heat transfer (kW/m^2), in accordance with AS 3959:2018 BAL determination methodology.

The highest BAL rating contour that an exposed element (building, person or other defined element), is partly or fully located within, is the BAL rating that will apply to that element.

The width of each BAL contour:

- Will vary dependent on the BAL rating it represents; and
- The assessed potential bushfire behaviour that considers site specific vegetation types, fuel loads, ground slopes and fire weather; and
- Represents the minimum and maximum vegetation separation distances corresponding to the BAL rating it represents.

For 'post development' BAL contour maps, the areas of classified vegetation applied to the production of the BAL contours, are those that will remain at the intended end state of the subject development once earthworks, clearing and/or landscaping and/or re-vegetation have been completed.

IMPORTANT

A BAL contour map is typically constructed for planning assessment and application purposes rather than building permit application purposes.

The BAL ratings identified from a BAL contour map will likely only be 'indicative' of what can be achieved – with planning compliance for this factor being satisfied when BAL-29 is indicated.

However, future building works require a 'determined' BAL rating for building permit applications and a BAL Certificate. The required 'determined' BAL rating is not necessarily able to be derived from the BAL contour map. There are only limited scenarios where this is possible. Refer to Appendix B1 and B3 for additional information.

Consequently, a subsequent assessment of the site data and associated report for building application purposes may be required to determine the BAL rating that is to apply for building purposes. Note: If approval from the relevant authority needs to be obtained for native vegetation modification and/or removal this also establishes that a subsequent assessment and report will be required.

B3: The Asset Protection Zone (APZ)

THE APZ – DESCRIPTION, TECHNICAL REQUIREMENTS AND DIMENSIONS

DESCRIPTION AND PURPOSE

An asset protection zone (APZ) is an area surrounding a habitable or specified building that is:

- Not vegetated; and/or
- Supports retained or planted vegetation that can be considered to present a low bushfire threat as a result of;
    - Low flammability and/or higher moisture content characteristics; and/or
    - Minimal fuel loads (either naturally or as a result of continual maintenance).

The primary objectives of establishing an APZ are:

1. To ensure a reduction in the exposure of the building/structure to the bushfire direct attack mechanisms (threats) of flame contact, radiant heat transfer and ember attack, by establishing appropriate separation distances from each identified area of classified vegetation.

   These distances are measured from the nearest part of an external wall and/or the supporting posts of building parts without external walls; and
2. To ensure a reduction in the exposure of the building/structure to bushfire indirect attack mechanisms (threats) by:
    - Preventing surface fire spreading to the building/structure;
    - Minimising the potential for tree strike that can decrease building/structure resilience to bushfire direct attack mechanisms; and
    - Limiting the potential for consequential fires to impact the building/structure by eliminating, reducing, moving away and/or shielding consequential fire fuels.

      These fuels include accumulated debris, stored combustible/flammable items and constructed combustible items. Note that consequential fire, typically ignited by embers, is the primary cause of building loss in a bushfire event; and
3. To provide a defendable space for firefighting activities.

TECHNICAL REQUIREMENTS

Established by the Guidelines

The relevant technical requirements for an APZ are established in the Planning for Bushfire Guidelines (DPLH/WAPC) (as amended), Appendix B2: Siting and design and available online at Planning WA - SPP 3.7 Bushfire

Established by the Relevant Local Government

Certain LGA may state technical requirements to be complied with that vary from and/or are additional to those established by the Guidelines.

Refer to the notice issued annually by the relevant local government under s33 of the Bushfires Act 1954 (e.g. Bushfire Risk Reduction Notice or Firebreak and Hazard Reduction Notice etc). These technical requirements may also be established by their gazetted local planning scheme. Refer to the ratepayer notice and/or the local government's website for the current version.

Information Published by the Bushfire Centre of Excellence (DFES)

The book titled Firewise Gardening in Western Australia (2024), is a good source of relevant information and is available online at https://dfes.wa.gov.au/hazard-information/bushfire/bcoe#bushfire-resources.

DIMENSIONS

The dimensions of the APZ that will be the responsibility of a landowner to implement and/or maintain around a habitable or specified building/structure, are stated as the separation distances between these buildings and each identified area of classified vegetation. These distances will be site specific and dependant on variables which include:

- The potential bushfire behaviour in the identified vegetation which is dependent on factors including vegetation types, fuel loads, ground slopes and fire weather;
- The intended use of the site, with vulnerable uses requiring greater safety margins; and
- The constructed bushfire resistance of the subject building/structure (typically corresponding to a BAL rating or kW/m² level of radiant heat exposure).

Dimensions Established by the BAL Rating of the Subject Building/Structure

These minimum separation distances, to be installed and maintained, correspond to a 'determined' BAL rating and align the building's applied level of bushfire resistant construction to its potential level of exposure to flames, radiant heat and embers from the bushfire (note: this will not account for any exposure from significant consequential fires closer to the building).

The dimensions should be stated within a Bushfire Attack Level Report (BAL Report) produced for building application purposes. They may also be identified in an associated Bushfire Management Plan (BMP) produced for planning application purposes.

Dimensions Established by the Guidelines, DPLH/WAPC for an On-site Shelter for a Vulnerable Tourism Land Use

For the stated specific use, the Guidelines specify the maximum level of radiant heat exposure allowed. Consequently, the BMP produced for planning application purposes will state the minimum distances that are to be installed and maintained.

> *Note: Other than for the above use, the Guidelines do not establish the dimensions of the APZ for other buildings/structures that must be installed. They only establish that at least a BAL-29 dimensioned APZ should be the minimum that is installed and ensures that this is possible for the subject planning proposal. Consequently, the BMP can only indicate the separation distances corresponding to different levels of radiant heat exposure. Refer also to Appendix B1 in this BMP.*

Dimensions Established by this BMP

The required dimensions may be identified in this BMP when specific increased separation distances have been applied through the application of an outcomes-based assessment that requires this as an additional protection measure.

Dimensions Established by the BCA (NCC 2022) for Certain Class 9 Vulnerable Use Buildings

These separation distances are stated in the BCA in Specification 43 as either:

- Not less than the minimum distances specified in Table S43C2; or
- Those corresponding to radiant heat flux on exposed building elements not exceeding 10kW/m² from a justified design bushfire analysis; or
- Those justified as an outcome of a building performance solution.

The separation distances may be included in the BMP by the bushfire practitioner as additional information to inform proponents and decision makers. They are not addressed by the Guidelines and therefore not a required part of the bushfire assessments presented within a BMP for planning application purposes.

Dimensions Established by a Local Government

To satisfy certain local government requirements, required APZ dimensions may be stated in the notice issued annually by the relevant local government under s.33 of the Bushfires Act 1954. These may be greater than the dimensions applied by the above mechanisms. A maximum APZ dimension could also be applied by the LGA.

These separation distances may be included in the BMP for informative purposes, but they are not a requirement for a BMP submitted for planning application purposes in accordance with the Guidelines.

B4: Vegetation Excluded from Classification – Ensure Continued Low Threat Status

MAINTAINING THE LOW THREAT STATUS OF EXCLUDED VEGETATION

When applying AS 3959:2018 BAL determination methodology, vegetation adjoining or adjacent to the subject site can be excluded from classification based on being a 'low bushfire threat'. To maintain this status, certain requirements must continue to be met in accordance with the below extract from AS3959:2018. Refer to the 'Classified Vegetation and Topography Map' for the relevant low threat areas associated with the subject site.

Determination of 'low threat' vegetation is based on factors such as - proximity to the subject site / small areas of vegetation / low flammability / higher moisture content / low fuel load.

Aside from a naturally occurring low fuel load, vegetation maintained in a minimal fuel condition through active management can be excluded. The associated key requisite is that the active management can be expected to continue in perpetuity, and this can be adequately justified.

Acceptable forms of justification typically involve supportable evidence or the existence of an enforceable mechanism. Examples of enforceable mechanisms include:

- Requirements established by a Section 33 (Bush Fires Act 1954) notice issued by a local government;
- An appropriate and enforceable agreement between relevant parties (which may involve additions to land titles); and
- For public open space or crown land, written evidence that the land manager e.g. local government or a State Government department, agrees to maintain the designated area of land in a low threat state in perpetuity.

2.2.3.2 *Exclusions—Low threat vegetation and non-vegetated areas*

The following vegetation shall be excluded from a BAL assessment:

(a) Vegetation of any type that is more than 100 m from the site.

(b) Single areas of vegetation less than 1 ha in area and not within 100 m of other areas of vegetation being classified vegetation.

(c) Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other or of other areas of vegetation being classified vegetation.

(d) Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified vegetation.

(e) Non-vegetated areas, that is, areas permanently cleared of vegetation, including waterways, exposed beaches, roads, footpaths, buildings and rocky outcrops.

(f) Vegetation regarded as low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and windbreaks.

NOTES:

1 Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack (recognizable as short-cropped grass for example, to a nominal height of 100 mm).

2 A windbreak is considered a single row of trees used as a screen or to reduce the effect of wind on the leeward side of the trees.

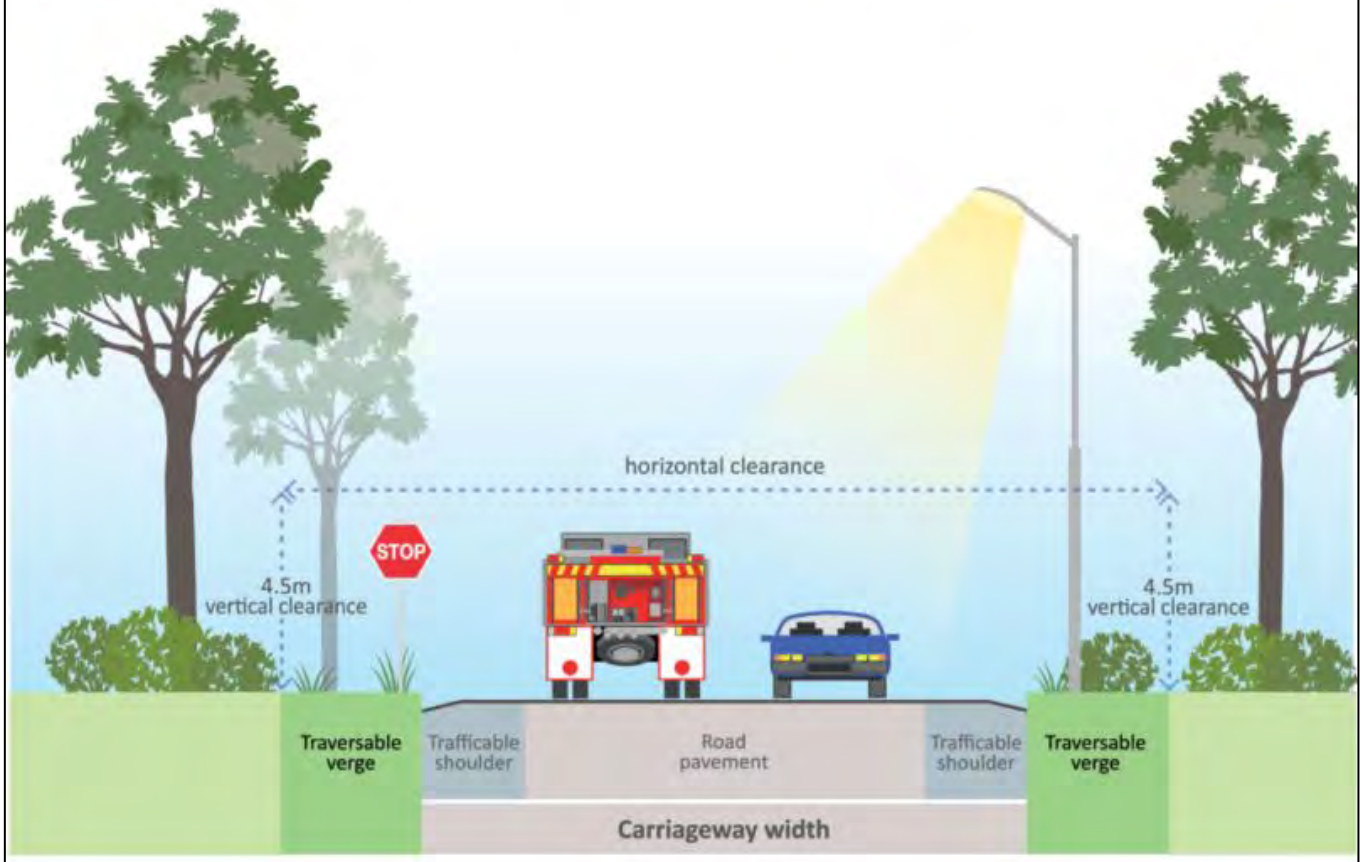
APPENDIX C: GUIDANCE - TECHNICAL REQUIREMENTS FOR VEHICULAR ACCESS

The relevant technical requirements are established in the Planning for Bushfire Guidelines (DPLH/WAPC) (as amended), Appendix B3: Vehicular access and available online at Planning WA - SPP 3.7 Bushfire

The following excerpts are presented here as a quick reference to applicable terminology and design requirements applied in the assessment against the bushfire protection criteria, Element 3: Vehicular access in this BMP.

C1: Road Component Terminology

Figure 26: Area encompassing horizontal clearance and vertical clearance



Horizontal clearance: The carriageway width (including the road pavement and trafficable shoulder) and traversable verge that provides for the movement and parking of vehicles and area required by emergency services to operate. Infrastructure and vegetation within the traversable verge should be frangible, however, non-frangible items can occur providing they do not restrict vehicular movement in the event of an emergency.

C2: Vehicular Access Technical Requirements

Table 10: Vehicular access technical requirements

	1		2		3		4		5	
TECHNICAL REQUIREMENTS	**PERIMETER ROADS**		**PUBLIC ROADS**		**EMERGENCY ACCESS WAY[3]**		**FIRE SERVICE ACCESS ROUTE[3]**		**BATTLE-AXE & PRIVATE DRIVEWAYS[1]**	
MAP OF BUSH FIRE PRONE AREAS DESIGNATION	**Area 2**	**Area 1**	**Area 2**	**Area 1**	**Area 2**	**Area 1**	**Area 2**	**Area 1**	**Area 2**	**Area 1**
Minimum horizontal clearance (metres)	12	8	See note 5		10	6	10	6	6	
Minimum vertical clearance (metres)	4.5									
Minimum weight capacity (tonnes)	15									
Maximum grade unsealed road[2]	See note 5		See note 5		1:10 (10% or 6°)					
Maximum grade sealed road[2,4]					1:7 (14.3% or 8°)					
Maximum average grade sealed road					1:10 (10% or 6°)					
Minimum inner radius of road curves (metres)					8.5					

Notes:

[1] Driveways and battle-axe legs to comply with the Residential Design Codes and Development Control Policy 2.2 Residential Subdivision where not required to comply with the widths in this Appendix or the Guidelines.

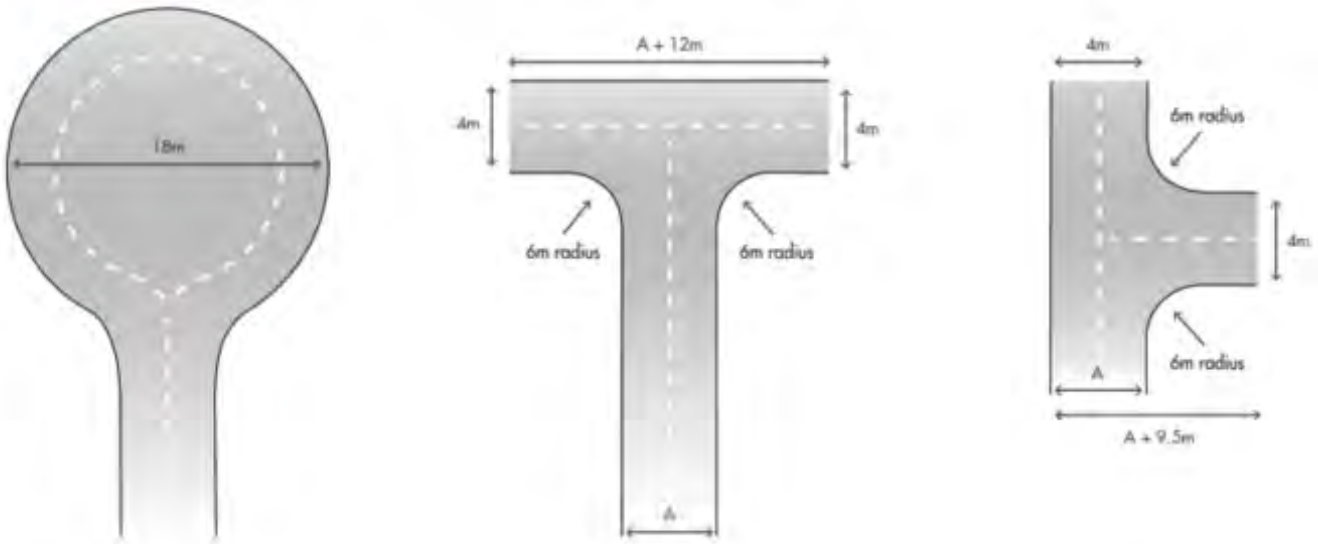
[2] Dips must have no more than a 1 in 8 (12.5% - 7.1 degrees) entry and exit angle.

[3] To have crossfalls between 3 per cent and 6 per cent.

[4] For sealed roads only the maximum grade of no more than 1 in 5 (20 per cent) (11.3 degrees) for no more than 50 metres is permissible, except for short constrictions to 3.5 metres for no more than 30 metres in length where an obstruction cannot be reasonably avoided or removed.

[5] As outlined in the Institute of **Public Works Engineering Australasia (IPWEA) subdivision guidelines, Liveable Neighbourhoods, Austroads Standards** Main Roads standard, supplement, policy or guideline and/or any applicable or relevant local government standard or policy.

Figure 30: Design requirements for a turn-around area



The relevant technical requirements are established in the Planning for Bushfire Guidelines (DPLH/WAPC) (as amended), Appendix B4: Water supply and available online at Planning WA - SPP 3.7 Bushfire

The information provided in this appendix is additional to that provided in the Guidelines. It includes:

- For reticulated water supply, the hydrant location specifications established by the WA Water Corporation (Design Standard DS 63), as dependant on land use type and relevant to bushfire planning assessments (highlighted). Note: the maximum distance from a hydrant to the rear of a lot/building is generally interpreted as not applicable to large lot sizes where the maximum distance becomes an impractical limitation i.e., typically rural residential areas; and
- Images of example installations of acceptable water supply tanks and outlet fittings.

D1: Hydrant Location in Reticulated Areas

Design Standard DS 63
Water Reticulation Standard

2.2.1.5 Appurtenances

c. Hydrants

Hydrants shall be screw-down hydrant with built-in isolation valve and installed only on DN100 or larger pipes. Hydrants shall be located:

- so that the maximum distance between a hydrant and the rear of a building envelope. (or in the absence of a building envelope the rear of the lot) shall be 120m;
- so that spacing (as measured by hose-run) between hydrants in non-residential or mixed use areas shall be maximized and no greater than 100m;
- so that spacing (as measured by hose-run)between hydrants in residential areas with lots per dwelling <10,000m^2 shall be maximized and no greater than 200m;
- so that spacing between hydrants (as measured by hose-run) in rural residential areas where minimum lots per dwelling is >10,000 m^2 (1ha) shall be maximized and no greater than 400m;
- centrally along the frontage of a lot to avoid being under driveways, unless the lot features a frontage 6m or less, in which case it shall be placed to the side opposite the driveway;
- at lots that have the widest frontage in the local area;
- where appropriate at the truncation of road junctions or intersections so that they can serve more than one street and can be readily located;
- on both sides of the major roads at staggered intervals where there are mains on both sides of the road;
- at major intersections on dual multi-lane roads, where two hydrants are to be sited on diagonally opposite corners;
- hydrants should be located at least 20m from traffic calming devices i.e. median slow points or chokers, chicanes, mini traffic circles, and intersection 'pop-outs' to ensure traffic is not impeded;
- in a position not less than 10m from any high voltage main electrical distribution equipment such as transformers and distribution boards, liquefied petroleum gas or other combustible storage
- directly on top of the main using a tee unless proved to be impractical

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GOVERNMENT OF WESTERN AUSTRALIA
DFES Department of Fire & Emergency Services
Bushfire Centre of Excellence
TRAINING / KNOWLEDGE / ENGAGEMENT

Water tank connections for bushfire-prone areas (domestic and commercial)

Information Sheet, January 2025

This fact sheet provides information on how to best set up water supplies to assist firefighters on properties in bushfire-prone areas. It includes information on the siting, capacity, access and appropriate fittings needed for firefighters to access and use water supplies during an emergency.

Please note: if you are establishing water supplies to comply with planning requirements, you should read this fact sheet in conjunction with the *Planning for Bushfire Guidelines*, as well as relevant planning schemes or policies from your local government.



What fittings should I fit the water tank with?

All tanks for firefighting should be fitted with a 50 millimetres or 100 millimetres male camlock fitting. This fitting is readily available from most hardware and rural supply shops. DFES recommends a male camlock fitting, as it means there are no perishable washers or working parts to maintain.

The fitting should be controlled by a butterfly, ball or gate valve, as these can easily control flow.



Why do I need a water tank for bushfires on my property?

You may have a water tank dedicated to bushfires to make your property as resilient as possible, or it may be a formal requirement under relevant planning or building regulations.

A water tank dedicated to firefighting supports firefighters attempting to protect your property and other assets from bushfires. You should consider a dedicated water tank alongside other bushfire prevention and preparedness activities, such as managing bushfire fuels and having a bushfire plan.

Where should I site a water tank?

You should site water tanks on clear, level ground compacted to take the maximum weight of the tank when full.

The tank should also be in a low-fuel area with at least 3 metres cleared around it to prevent direct contact with flames.

The water tank must be accessible to firefighting appliances and include a suitable area for these to turn around. You can find more information on recommended minimum standards for access in the *firebreak construction guidelines*.

What capacity should the tank be?

The recommended minimum capacity for a firefighting water supply is 10,000 litres.

You may be using the tank for other purposes besides bushfire fighting, such as water for livestock or other rural purposes. However, it is recommended that a minimum of 10,000 litres is always available for firefighting.







Example Strategic 47,000 Litre Concrete Tank & Protected Fittings



Example 10,000 Litre Concrete Tank



Example Storz and Camlock Couplings

APPENDIX E
Traffic Impact Statement



Transport Impact Statement

Project:	Ngaangk Boodja Battery and Solar Farm Robartson Road, Merredin
Client:	BRM Solar Farm Nominee Pty Ltd
Author:	Paul Nguyen
Date:	19th December 2025
Shawmac Document #:	2511004-TIS-001

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Document Status: Client Review

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File Reference: Y:\Jobs Active 2025\T&T - Traffic & Parking\Land Insights_Merredin Stage 2 Solar Farm_2511004\3. Documents\3.20 TIS\Land Insights_Ngaangk Boodja Battery & Solar_TIS_Rev A.docx

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1 Introduction

1.1 Proponent

Shawmac has been engaged by BRM Solar Farm Nominee Pty Ltd to prepare a Transport Impact Statement (TIS) for proposed battery and solar farm development in Merredin.

This TIS has been prepared in accordance with the Western Australian Planning Commission (WAPC) *Transport Impact Assessment Guidelines Volume 4 – Individual Developments*. The assessment considers the following key matters:

- Details of the proposed development.
- Vehicle access and parking.
- Provision for service vehicles.
- Hours of operation.
- Daily traffic volumes and vehicle types.
- Traffic management on frontage streets.
- Site specific and safety issues.

1.2 Site Location

The site comprises two lots on the west side of Robartson Road, north of Bruce Rock-Merredin Road. The local authority is Shire of Merredin.

The general site location is shown in Figure 1. An aerial view of the existing site is shown in Figure 2.



Figure 1: Site Location



Figure 2: Aerial View

2 Proposed Development

2.1 Land Use

The site is primarily undeveloped.

The proposed development is a new battery and solar farm (Ngaangk Boodja Battery and Solar Farm comprising solar arrays with a capacity of approximately 150MW and battery storage with a capacity of approximately 640MWh.

During construction, working hours will be from 6am to 6pm Monday to Saturday.

The site plan is shown in Figure 3.

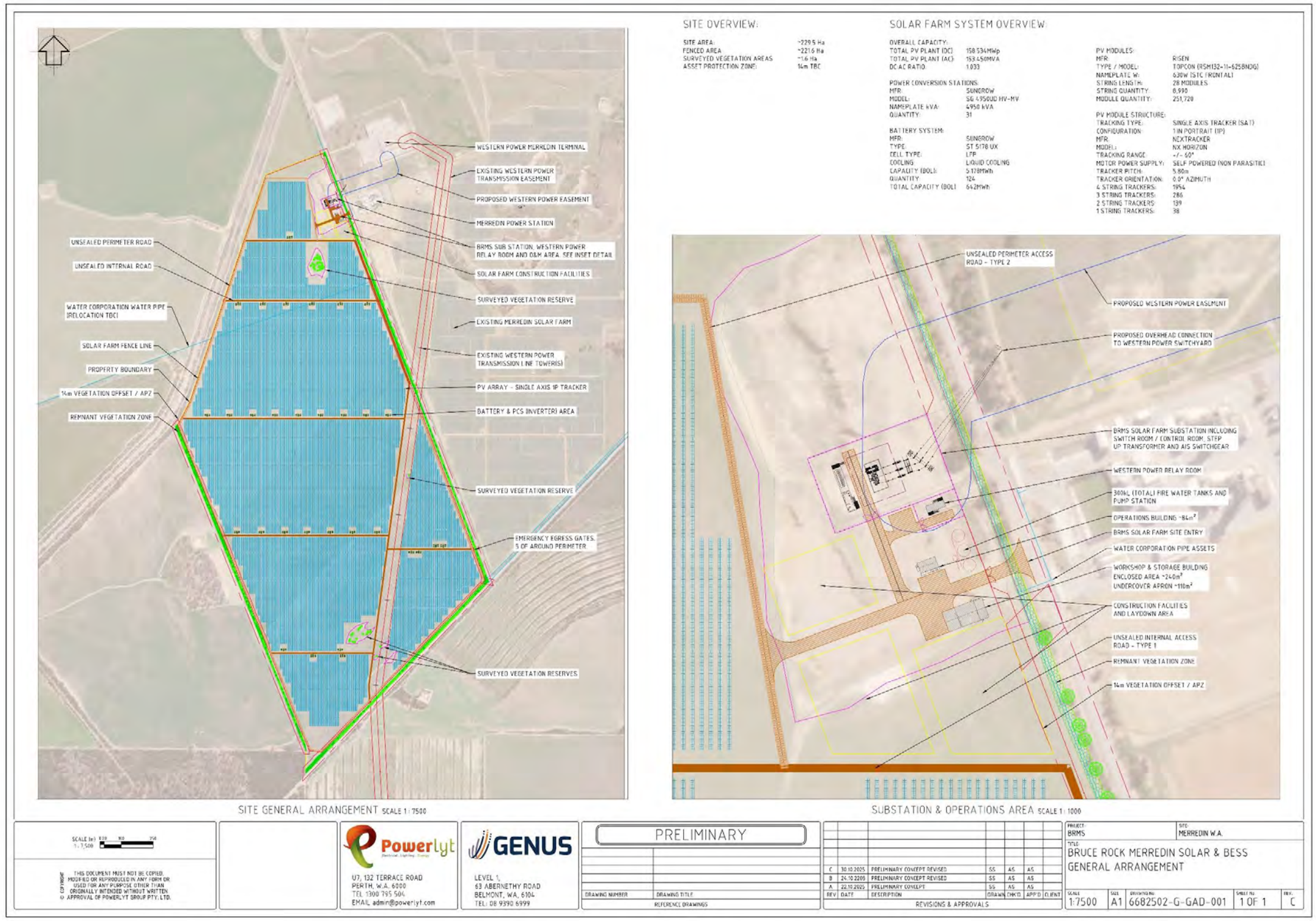


Figure 3: Site Layout

3 Traffic Management on Frontage Streets

3.1 Road Network

The layout and hierarchy of the existing local road network according to the Main Roads WA *Road Information Mapping System* is shown in Figure 4.

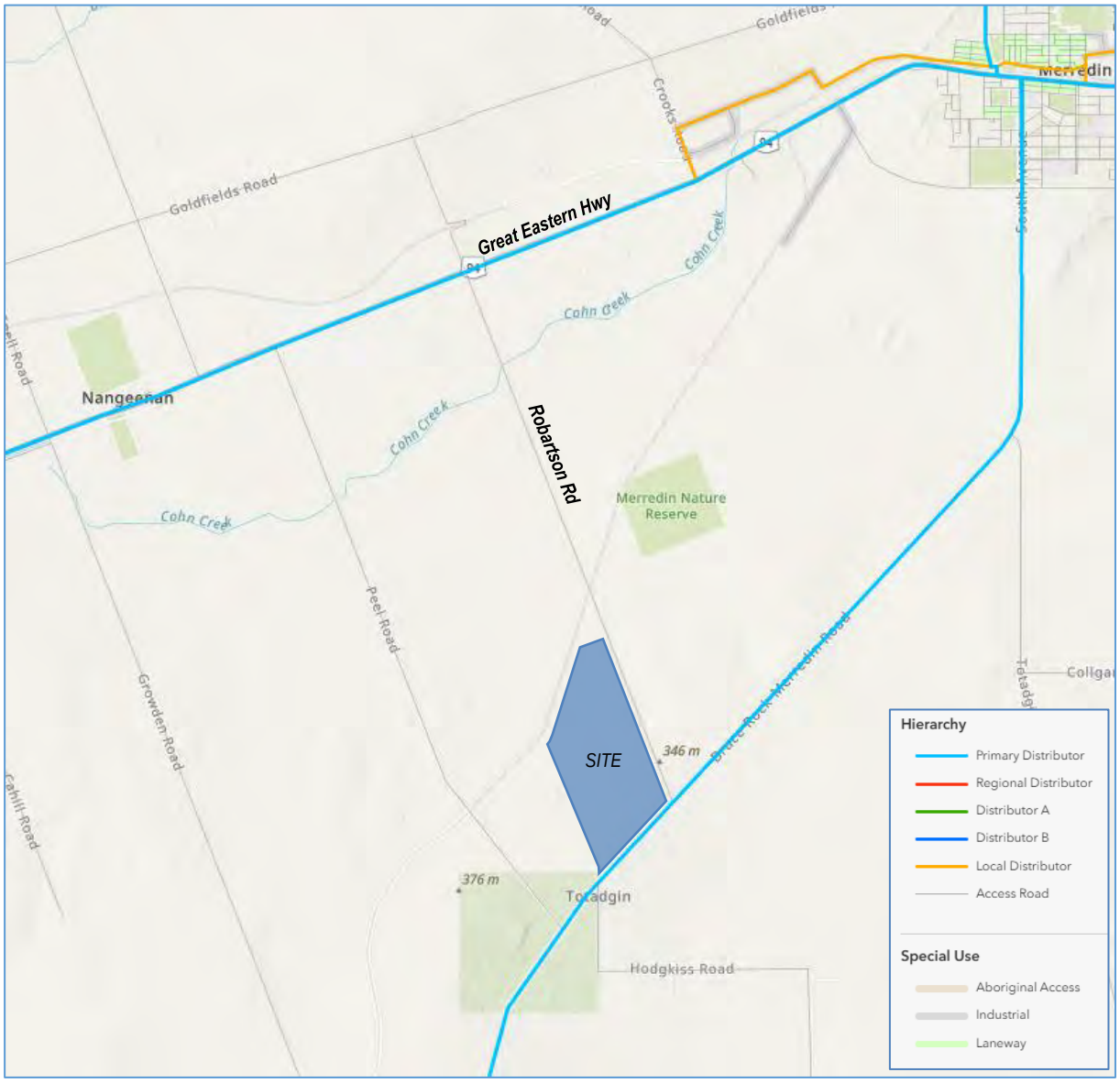


Figure 4: Existing Road Network Hierarchy

3.2 Speed Limits

The existing speed limits on the surrounding roads are shown in Figure 5.

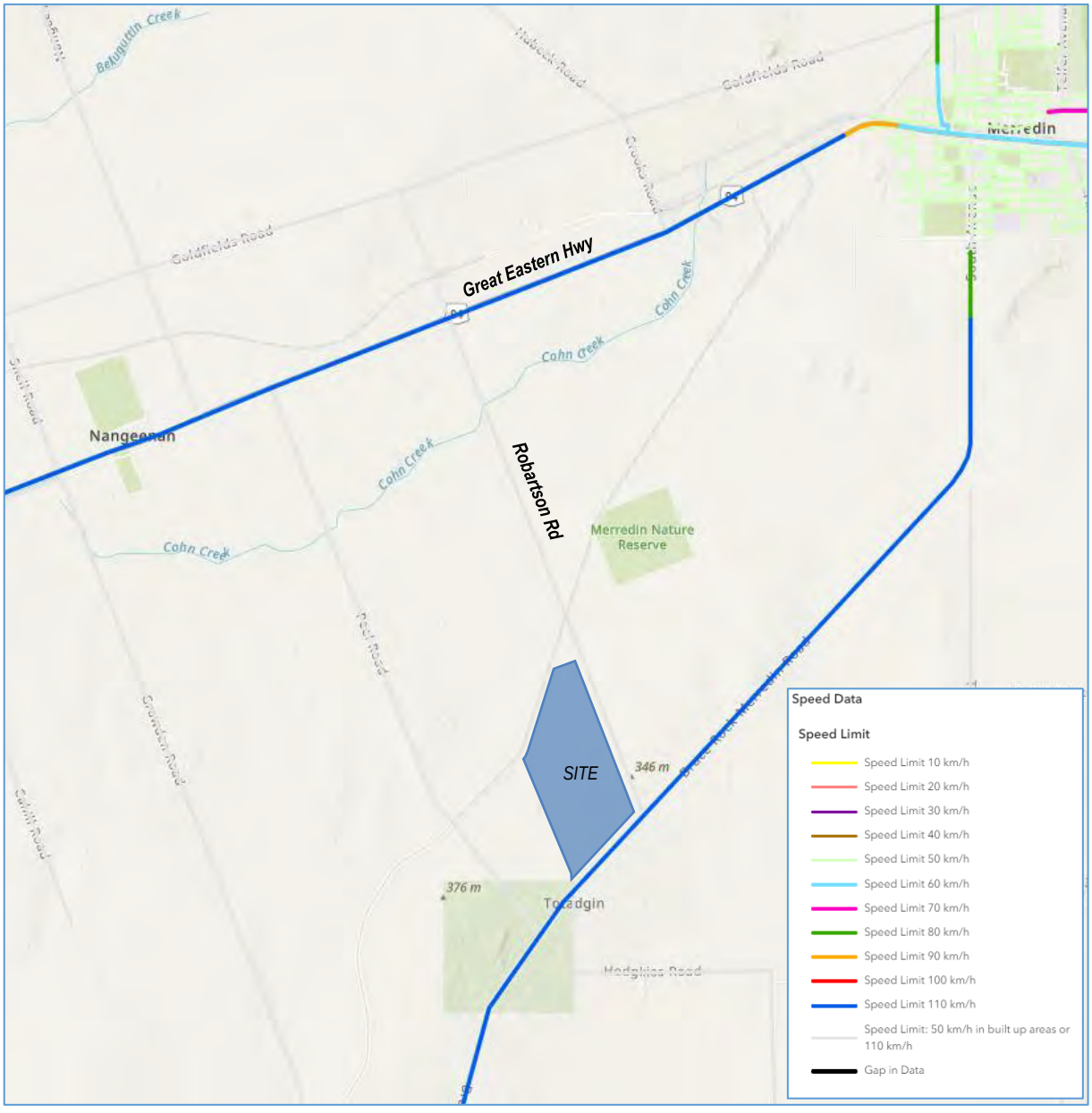


Figure 5: Existing Speed Limits

3.3 Traffic Volumes

The latest traffic counts were obtained from Main Roads WA *Traffic Map*. The closest available counts were on Bruce Rock – Merredin Road approximately 3.8km east of Robartson Road as shown in Figure 6 and Figure 7.

mainroads WESTERN AUSTRALIA

SITE 7175

Hourly Volume

Bruce Rock Merredin Rd (M041)

South of Great Eastern Hwy (SLK 187.68)

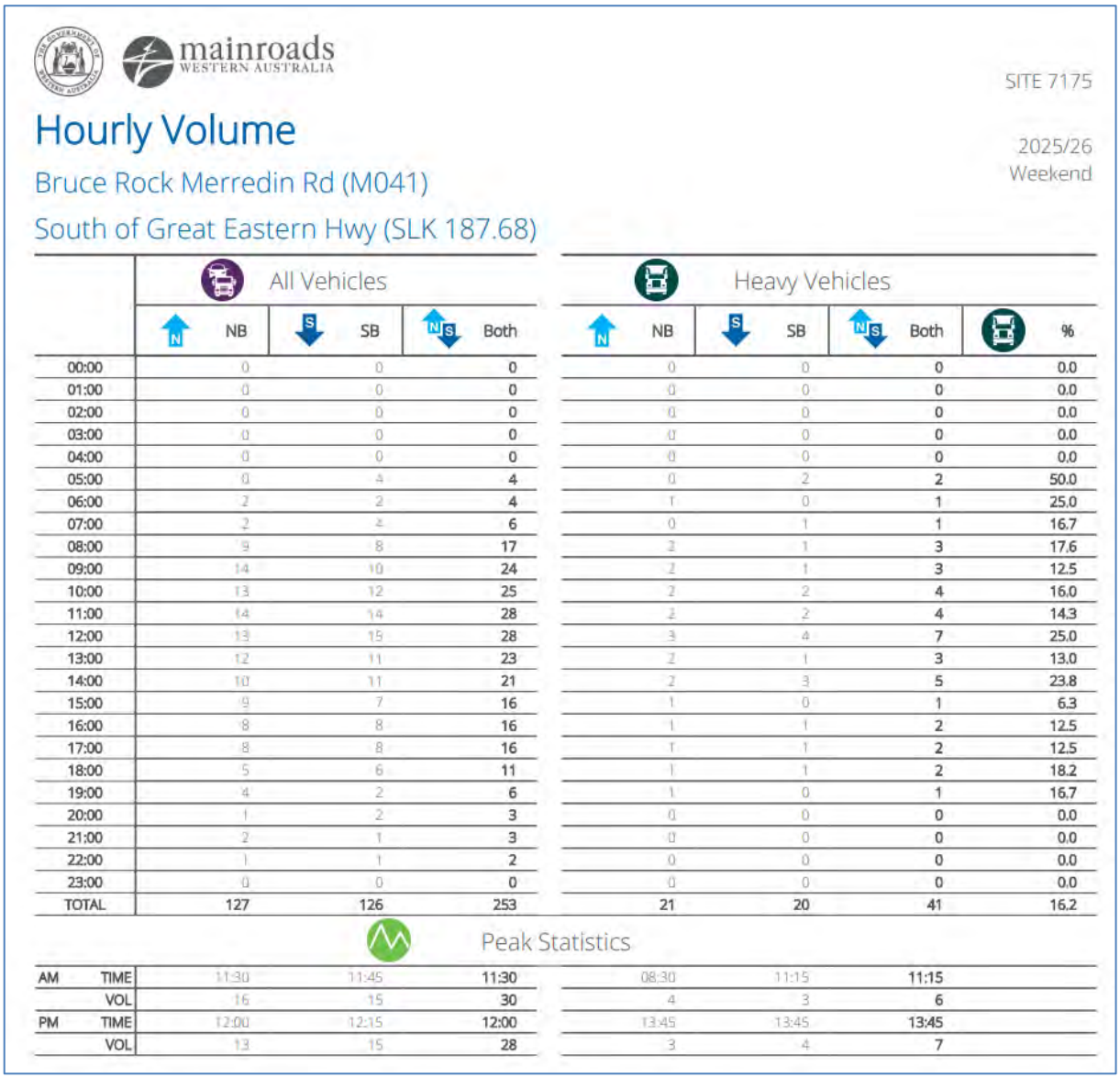
2025/26
Monday to Friday

	All Vehicles			Heavy Vehicles			
	NB	SB	Both	NB	SB	Both	%
00:00	0	0	0	0	0	0	0.0
01:00	0	0	0	0	0	0	0.0
02:00	0	0	0	0	0	0	0.0
03:00	0	0	0	0	0	0	0.0
04:00	0	0	0	0	0	0	0.0
05:00	0	9	9	0	2	2	22.2
06:00	5	7	12	2	1	3	25.0
07:00	8	8	16	2	2	4	25.0
08:00	14	12	26	3	3	6	23.1
09:00	15	13	28	4	4	8	28.6
10:00	15	17	32	4	5	9	28.1
11:00	16	13	29	4	3	7	24.1
12:00	15	15	30	4	4	8	26.7
13:00	13	13	26	4	3	7	26.9
14:00	13	12	25	3	3	6	24.0
15:00	15	12	27	4	3	7	25.9
16:00	14	10	24	3	1	4	16.7
17:00	11	9	20	2	1	3	15.0
18:00	6	5	11	1	1	2	18.2
19:00	3	3	6	1	0	1	16.7
20:00	1	2	3	0	0	0	0.0
21:00	1	1	2	0	0	0	0.0
22:00	1	0	1	0	0	0	0.0
23:00	0	0	0	0	0	0	0.0
TOTAL	166	161	327	41	36	77	23.5

Peak Statistics

AM	TIME	10:15	10:30	10:15	09:30	10:15	10:15
	VOL	18	19	36	5	6	11
PM	TIME	15:45	12:15	12:00	12:30	14:30	12:30
	VOL	16	15	30	6	4	9

Figure 6: Bruce Rock – Merredin Road – Average Weekday Traffic



mainroads WESTERN AUSTRALIA

SITE 7175

Hourly Volume

Bruce Rock Merredin Rd (M041)

South of Great Eastern Hwy (SLK 187.68)

2025/26
Weekend

	All Vehicles			Heavy Vehicles			
	NB	SB	Both	NB	SB	Both	%
00:00	0	0	0	0	0	0	0.0
01:00	0	0	0	0	0	0	0.0
02:00	0	0	0	0	0	0	0.0
03:00	0	0	0	0	0	0	0.0
04:00	0	0	0	0	0	0	0.0
05:00	0	4	4	0	2	2	50.0
06:00	2	2	4	1	0	1	25.0
07:00	2	4	6	0	1	1	16.7
08:00	9	8	17	2	1	3	17.6
09:00	14	10	24	2	1	3	12.5
10:00	13	12	25	2	2	4	16.0
11:00	14	14	28	2	2	4	14.3
12:00	13	15	28	3	4	7	25.0
13:00	12	11	23	2	1	3	13.0
14:00	10	11	21	2	3	5	23.8
15:00	9	7	16	1	0	1	6.3
16:00	8	8	16	1	1	2	12.5
17:00	8	8	16	1	1	2	12.5
18:00	5	6	11	1	1	2	18.2
19:00	4	2	6	1	0	1	16.7
20:00	1	2	3	0	0	0	0.0
21:00	2	1	3	0	0	0	0.0
22:00	1	1	2	0	0	0	0.0
23:00	0	0	0	0	0	0	0.0
TOTAL	127	126	253	21	20	41	16.2

Peak Statistics

AM	TIME	11:30	11:45	11:30	08:30	11:15	11:15
	VOL	16	15	30	4	3	6
PM	TIME	12:00	12:15	12:00	13:45	13:45	13:45
	VOL	13	15	28	3	4	7

Figure 7: Bruce Rock – Merredin Road – Average Weekend Traffic

Traffic volumes for Robartson Road were not available but it is reasonable to assume that the volumes will be lower than those along Bruce Rock – Merredin Road.

3.4 RAV Network

3.4.1 Tandem Drive Network

The Tandem Drive Restricted Access Vehicle (RAV) network according to Main Roads WA's Heavy Vehicle Services (HVS) network mapping tool is shown in Figure 8.

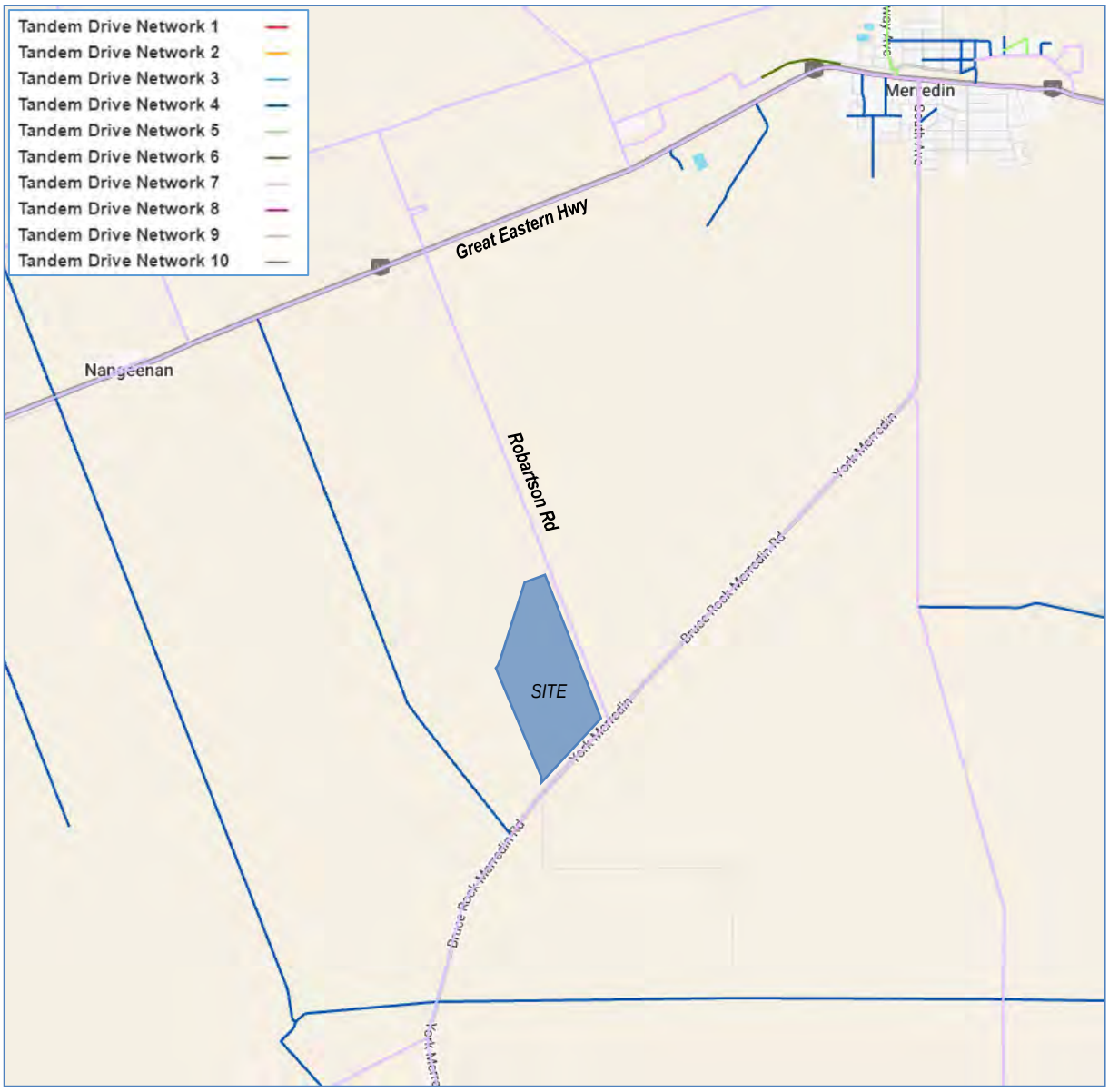


Figure 8: Tandem Drive RAV Network

As shown, Great Eastern Highway, Robartson Road and Bruce Rock – Merredin Road are permitted to carry trucks up to a Tandem Drive RAV Category 7.

3.4.2 Tri-Drive Network

The Tri-Drive RAV network according to Main Roads WA's HVS network mapping tool is shown in Figure 9.

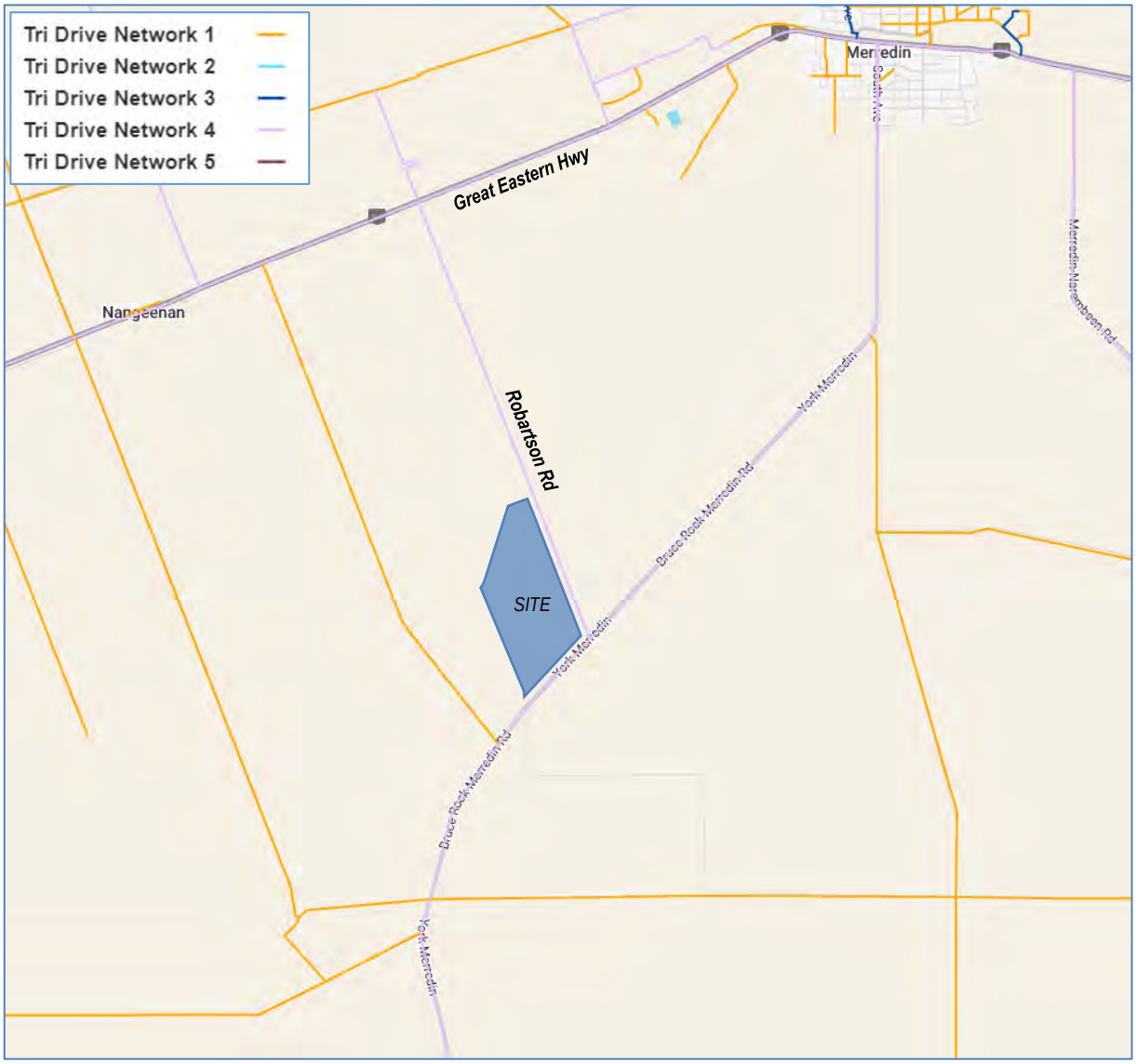


Figure 9: Tri-Drive RAV Network

As shown, Great Eastern Highway, Robartson Road and Bruce Rock – Merredin Road are permitted to carry trucks up to a Tri-Drive RAV Category 4.

4 Traffic Impact

4.1 Assessment Period

The site will generate the most traffic during the construction phase which is estimated by the client to last approximately 18 to 24 months. The peak construction phase is expected to last approximately 12 months with activity ramping up towards this peak period and then ramping down after this peak period.

The client has also confirmed that construction will occur from 6am to 6pm Monday to Saturday.

Once constructed and operational, the site will be unmanned and will generate no traffic other than for occasional maintenance which is expected to occur a few times per year. This assessment therefore focusses on the traffic impact of the construction phase.

The peak traffic hours will be from 5am to 6am as staff travel to work and from 6pm to 7pm as staff travel home after work.

4.2 Proposed Construction Vehicle

During the construction phase, some material and infrastructure will be delivered to the site using articulated heavy vehicles smaller than a 27.5m B-double. The expected construction vehicles are smaller than the maximum allowable RAV trucks on the adjacent road network.

4.3 Traffic Generation

4.3.1 Trucks

The construction phase will generate a maximum of 26 trucks movements per day. Truck movements will be spread out over the day and so it is estimated that there would be up to 2 truck movements during any one hour. The client has also advised that all majority of truck movements will be generated to and from the north along Robartson Road to access Great Eastern Highway.

4.3.2 Staff

Staff will travel to and from the site via light vehicles, vans, and buses. All staff are expected to arrive from 5 to 6am and leave from 6 to 7pm. For assessment purposes, it is assumed as a worst-case scenario that all staff movements will occur within a peak hour. The client has advised that there would be a maximum of 200 staff on site during the peak construction period. Staff will be transported using a combination of light vehicles (with carpooling) and shuttle buses and the average vehicle occupancy will be 6 people per vehicle.

Based on the maximum of 200 staff, the peak hour trip generation is estimated to be in the order of 33 inbound vehicle movements during the morning peak hour and 33 outbound vehicle movements during the afternoon peak hour.

4.3.3 Total Traffic Generation

Based on the above, the peak traffic generation during the construction period is estimated to be:

- 26 truck movements and 66 light vehicle movements per day.
- Total of 35 (33 light vehicles + 2 trucks) movements during the arrival period (5 to 6am).
- Total of 35 movements during the departure period (6 to 7pm).

4.4 Road Capacity

According to the WAPC TIA guidelines, an increase of between 10 to 100 peak hour vehicles is considered to have a low to moderate impact and is generally deemed acceptable without requiring detailed capacity analysis. The estimated 35 vehicles per hour is around the lower end of this range and so the construction traffic will have a low impact and can be accommodated within the existing capacity of the road network.

Based on traffic count data, the peak hours of traffic on the road network (around 10 to 11am and 1 to 2pm) do not appear to coincide with the peak periods of construction traffic and so the impact is further reduced.

5 Vehicle Access Assessment

5.1 Access Arrangements

Vehicle access to the site is proposed via Robartson Road adjacent to the power station as shown in Figure 10.

No vehicle access is proposed to Bruce Rock – Merredin Road.



Figure 10: Site Access On Robartson Road

5.2 Sight Distance

Sight distance requirements from vehicle exit points for RAV trucks are defined in Main Roads WA's Standard Restricted Access Vehicle (RAV) Route Assessment Guidelines as shown in Figure 11.

The vertical alignment of Robartson Road is relatively flat based on contours from Landgate V5.

Appendix D: Required Sight Distances

Posted Speed km/h	Downhill				Level	Uphill			
	-8%	-6%	-4%	-2%		2%	4%	6%	8%
40	74	72	70	68	66	65	64	62	61
50	102	98	95	92	89	87	85	84	82
60	134	128	123	119	116	112	110	107	105
70	170	162	155	149	144	140	136	133	130
80	209	198	190	182	176	170	165	161	157
90	252	239	228	218	Both	203	197	191	186
100	308	290	275	263	252	242	234	227	220

Figure 11: RAV Guidelines - Sight Distance

As shown, the proposed site access is required to provide a minimum of 252m of sight distance in both directions.

As shown in Figure 12, the required sight distance is achieved in both directions. A detailed survey and assessment can be undertaken as part of the access design to confirm whether any vegetation removal is required.



Figure 12: Available Sight Distance

5.3 Access Geometry

The vehicle access will need to be designed to accommodate the turning movement of the proposed construction trucks.

A preliminary vehicle swept path analysis has been undertaken to indicate the likely extent of the crossover on Robartson Road. The analysis has been undertaken in AutoTURN vehicle tracking software using the Main Roads WA 27.5m B-Double template (with a 12.5m turning radius). The proposed construction vehicle is shorter than the B-double and is therefore likely to manoeuvre better than shown using the B-double templates.

As trucks are only proposed to travel to and from the north along Robartson Road, only these movements have been shown.

The swept paths are attached as Appendix A.

6 Site Specific Issues and Safety Issues

6.1 Crash History

The crash history of the adjacent road network was sourced from the Main Roads WA's Reporting Centre. The search included the length of Robartson Road between Great Eastern Highway and Bruce Rock – Merredin Road. The crashes recorded over the five-year period from 2020 to 2024 are shown in Figure 13.

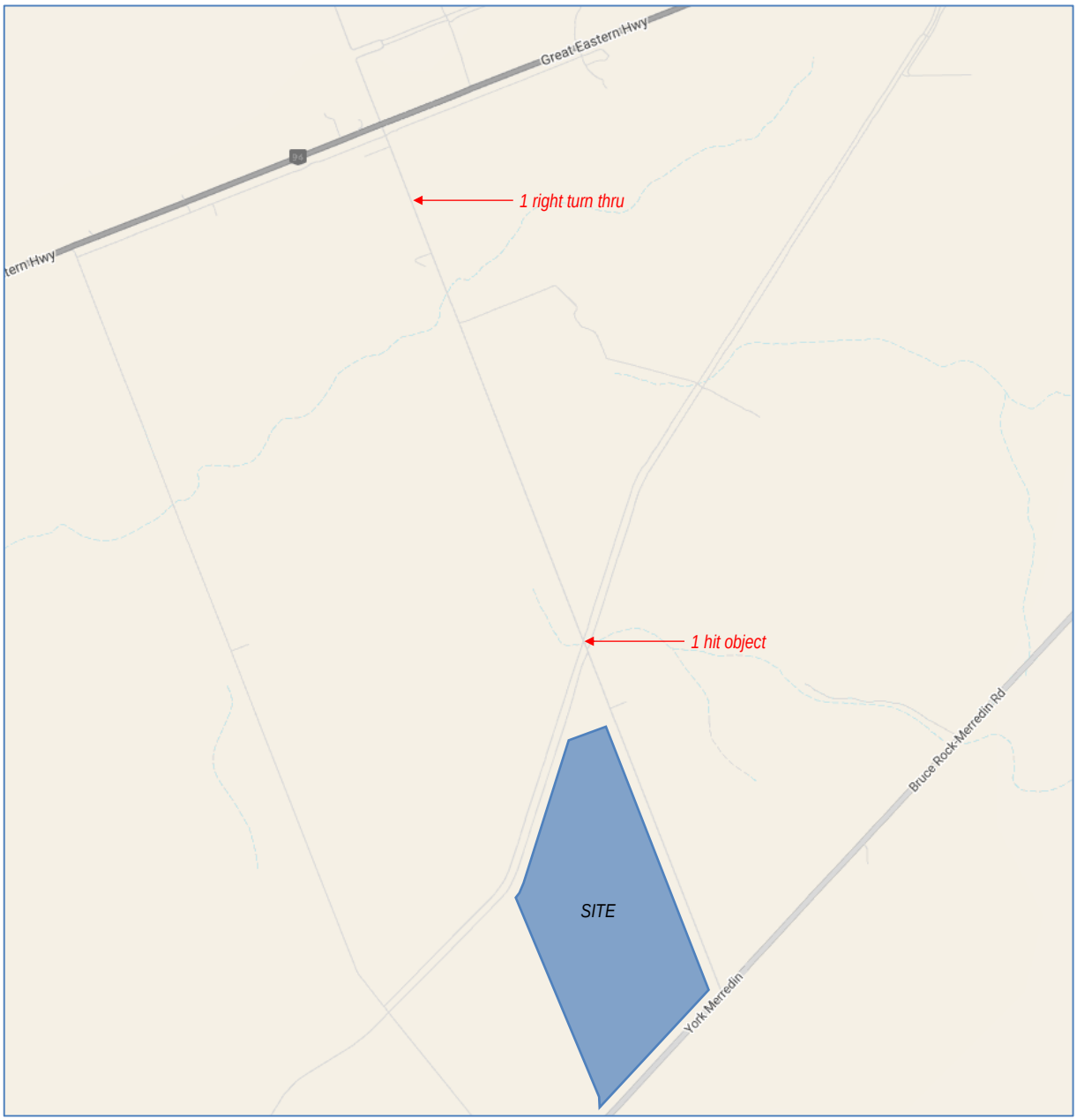


Figure 13: Crash History 2020 to 2024

As shown, only two crashes have been reported along Robartson Road. The detailed crash history indicates that both crashes resulted in property damage only. The crash history is low and does not appear to indicate any major safety issue.

The proposed development will generate a low volume of additional traffic over a limited period of time and is unlikely to increase the risk of crashes unacceptably.

7 Conclusion

This Transport Impact Statement for the proposed Ngaangk Boodja Battery and Solar Farm in Merredin concluded the following:

- The peak daily traffic generation during the construction period is estimated to be 26 truck movements and 66 light vehicle / bus movements per day.
- The peak hour traffic generation is estimated to be in the order of 35 vehicle movements per hour.
- The volume of traffic generated during the construction period is low and can be accommodated within the capacity of the road network. Once constructed and operational, the development will generate little or no traffic.
- The minimum required sight distance is achieved in both directions at the proposed vehicle access on Robartson Road.
- The vehicle access will need to be designed to accommodate the turning movement of the proposed construction trucks. A preliminary swept path analysis using Main Roads WA's RAV vehicle templates has been undertaken to demonstrate the likely extent of the vehicle crossover.
- The crash history of the adjacent road network does not indicate any major safety issues. The proposed development will generate a low volume of additional traffic over a limited period of time and is unlikely to increase the risk of crashes unacceptably.

Appendix A – Preliminary Swept Paths


MRWA RAV2 BDOUBLE 12.5m RADIUS
Custom
MRWA RAV2 BDOUBLE 12.5m RADIUS
Custom
MRWA RAV2 BDOUBLE 12.5m RADIUS
Custom
MRWA RAV2 BDOUBLE 12.5m RADIUS
Custom
3000
8000
13000
1000
9000
0
9500
0
1500
5000
1000
MRWA RAV2 BDOUBLE 12.5m RADIUS
mm
Tractor Width : 2500
Trailer Width : 2500
Tractor Track : 2500
Trailer Track : 2500
Lock to Lock Time : 6.0
Steering Angle : 26.1
Articulating Angle : 70.0

APPENDIX F
Glint and Glare Assessment

Ngaangk Boodja Battery & Solar Farm

Glint and Glare Assessment

BRM Solar Farm Nominee Pty Ltd c/- Nomad Energy Pty Ltd

Unit 5, 6 Short Street
Fremantle WA 6160

Prepared by:

SLR Consulting Australia Pty Ltd

SLR Project No.: 640.032254.00001

4 December 2025

Revision: R01-v1.0

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
R01-v1.0	11 December 2025	P Hayman	P Georgiou	P Georgiou

Basis of Report

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with BRM Solar Farm Nominee Pty Ltd c/- Nomad Energy Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

Executive Summary

SLR Consulting Australia Pty Ltd (SLR) has been engaged by BRM Solar Farm Nominee Pty Ltd c/- Nomad Energy Pty Ltd (the Client) to carry out a Reflective Glare assessment of a proposed 158 MWdc photovoltaic solar and 640 MWh Ngaangk Boodja BESS and Solar Farm (herein the "Project") located on Robartson Road outside the town of Merredin.

The Project is located approximately 9 km to the southwest of Merredin on a site neighbouring the operational 132 MWdc Merredin solar farm owned by Sun Energy and the Merredin Energy Power Station.

GLARE CONDITIONS ANALYSED

Road/Rail Traffic Disability Glare

The potential for glare was assessed along the nearest surrounding carriageways:

- Bruce Rock - Merredin Road, Robartson Road and the Eastern Goldfields Rail Line to the northwest of the site.

Residential Nuisance Glare

The potential for glare was assessed at 5 surrounding dwellings located up to approximately 1 km from the Site.

GLARE SCENARIOS ANALYSED

The present study has examined glare potential for the following scenarios:

- "Baseline" Scenario: involving calculations with the Single-Axis Tracking (SAT) panel support system assuming a Rest Angle of 0° - in this mode, panels commence each morning and end each afternoon in an essentially horizontal position. These simulations did NOT include any existing vegetation screening.
- "Mitigation" Scenarios: involving calculations with a Rest Angle of 5°.

GLARE ASSESSMENT CRITERIA

The SGHAT software suite was used for the present study. For solar farm applications, solar reflections predicted by SGHAT fall into two categories – refer **Section 4.3.**

- SGHAT GREEN - reflections with low potential to cause "after-image" impact.
- SGHAT YELLOW - reflections with potential to cause "after-image" impact.

Criteria for Road Traffic Disability Glare

- Any instance of SGHAT YELLOW Category glare warrants consideration of mitigation.

Criteria for Residential Nuisance Glare

- The impact of SGHAT YELLOW Category glare is assessed via the amenity objectives shown in **Table 1**.

GLARE ANALYSIS RESULTS

BASELINE Scenarios

Road Traffic Disability Glare

- 1,265 minutes of Yellow SGHAT glare was predicted annually for vehicles travelling north on Robartson Road.
- NIL glare was predicted for Bruce Rock – Merredin Road.
- NIL glare was predicted for the Eastern Goldfields Rail Line.

Residential Nuisance Glare

- NIL glare was predicted for all assessed residential dwellings.

Analysis of the Baseline Results

The reflection conditions predicted in the Baseline Modelling were examined further in light of the observation (refer **Section 3**) that for very high Incidence Angles, it would almost always be the case that an observer would perceive reflections coming from virtually the same direction as the incoming direct solar rays themselves. Such a condition would not constitute a glare situation as the intensity of the incoming direct solar ray itself would dominate the field of vision perceived by the observer.

On this basis the following was concluded:

- A significant portion of the reflections impacting Robartson Road would not be considered to constitute a glare condition.

MITIGATION Scenarios

Mitigation scenarios have been explored to reduce or eliminate all reflections.

Rest Angle

A Rest Angle of 5° has been investigated for the panel SAT system.

- All reflections for vehicles travelling on Robartson Road were eliminated under this condition.

A rest angle of 5° could be applied to the highlighted area shown in **Figure** 14 in the afternoons between mid-April and the end of August. No restriction of Rest Angle would be required for the mornings all-year-round.

Given BRM Solar Farm Nominee Pty Ltd c/- Nomad Energy Pty Ltd's desire to retain standard tracker operations and conservative elements of the modelling (eg no account taken of cloud cover), the mitigation strategy for the facility could involve a review being conducted once construction is complete to confirm whether glare is observed during the impact times/dates found by the assessment. If the occurrence of glare is confirmed, the 4-month (mid-April to August), afternoon 5° rest angle mitigation could then be applied or further vegetation screening implemented.

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Appendix A Residential Receiver Coordinates

Acronyms and Abbreviations

PV Panel	Photovoltaic (PV) panels are designed to absorb solar energy and retain as much of the solar spectrum as possible in order to produce electricity.
Glare	Glare refers to the reflections of the sun off any reflective surface, experienced as a source of excessive brightness relative to the surrounding diffused lighting. Glare covers reflections: . Which can be experienced by both stationary and moving observers (the latter referred to as “glint”). Which are either specular or diffuse.
Specular	A reflection which is essentially mirror-like – there is virtually no loss of intensity or angle dispersion between the incoming solar ray and outgoing reflection. 
Diffuse	A reflection in which the outgoing reflected rays are dispersed over a wide (“diffuse”) range of angle compared to the incoming (parallel) solar rays, typical of “rougher” surfaces. 
KVP	Key View Points (KVPs) are offsite locations where receivers of interest have the potential to experience adverse reflective glare.
Glare **AS/NZ 1158.2:2020**	Condition of vision in which there is a discomfort or a reduction in the ability to see, or both, caused by an unsuitable distribution or range of luminance, or to extreme contrast in the field of vision. Glare can take the form of: (a) Disability Glare – glare that impairs the visibility of objects without necessarily causing discomfort. This is relevant to Motorist Disability Glare, a safety issue. Discomfort Glare – glare that causes discomfort without necessarily impairing the visibility of objects. This is relevant to Residential Nuisance Glare, an amenity issue.
Threshold Increment (TI) **AS/NZ 4282:2023**	TI is the measure of disability glare expressed as the percentage increase in contrast required between an object and its background for it to be seen equally well with a source of glare present. Higher TI values correspond to greater disability glare.

1.0 Heading 1

SLR Consulting Australia Pty Ltd (SLR) has been engaged by BRM Solar Farm Nominee Pty Ltd c/- Nomad Energy Pty Ltd (the Client) to carry out a Reflective Glare assessment of a proposed 158 MWdc photovoltaic solar and 640 MWh Ngaangk Boodja BESS and Solar Farm (herein the “Project”) located on Robartson Road outside the town of Merredin.

The Project is located approximately 9 km to the southwest of Merredin on a site neighbouring the operational 132 MWdc Merredin solar farm owned by Sun Energy and the Merredin Energy Power Station.

The Project will comprise several sections of panel arrays split by an existing cable easement that runs through the site.

The following potential glare conditions have been considered:

- Daytime Reflective glare (and glint) arising from the solar PV panels and impacting on the surround area.

1.1 Structure of Report

The remainder of this report is structured as follows:

- **Section 2** describes the Project and surrounding environment.
- **Section 3** outlines the requirements of the impact assessment.
- **Section 4** provides background information regarding the calculation of reflectivity and glare.
- **Section 5** presents the analysis, results and proposed mitigations.

2.0 Proposed Ngaangk Boodja Battery and Solar Farm Project

The Project site is set between Bruce Rock – Merredin Road and the Eastern Goldfields Rail Line – refer **Figure 1**. The site is approximately 9 km southwest of the town centre of Merredin.

In terms of the relative heights of the Project site and surrounds, ground elevations at the site are undulating in most directions with a general upward slope to the east and south. Ground heights appear to vary between 300 and 340 metres above sea level within 1 km of the project site.

Figure 1 Project Location Map

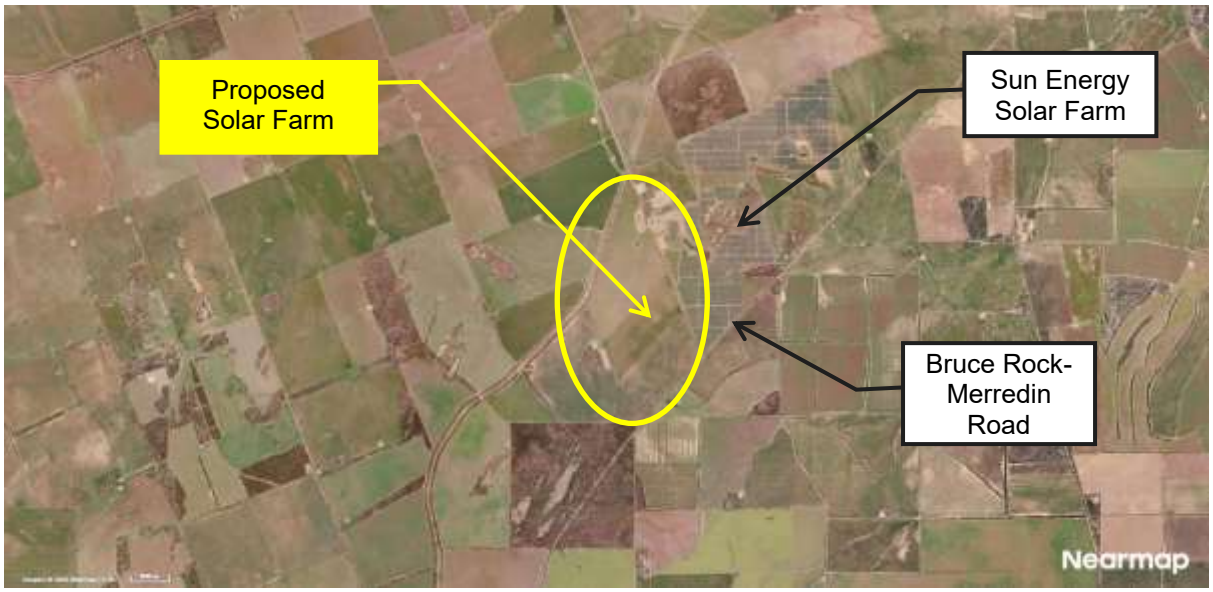


Image: Nearmap

2.1 Site Description and Key Project Components

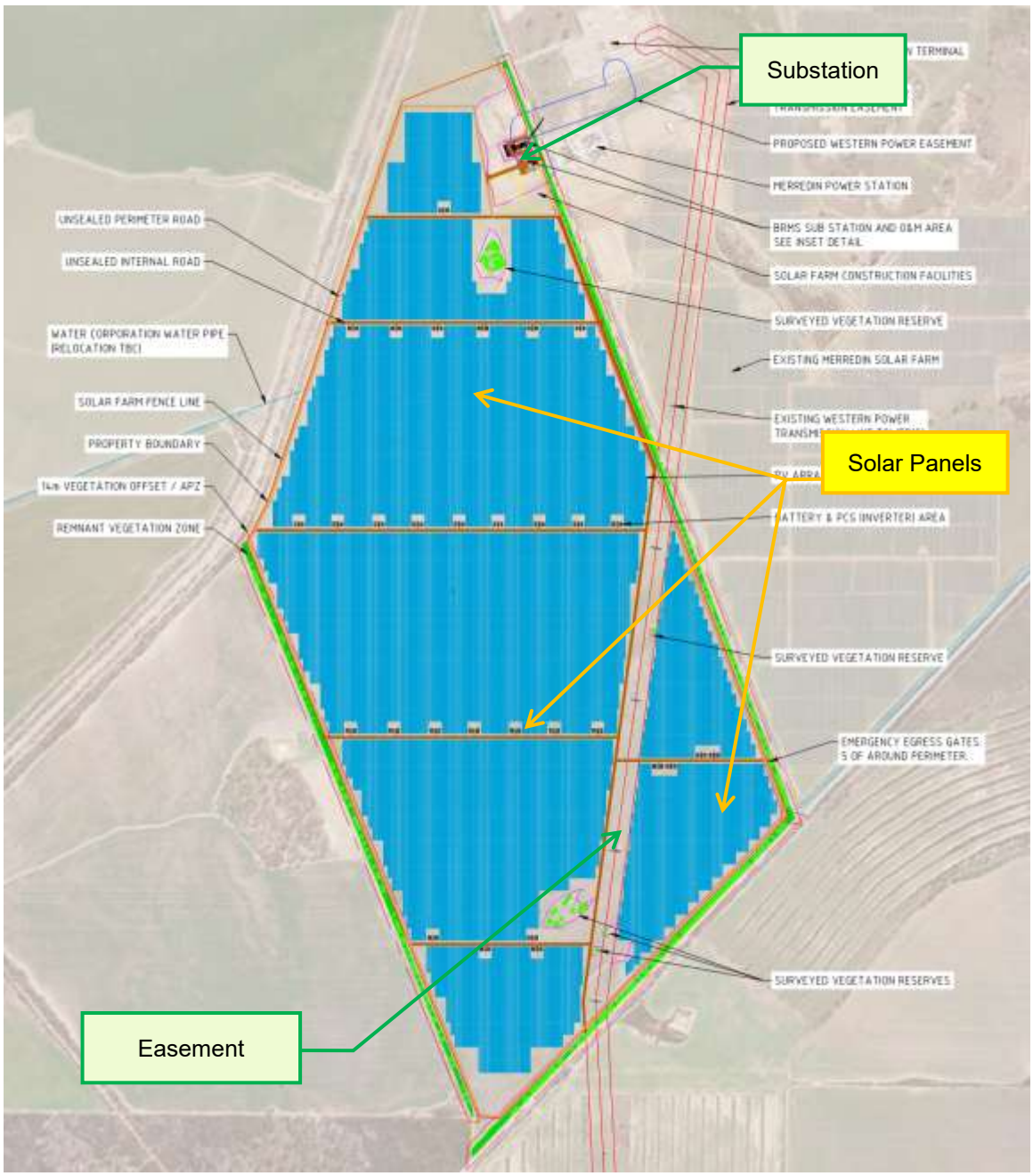
From a Reflective Glare point of view, the key components of the Project are:

- The photovoltaic (PV) modules in relation to their daytime reflective glare potential.

Overall Layout

The proposed ground-mounted arrays (refer **Figure 2**) would consist of solar panels oriented in north-south rows within a number of sub-array "blocks" separated by an existing cable easement that runs through the site.

Figure 2 Proposed Site Layout



Panel Support System

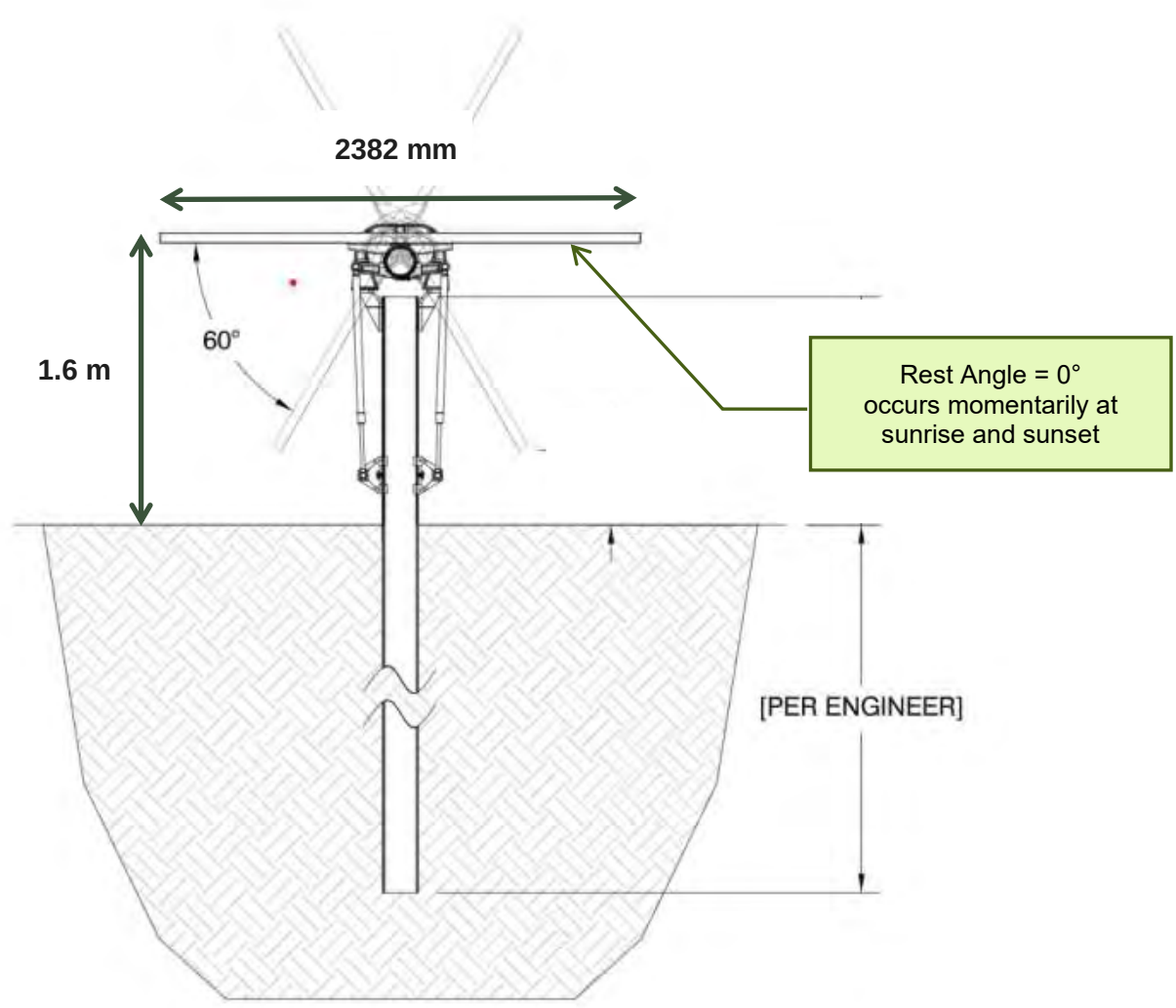
The rows of panels will be supported by a Single-Axis Tracking (SAT) System with a ±60° maximum tilt, 1-portrait ("1P") configuration – refer **Figure 3**.

- As noted above, the panels will have a maximum tilt of ±60° facing east and west.
- The ground coverage ratio will be approximately 40%.
- The SAT system will support "Back-Tracking", such that panel orientation at the start and end of the day can have a "Rest" Angle of 0°, ie horizontal. Note that, overnight, panels are "stowed" at a set angle (so as to avoid damage and the pooling of rain).

The ultimate height above ground of individual panels may vary slightly, depending on local ground conditions.

- The median height of the panels has been modelled as 1.6 m above the ground.

Figure 3 View of Proposed "1P" Single-Axis Tracking (SAT) Support System



3.0 Requirements

There are currently no national guidelines or policies regarding the assessment of glare from solar farms. New South Wales, Queensland and Victoria have guidance set out in the following documents.

- NSW – "Large Scale Solar Energy Guideline"
- QLD – "Queensland: Solar Farm Guidelines: Practical guidance for communities, landowners and project proponents"
- VIC – "Solar Energy Facilities Design and Development Guideline"

Western Australia's Department of Water and Environmental Regulation has produced the "Green Energy Proponent Guideline" which provides comment on ways to reduce environmental impacts from green energy projects. At its top level it recommends an avoidance and minimisation approach. For glint and glare, it acknowledges that this can be an issue and provides some general mitigation options however there is no guidance around what constitutes a glare condition in terms of duration or intensity. As such, detailed below is the guidance typically followed by SLR in making these assessments

3.1 Aviation Glare

In relation to the potential impact of solar PV systems on aviation activity, guidance is available from the US Federal Aviation Administration (FAA) which regulates and oversees all aspects of American civil aviation. The FAA issued a Technical Guidance Policy in 2010 and a subsequent (over-riding) Interim Policy in 2013, which was updated again in 2018.

- FAA, *"Technical Guidance for Evaluating Selected Solar Technologies on Airports"*, Federal Aviation Administration, Washington, D.C., November 2010.
- FAA, *"Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports"*, Federal Register, Oct. 23, 2013.
- FAA, *"Technical Guidance for Evaluating Selected Solar Technologies on Airports"*, Federal Aviation Administration, Washington, D.C., Version 1.1, April 2018.

The above interim policy and guidance notes the use of the ForgeSolar SGHAT software tool to assess aviation glare. SGHAT has been accepted by regulatory bodies globally including Australia's Civil Aviation Safety Authority (CASA).

In the above interim policy and guidance notes, the SGHAT glare criteria were:

- Airport Traffic Control Tower (ATCT): NO GREEN or YELLOW Glare
- Aircraft Landing: NO YELLOW Glare (GREEN is permissible)

In 2021 the FAA released updated guidance:

- FAA, *"FAA Aviation Administration Policy, Review of Solar Energy System Projects on Federally Obligated Airports"*, Federal Register, Vol.86, No.89, May 11, 2021.

In this updated policy:

- The FAA concluded that the glare from solar installations impacting on pilots is similar to the glare routinely experienced by pilots from bodies of water and glass-facade buildings.
- Accordingly, the FAA refined the scope of their policy to focus on the glare received by ATCTs (Air Traffic Control Towers) and no longer provide guidance as to the glare experienced by pilots on final (landing) approach.

SLR has taken a precautionary approach and has continued to include assessment of approach flightpaths when they are within approximately 5 km of a proposed solar facility, given that this will be a new source of glare.

In doing so we take into account the severity of the SGHAT predictions in terms of both the duration and the magnitude of predicted “YELLOW” zone glare, when recommending consideration of mitigation.

3.2 Residential Nuisance Glare

SLR notes the criteria available in the New South Wales (NSW) Large Scale Solar Energy (LSSE) Guideline (2022). The LSSE Guideline categorises Residential Nuisance Glare as “High”, “Moderate” or “Low” impact, depending on the predicted minutes per day and/or hours per year of glare.

Table 1 summarises the three impact levels and associated amenity objectives.

- When applying the LSSE Guideline to Residential Nuisance Glare, it is standard industry practice to use the occurrence of predicted SGHAT YELLOW glare, noting that SGHAT GREEN glare:
  a) implies LOW potential for an after-image; and
  b) is acceptable in terms of aviation glare for pilots on final landing approach.

Table 1 Extract (*Table 2*) from NSW Large-Scale Solar Energy Guideline (2022)

High glare impact	Moderate glare impact	Low glare impact
> 30 minutes per day > 30 hours per year	< 30 minutes & > 10 minutes per day < 30 hours & > 10 hours per year	< 10 minutes per day < 10 hours per year
Significant amount of glare that should be avoided.	Implement mitigation measures to reduce impacts as far as practicable.	No mitigation required.

3.3 Road Traffic Disability Glare

There are no SGHAT nor LSSE Guideline criteria for Road and Rail Traffic Disability Glare.

Accordingly, when considering motorists, the occurrence of SGHAT YELLOW glare for ANY number of minutes per day or hours per year is taken by SLR as necessitating consideration of mitigation, unless the reflection condition occurs at a time of day when the difference in angle between an incoming direct solar ray and its associated reflection is less than around 10°, in which case a motorist’s view would be completely dominated by the radiance level of the sun’s direct solar rays.

4.0 PV Solar Glare Background

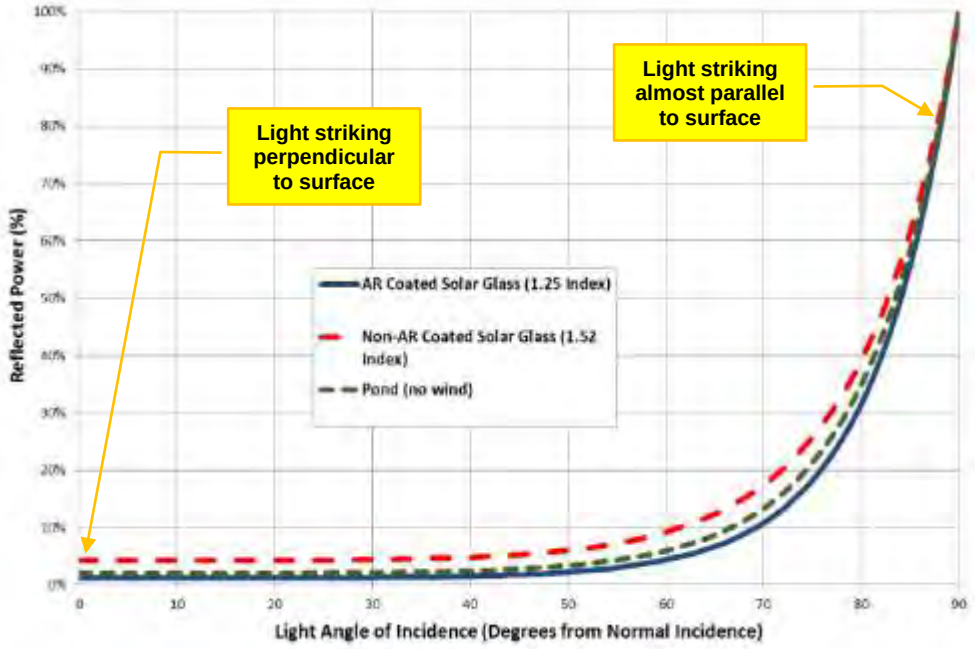
4.1 Solar Panel Reflectivity

Solar PV panels are designed to capture (absorb) the maximum possible amount of light within the layers below the front (external) surface and hence minimise reflections off the surface of each panel. Reflections are a function of:

- the angle at which the light is incident onto the panel (which will vary depending on the specific location, time of day and day of the year); and
- the index of refraction of the front surface of the panel and associated degree of diffuse (non-directional) versus specular (directional or mirror-like) reflection, which is a function of the surface texture of the front module (reflecting) surface.

Representative reflectivity curves are shown in **Figure 4**.

Figure 4 Typical Reflectivity Curves as a Function of Incidence Angle



- When an incoming solar ray strikes the surface of a solar PV panel close to perpendicular to the panel surface (ie LOW angle of “incidence”), reflectivity is minimal, less than 5% for all solar panel surface types.
- It is only when an incoming solar ray strikes the panel at increasingly HIGH “incidence” angles, ie approaching parallel to the panel, that reflectivity values increase. When this happens, reflections become noticeable and potentially at “glare” level – this can occur for all solar panel surface types.
- However, at VERY HIGH incidence angles, it would almost always be the case that an observer (motorist, resident, etc) would perceive reflections coming from virtually the same direction as the incoming solar rays themselves. Such a condition would not constitute a glare situation as the intensity of the incoming solar ray itself would dominate the field of vision perceived by the observer.

4.2 Project Site Solar Angles – Annual Variations

One of the challenging issues encountered with daytime solar panel glare is the varying nature of the associated reflections, whose occurrence will vary with time of day and day of the year as the sun's rays follow varying incoming angles between the two extremes of:

- Summer solstice – sunrise incoming rays from just south of east, maximum angle altitude rays at midday, sunset incoming rays from just south of west.
- Winter solstice – sunrise incoming rays from almost northeast, minimum angle altitude rays at midday, sunset incoming rays from almost northwest.

Any solar glare analysis must take into account the complete cycle of annual reflection variations noted above. The potential range of incoming solar angles at the Project site relevant to daytime glare is shown in **Figure 5**, with critical angles summarised in **Table 2**.

Figure 5 Project Site Incoming Solar Angle Variations

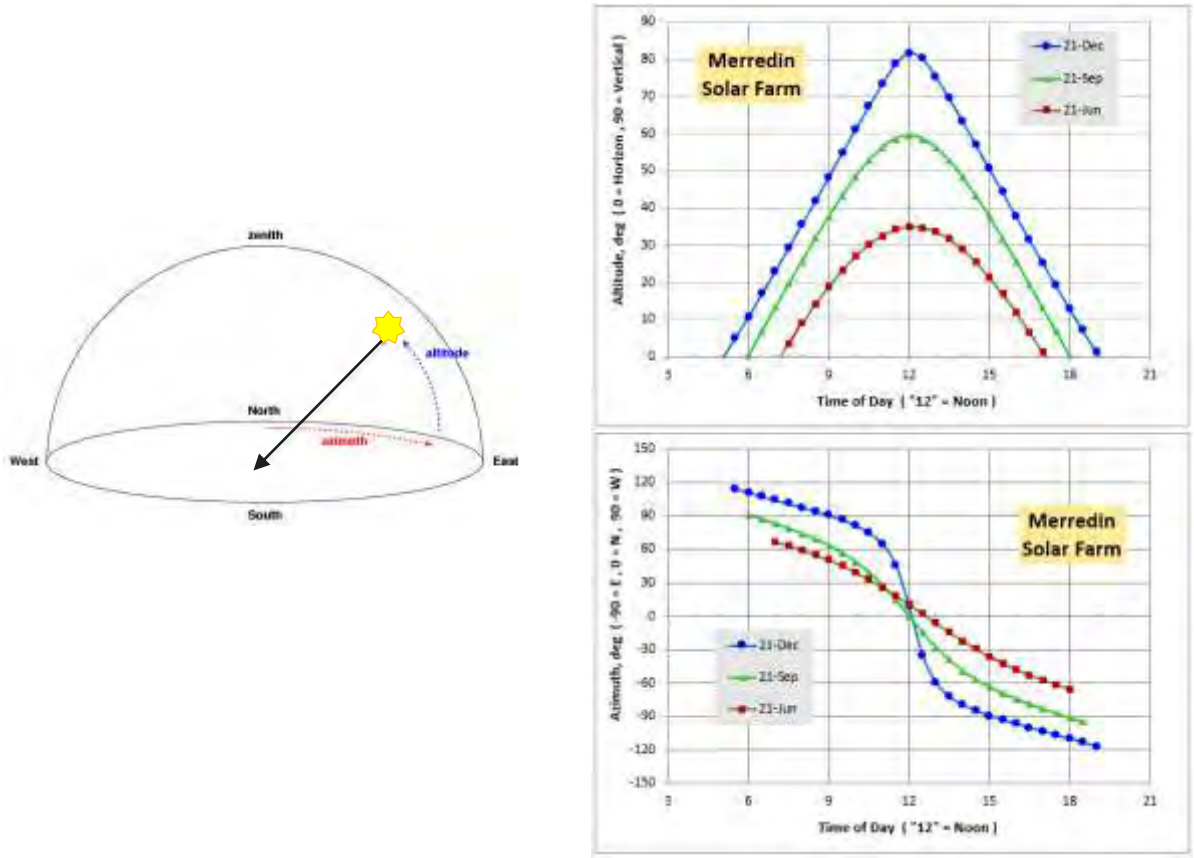


Table 2 Key Annual Solar Angle Characteristics for Project Site

Day of Year	Sunrise	Sunset	Sunrise-Sunset Azimuth Range	Max Altitude
Summer Solstice [1]	5:04 am	7:07 pm	±118° East & West of North	81.4°
Equinox	5:57 am	6:02 pm	±91° East & West of North	59.4°
Winter Solstice	7:10 am	5:07 pm	±62° East & West of North	35.9°

Note 1: Times of day do not take into account Daylight Savings Time

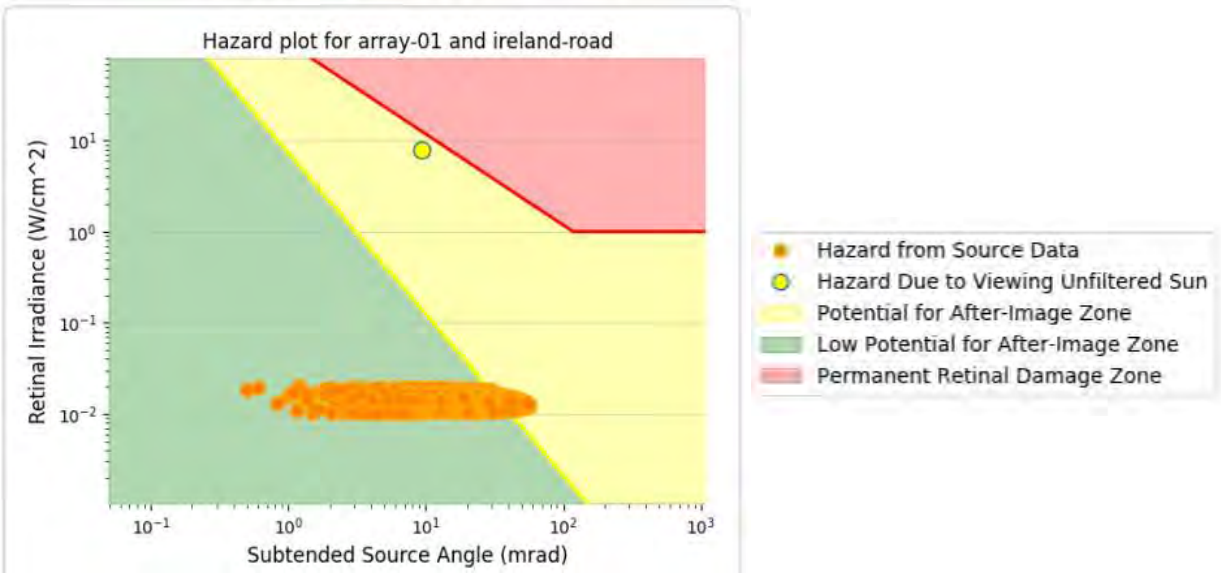
4.3 SGHAT Modelling Outputs

As previously, noted, the glare modelling in this study has been undertaken using the SANDIA Labs Forge Solar SGHAT software suite.

SGHAT calculations extend over the entire calendar year in 1-minute intervals, sunrise to sunset, and apply the relevant solar altitude and azimuth angles for the specific project location.

SGHAT provides output in the form of an ocular hazard analysis plot, a sample of which is shown in **Figure 6**.

Figure 6 Example Solar Glare Ocular Hazard Plot (SGHAT Software Output)



The following is noted regarding the **Figure 6** sample plot:

- SGHAT ocular impact is a function of both:
  - o "retinal irradiance" (i.e. the light seen by the eye) and
  - o "subtended source angle" (i.e. how wide an arc of view the light appears to be arriving from).
- SGHAT ocular impact falls into three categories:
  - o GREEN: low potential to cause "after-image"
  - o YELLOW: potential to cause temporary "after-image"
  - o RED: potential to cause retinal burn (permanent eye damage)
- "After-Image" is the term applied to a common retinal phenomenon that most people have experienced at some point or other, such as the effect that occurs when a photo with flash is taken in front of a person who then sees spots in front of their eyes for a few seconds. A more extreme example of "after-image" occurs when staring at the sun. "After-image" (also known as "photo bleaching") occurs because of the de-activation of the cells at the back of the eye's retina when subjected to a very bright light.

- The SGHAT plot provides an indication of the relative intensity of both the incoming reflection and the sources of light itself (i.e. the sun).
    - The occurrence of glare is shown in the plot as a series of **orange circles**, one circle for each minute that a reflection is visible.
    - A reference point is also shown in each SGHAT plot - the **yellow circle** with the **green outline** - representing the hazard level of viewing the sun directly without any filtering, i.e. staring at the sun.
    - In **Figure 6**, it can be seen that the reflection visible by the receiver is roughly 1,000 times less intense than the direct light from the sun itself.
- Finally, in relation to PV Solar facilities, it is important to note that the third SGHAT Ocular Plot "RED" category is **not possible**. This is because standard PV modules do not focus reflected sunlight (as in a concave mirror).

Additional SGHAT Modelling Output

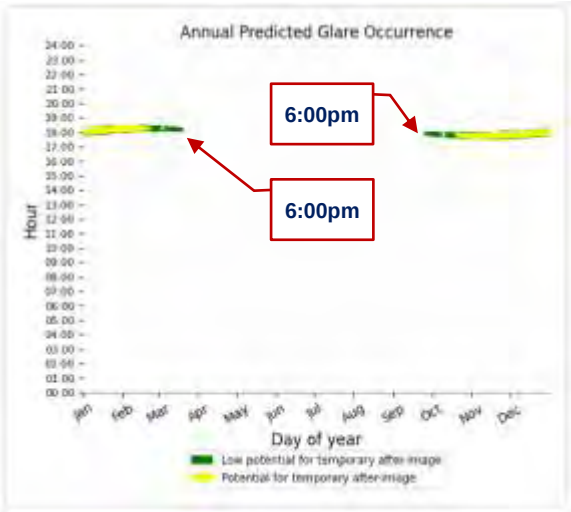
In addition to the ocular hazard analysis plot, SGHAT also produces information which reveals the extent of visibility of reflections at any chosen receiver position, regardless of whether the reflections constitute a glare condition or not.

An example of shown in **Figure 7**.

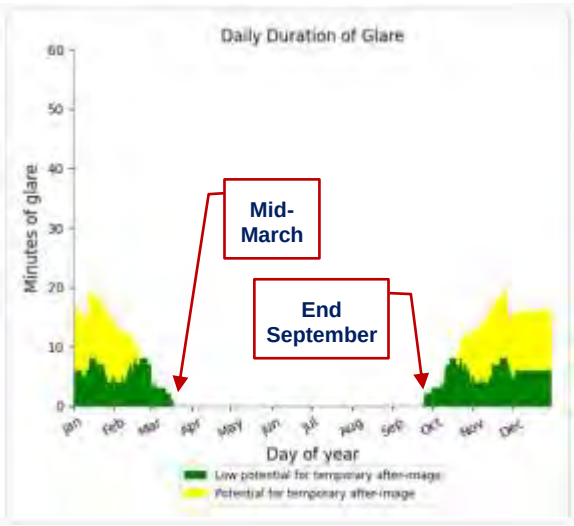
- **Figure 7-A:**
    - shows the am/pm time periods when SGHAT GREEN and YELLOW reflections are predicted to occur at a receptor throughout the year, in this case between around 6:00 pm in the evening
- **Figure 7-B:**
    - shows the months during the year and the minutes per day when SGHAT GREEN and YELLOW reflections occur at the same position, in this case from the end of September to mid-March, for periods ranging up to a peak of 20 minutes per day.
- **Figure 7-C:**
    - shows where within the solar farm panel array the SGHAT GREEN and YELLOW reflection rays of interest are emanating from, in this case from panels near the southwest corner.

Figure 7 Example Solar Glare Output Plots (SGHAT Software Output)

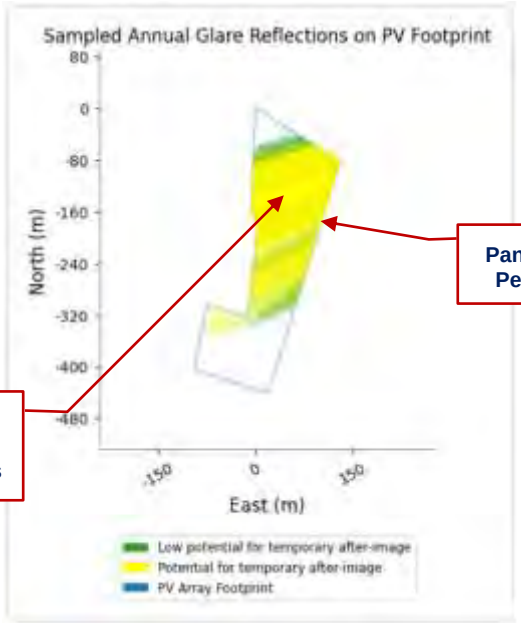
A.



B.



C.



4.4 Other Factors Relevant to Glare Prediction

Weather

SGHAT model calculations (and indeed all commercially available glare models) assume CLEAR skies all year round.

Sky conditions in Merredin are mostly cloudy or overcast at least 14% of the time throughout the year[1]. This means that the total annual minutes of duration for any potential glare conditions predicted using SGHAT (or any "clear sky" glare model) should be reduced by an appropriate "overcast" factor, resulting in lower overall annual impacts.

- This however would only reduce the likely cumulative impact over the entire year.
- The maximum duration of glare on any one day predicted by SGHAT would not be affected.

Terrain

Terrain features such as natural obstacles (vegetation, tree lines, etc) are not explicitly considered within SGHAT.

These however can be added to the simulation as so-called SGHAT "Obstructions" which can model vegetation/tree lines for example as solid, screening walls.

- In this case, if vegetation was modelled an SGHAT "obstruction", it would be implied that the vegetation has all-year-round dense coverage (i.e. evergreen species).

Topography

While topography is taken into account within SGHAT in terms of the placement (elevation) of solar panels and surrounding aerodrome features (landing glide paths, ATCT heights, etc), the potential blockage benefits of any intervening topography are not modelled within SGHAT.

This can only be overcome by an examination of the Viewshed Analysis often undertaken for such projects, which reveals which surrounding receivers (roadways, houses, etc) will be able to actually "see" the solar panels within a proposed facility and hence experience any potential reflections.

Alternatively, the "Elevation Profile" function available in Google Earth (or alternative mapping tools) may be able to identify surrounding receivers which do not have an unobstructed view of the proposed facility due to intervening topographic features.

[1] *https://weatherspark.com/y/131993/Average-Weather-in-Merredin-Western-Australia-Australia-Year-Round*

5.0 Glare Impacts

5.1 Modelling Inputs

Panel Sub-Arrays

The Project was modelled as two smaller “Sub-Arrays” – refer **Figure 8**.

- This was done to better follow the terrain of the site and give more detailed information as to which specific sub-areas of the proposed facility were responsible for potential glare occurrences.

Figure 8 Modelling of Project PV Sub-Arrays 1-2



Image: Google Earth

Consideration of the Potential for Aviation Glare

Merredin Airport is approximately 9 km to the east of the project site. It has two runways running approximately north-south and east-west. At this distance aircraft on final approach would not be impacted by any reflective glare. Further, there is no air traffic control tower at the airport. Accordingly, the assessment of aviation glare is not required for the assessment.

Road, Rail and Residential Receptors

The road receptors included in the analysis are shown in **Figure 9**. The observer viewing heights were based on the expected vehicle categories, as follows:

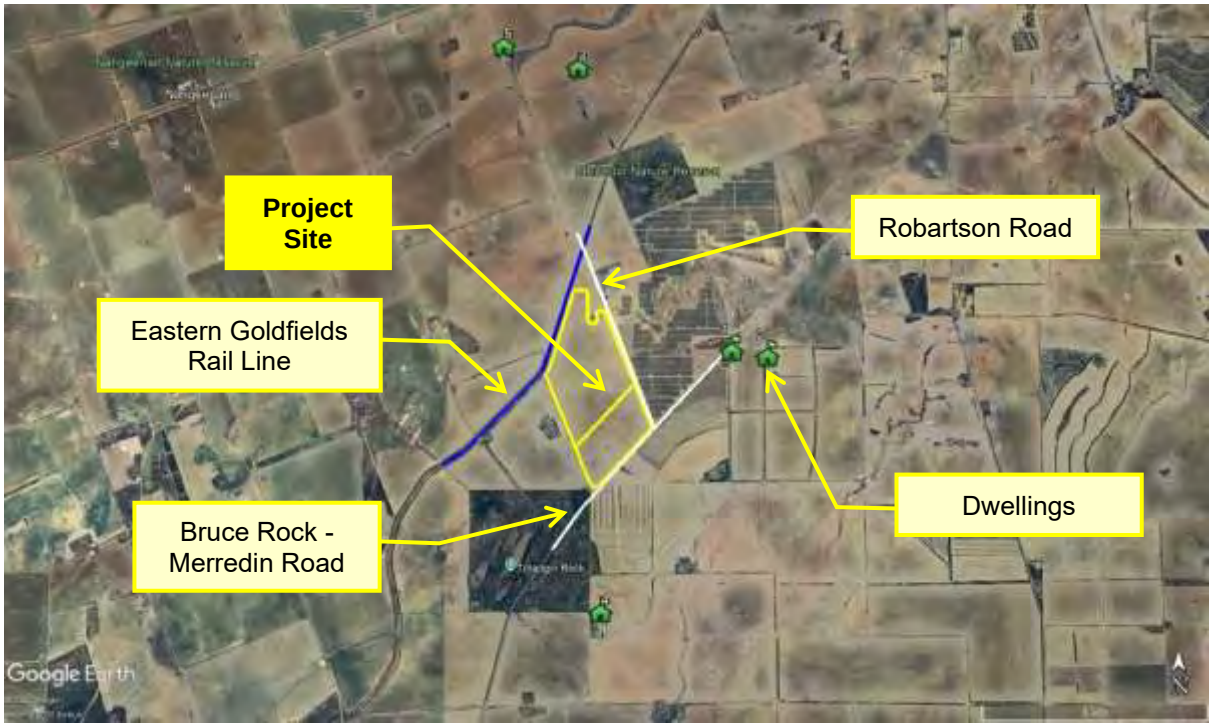
- 2.3 m for Bruce Rock - Merredin Road (heavy vehicles expected).
- 1.8 m for Robartson Road (passenger vehicles and medium trucks, vans, etc)
- 3 m for the Eastern Goldfields Rail Line

The representative dwellings included in the analysis are also shown in **Figure 9**.

- For surrounding residential dwellings, the observer height was set at 1.5 m above the ground. SLR notes that additional stakeholder engagement dwellings were received. Some of these have not been included when they are behind an included dwelling

The latitude and longitude coordinates of the representative residential locations shown in **Figure 9** can be found in **Appendix A**.

Figure 9 Surrounding Road and Residential Receptor Locations



5.2 Modelling Staging Methodology

The modelling study involved the following stages:

Stage 1 Baseline Scenario

- Calculations made with a Rest Angle of 0°
- NO existing vegetation included in the model
- Minimum altitude angle of the sun is 2°.
- Assessment made of Incidence Angle, duration of glare conditions, etc

Stage 2 Design Operational Scenarios

- Modelling to assess the final design options, including existing and planned vegetation screening
- Assessment of influence of Rest Angle.

5.3 Stage 1 - Baseline Modelling

5.3.1 "Baseline" Model Assumptions

For the "Baseline" model simulation, the following assumptions were made:

- The Project was modelled using the sub-arrays shown in **Figure 8**.
- The Rest Angle assumed was **0°**.
- The panel median height was as per **Section 2.2**.
- **No vegetation or other screening** (eg buildings) was included in the model.
  - This includes the existing vegetation.
- **No allowance** was made for the impact of **intervening sections of topography** which could obscure the view of the facility for passing motorists or residences.

This run was designed to give an initial indication of potential locations of glare prior to considering screening and topographic influences and the need for mitigation.

Table 3 Annual Minutes of SGHAT YELLOW Glare (Baseline Simulation)

Rest Angle = 0°

Receptor	PV Sub-Array – refer Fig.8		Yearly Total
	1	2	
Bruce Rock – Merredin Road			
Robartson Road		1,265	**1,265**
Eastern Goldfields Rail Line			
Dwelling 1			
Dwelling 2			
Dwelling 3			
Dwelling 4			
Dwelling 5			

5.3.2 Baseline Model Results Summary

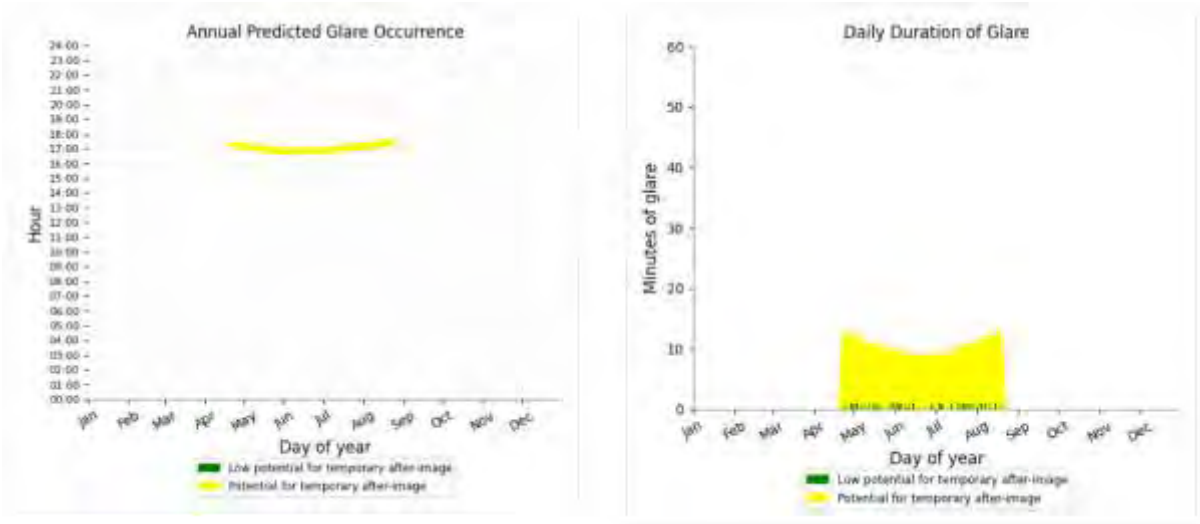
Road Traffic Disability Glare

- 1,265 minutes of Yellow SGHAT glare was predicted annually for vehicles travelling north on Robartson Road.
    - o This occurred in the late afternoon from mid April till August between 4:30 and 5:45 pm for a maximum of 13 minutes per day (Refer **Figure 10**)
- NIL glare was predicted for Bruce Rock – Merredin Road.
- NIL glare was predicted for the Eastern Goldfields Rail Line.

Residential Nuisance Glare

- NIL glare was predicted for all assessed residential dwellings.

Figure 10 Baseline Glare Occurrences for Robartson Road



5.3.3 Further Analysis of the Baseline Results

Relevance of Angle of Incidence for Reflections

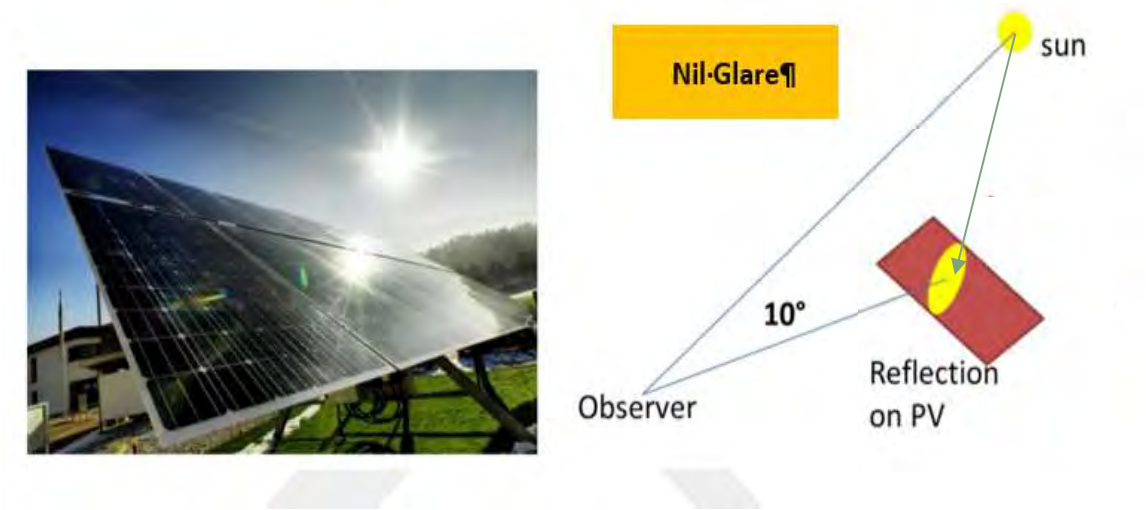
The SGHAT YELOW category reflections predicted in the Baseline simulations were examined further to assess whether they would constitute Disability Glare.

The context of this assessment was made in light of the observation made in **Section 3**, where it was noted that for very high incidence angles, it would almost always be the case that an observer would perceive reflections coming from virtually the same direction as the incoming solar rays themselves.

Such a condition would not constitute a glare situation as the intensity of the incoming solar ray itself would dominate the field of vision perceived by the observer.

In fact, this latter condition has evolved into a globally adopted “acceptability” glare axiom, namely that a glare condition can only exist if the angle difference between an incoming solar ray and its associated reflection is greater than approximately 10° – refer **Figure 11.**

Figure 11 Nil Glare Condition Applicable to High Incidence Angle Reflections



SLR has examined the predicted reflections onto the roads surrounding The Project in the above context. This effect is illustrated in the image below from Google Streetview.

Figure 12 Example of Low Altitude Rays

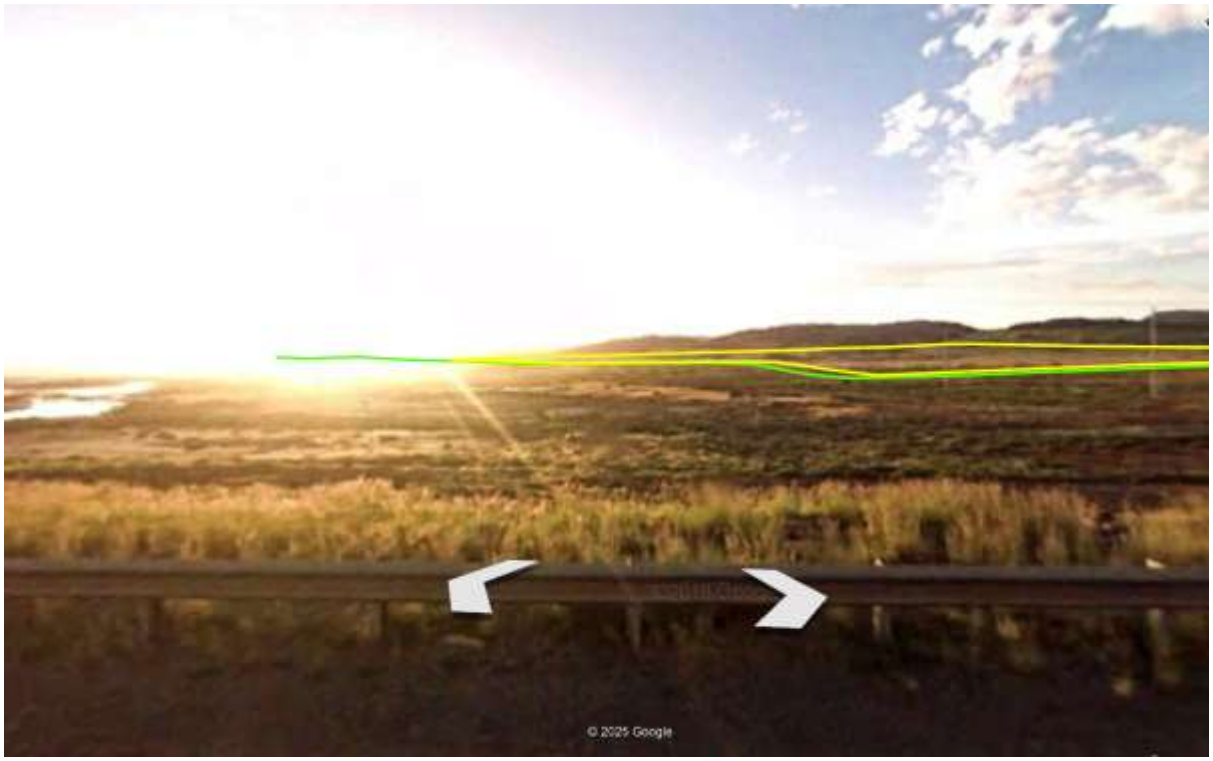


Image: Google

Robartson Road

- Reflections impacting Robartson Road occur with:
  - Altitude Angles up to 4.6°; and
  - Incidence Angles down to 82.7°.
- The “High Incidence Angle” condition shown in **Figure 11** can be applied to more than half of the occurrences and discounted.

Figure 13 Baseline Scenario - Altitude and Incidence Angles – Robartson Road



5.4 Stage 2 - Mitigation Modelling

While many of the reflections on Robartson Road discussed above can be discounted using the high incidence angle condition, SLR has investigated whether the remaining reflections can be reduced or eliminated. The presence of remnant vegetation along the west side of Robartson Road is also noted. While not continuous it is not insignificant and would provide some screening for the project.

5.4.1 Mitigation Model Assumptions

For the mitigation model simulation, the following assumptions were made:

- The Project was modelled using the sub-arrays shown in **Figure 8**.
- The Rest Angles assumed was 5°.
- The panel median height was as per **Section 2.2**.
- **No vegetation or other screening** (eg buildings) was included in the model.
- **No allowance** was made for the impact of **intervening sections of topography** which could obscure the view of the facility for passing motorists or residences.

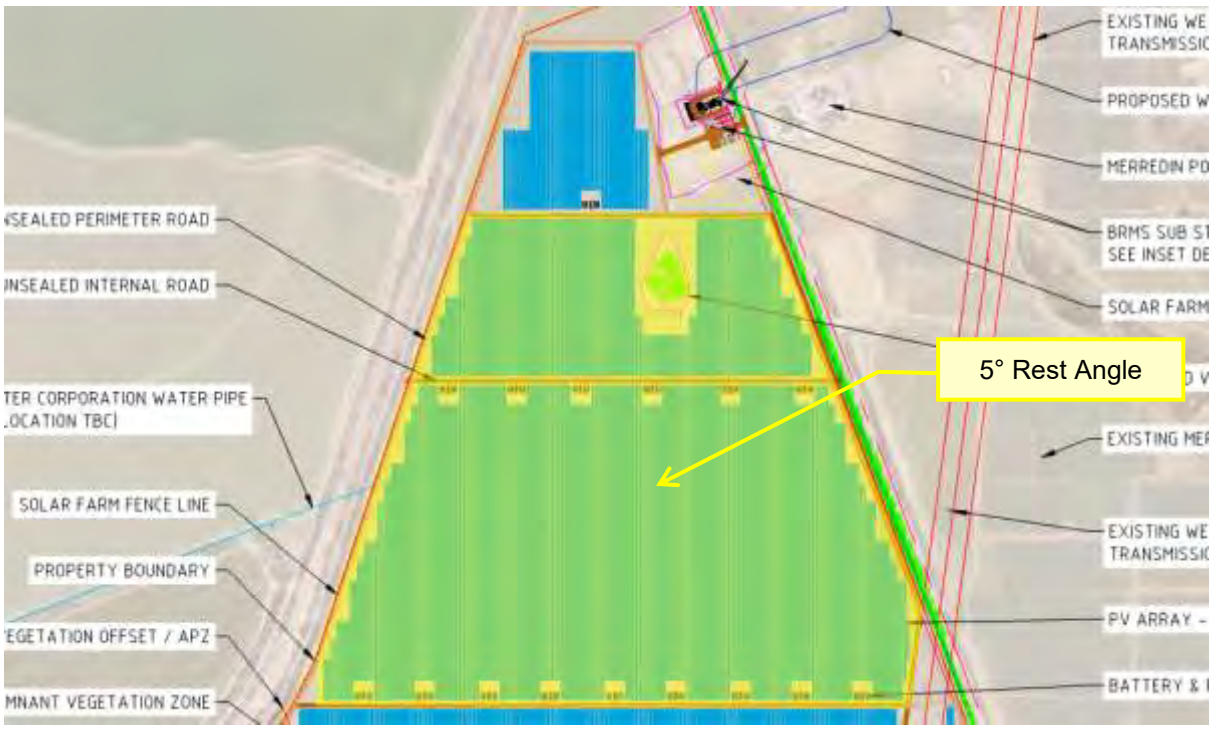
5.4.2 Summary

Road Traffic Disability Glare

- NIL SGHAT glare was predicted on Robartson Road.

A 5° rest angle could be applied to the area highlighted in **Figure 14** to eliminate all instances of glare. The 5° rest angle would only need to be applied in the afternoon between mid-April and the end of August. No restriction of Rest Angle would be needed for the mornings all-year-round.

Figure 14 Area for Mitigation



BRM Solar Farm Nominee Pty Ltd c/- Nomad Energy Pty Ltd have indicated a desire to initially retain standard tracker operations and conservative elements of the model such as the expected reduction factors for cloud cover, the mitigation strategy for the facility could involve a review being conducted once construction is complete to confirm whether glare is observed during the impact times/dates found by the assessment. If the occurrence of glare is confirmed, the 4-month (mid-April to August), afternoon 5° rest angle mitigation could then be applied or further vegetation screening implemented.

Appendix A Residential Receiver Coordinates

Ngaangk Boodja Battery & Solar Farm

Glint and Glare Assessment

BRM Solar Farm Nominee Pty Ltd c/- Nomad Energy Pty Ltd

SLR Project No.: 640.032254.00001

4 December 2025

Revision: R01-v0.4

The latitude and longitude coordinates, and elevation heights of the representative locations examined in this study are shown in **Table A-1**. OP stands for “Observation Point”.

Table A-1: Latitude and Longitude of Sensitive Receivers Surrounding Site

Number	Latitude	Longitude	Ground elevation	Height above ground	Total Elevation
	deg	deg	m	m	m
OP 1	-31.550162	118.243916	337.75	1.50	339.25
OP 2	-31.550788	118.249176	343.10	1.50	344.60
OP 3	-31.515007	118.222027	296.94	1.50	298.44
OP 4	-31.581176	118.224906	308.71	1.50	310.21
OP 5	-31.512310	118.211144	293.03	1.50	294.53



Making Sustainability Happen

APPENDIX G
Noise Assessment

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Environmental Noise Assessment - Ngaangk Boodja Battery & Solar Farm

Lot 19448 & Lot 27381 Robartson Road, Merredin, WA

Reference: 251010838-01B

Prepared for:
BRM SOLAR FARM NOMINEE PTY LTD as Trustee for the BRM SOLAR FARM TRUST

Reference: 251010838-01B

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Date	Rev	Description	Author	Verified
1-Dec-25	0	Issued to Client	Rob Connolly	Terry George
16-Dec-25	A	Minor Changes	Rob Connolly	-
16-Dec-25	B	Minor Changes	Rob Connolly	-

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EXECUTIVE SUMMARY

Lloyd George Acoustics was engaged by BRM SOLAR FARM NOMINEE PTY LTD as Trustee for the BRM SOLAR FARM TRUST, to undertake an environmental noise assessment for a proposed Solar Farm & Battery Energy Storage System (BESS) to be located at Lot 19448 & Lot 27381 Robartson Road, Merredin, WA.

With regard to noise emissions, consideration was given to noise from the proposed 124 decentralised Sungrow battery energy storage systems (BESS), 31 decentralised Power Conversion Systems (PCS) Skids (each skid incorporating six (6) individual inverters & 1 x MVA medium voltage transformer (MVT)), as well as one 153 MVA potential high voltage (HV) substation which will be capped at 100 MVA at neighbouring properties, against the prescribed standards of the *Environmental Protection (Noise) Regulations 1997*.

Calculations based on the data provided show that compliance can be practicably achieved at all identified receivers by implementing the compliant operational modes shown in *Table 7-1*. Specific noise control measures may be required (*if tonality is present*) for compliance to be achieved at R3 & R4, which may include reducing the sound power of BESS containers by 4 dB by either reducing the running speed or installing a noise mitigation kit.

Given the distances between the BESS and NSR's, there is a reasonable possibility that tonality may not be evident and may not be applicable as a noise characteristic penalty. This will be in part dependent on current background noise levels, which are unknown as no noise monitoring has been undertaken. This could however be assessed post construction, with a noise mitigation plan to be implemented if the tonality is evident.

1. INTRODUCTION

Lloyd George Acoustics was engaged by BRM SOLAR FARM NOMINEE PTY LTD as Trustee for the BRM SOLAR FARM TRUST to undertake an environmental noise assessment for a Solar Farm & Battery Energy Storage System (BESS) to be located at Lot 19448 & Lot 27381 Robartson Road, Merredin, WA - refer *Figure 1-1*.

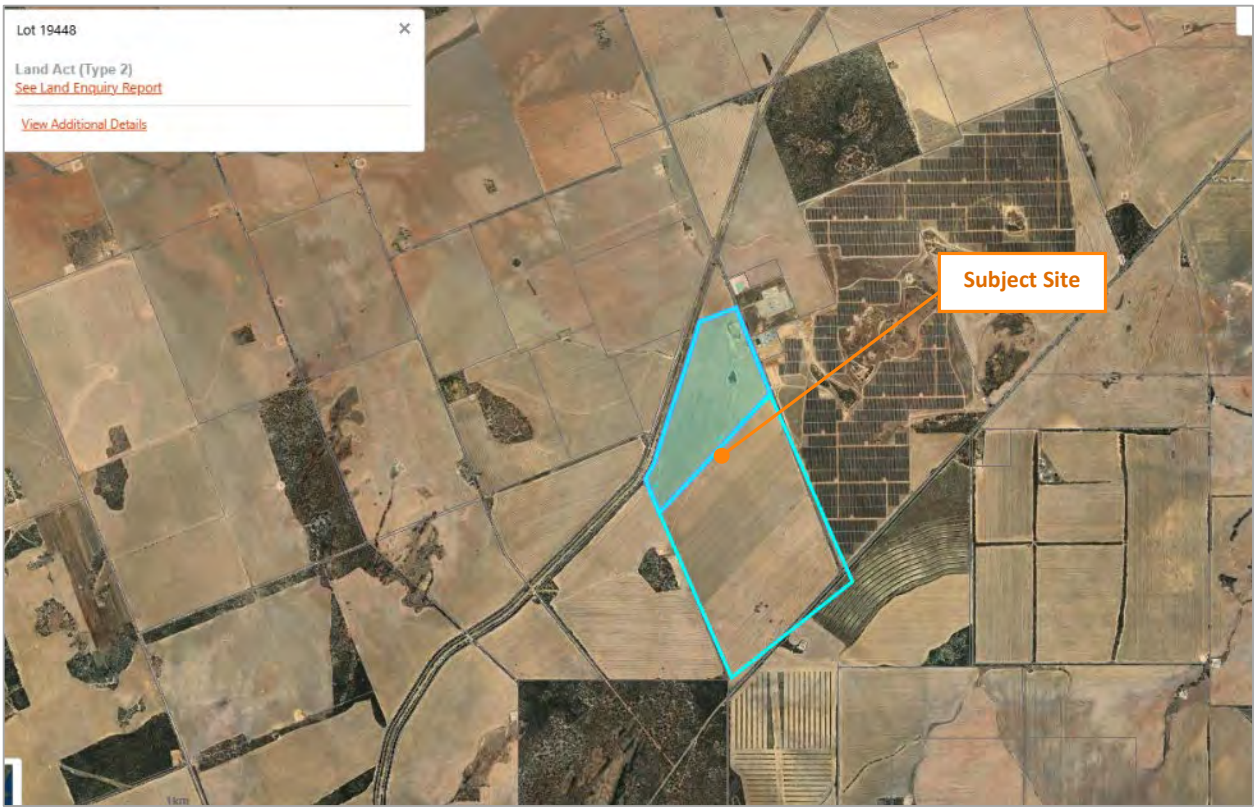


Figure 1-1: Subject Site Location (Source: DPLH PlanWA)

This facility will comprise of up to 124 decentralised Sungrow battery energy storage systems (BESS) held in containers, 31 decentralised Power Conversion Systems on skids (each skid incorporating six (6) individual inverters & 1 x MVA medium voltage transformer (MVT)), as well as one 125 MVA potential high voltage (HV) substation which will be capped at 100 MVA. HVAC is included within the plant containers to assist with cooling the equipment, as well as high speed rpm fans on each battery pack. Fan speeds of 100 percent are considered only likely in extreme heat and load conditions during daytime and evening operations. This report considers two scenarios based on noise data for each running condition supplied by Sungrow. A site plan is attached in *Appendix A*.

With regard to noise emissions, consideration is given to noise from the proposed BESS containers, PCS skids containing inverters and MVT's, as well as 100 MVA (capped) substation at neighbouring properties, against the prescribed standards of the *Environmental Protection (Noise) Regulations 1997*.

Appendix B contains a description of some of the terminology used throughout this report.

2. CRITERIA

Environmental noise in Western Australia is governed by the *Environmental Protection Act 1986*, through the *Environmental Protection (Noise) Regulations 1997* (the Regulations) as follows:

"7. Prescribed standard for noise emissions

(1) Noise emitted from any premises or public place when received at other premises –

(a) must not cause, or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind; and

(b) must be free of –

(i) tonality; and

(ii) impulsiveness; and

(iii) modulation,

when assessed under regulation 9.

(2) For the purposes of subregulation (1)(a), a noise emission is taken to significantly contribute to a level of noise if the noise emission … exceeds a value which is 5 dB below the assigned level at the point of reception."

Tonality, impulsiveness and modulation are defined in regulation 9 (refer *Appendix B*). Under regulation 9(3), *"Noise is taken to be free of the characteristics of tonality, impulsiveness and modulation if -*

(a) the characteristics cannot be reasonably and practicably removed by techniques other than attenuating the overall level of noise emission; and

(b) the noise emission complies with the standard prescribed under regulation 7(1)(a) after the adjustments in the table [Table 2-1] … are made to the noise emission as measured at the point of reception."

Table 2-1: Adjustments Where Characteristics Cannot Be Removed

Where Noise Emission is Not Music*			Where Noise Emission is Music	
Tonality	Modulation	Impulsiveness	No Impulsiveness	Impulsiveness
+ 5 dB	+ 5 dB	+ 10 dB	+ 10 dB	+ 15 dB

* These adjustments are cumulative to a maximum of 15 dB.

The assigned levels (prescribed standards) for all premises are specified in regulation 8(3) and are shown in *Table 2-2*. The L_{A10} assigned level is applicable to noises present for more than 10% of a representative assessment period, generally applicable to "steady-state" noise sources. The L_{A1} is for short-term noise sources present for less than 10% and more than 1% of the time. The L_{Amax} assigned level is applicable for incidental noise sources, present for less than 1% of the time.

Table 2-2: Baseline Assigned Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: highly sensitive area[1]	0700 to 1900 hours Monday to Saturday (Day)	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays (Sunday)	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days (Evening)	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	35 + influencing factor	45 + influencing factor	55 + influencing factor
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80
Commercial Premises	All hours	60	75	80
Industrial and Utility Premises	All hours	65	80	90

1. ***highly sensitive area*** means that area (if any) of noise sensitive premises comprising —
   (a) a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
   (b) any other part of the premises within 15 metres of that building or that part of the building.

The influencing factor (IF), in relation to noise received at noise sensitive premises (refer *Figure 3-2*), has been calculated as 0 dB. *Table 2-3* shows the determined assigned levels at the receiving locations.

Table 2-3: Assigned Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
R1 - R5 0 dB IF Noise sensitive premises: highly sensitive area[1]	0700 to 1900 hours Monday to Saturday (Day)	45	55	65
	0900 to 1900 hours Sunday and public holidays (Sunday)	40	50	65
	1900 to 2200 hours all days (Evening)	40	50	55
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	35	45	55
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80
R6 & R7 Industrial and Utility Premises	All hours	65	80	90

1. highly sensitive area means that area (if any) of noise sensitive premises comprising —
(a) a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
(b) any other part of the premises within 15 metres of that building or that part of the building.

It must be noted the assigned levels above apply outside the receiving premises and at a point at least 3 metres away from any substantial reflecting surfaces.

The assigned levels are statistical levels and therefore the period over which they are determined is important. The Regulations define the Representative Assessment Period (RAP) as "*a period of time of not less than 15 minutes, and not exceeding 4 hours*, *determined by* an *inspector* or *authorised person to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission*". An inspector or authorised person is a person appointed under Sections 87 & 88 of the *Environmental Protection Act 1986* and include Local Government Environmental Health Officers and Officers from the Department of Water Environmental Regulation. Acoustic consultants or other environmental consultants are not appointed as an inspector or authorised person. Therefore, whilst this assessment is based on a 4-hour RAP, which is assumed to be appropriate given the nature of the operations, this is to be used for guidance only.

3. METHODOLOGY

Computer modelling has been used to predict the noise emissions from the development to all nearby receivers. The software used was *SoundPLAN 9.1* with the CONCAWE algorithms selected, as they include the influence of meteorological conditions. Input data required in the model are listed below and discussed in *Section 3.1* to *Section 3-4.*

- Meteorological Information;
- Topographical data;
- Ground Absorption; and
- Source sound power levels.

3.1. Meteorological Conditions

Meteorological information utilised is provided in *Table 3-1* and is considered to represent worst-case conditions for noise propagation. At wind speeds greater than those shown, sound propagation may be further enhanced, however background noise from the wind itself and from local vegetation is likely to be elevated and dominate the ambient noise levels.

Table 3-1: Modelling Meteorological Conditions

Parameter	Day (7.00am to 7.00pm)[2]	Night (7.00pm to 7.00am)[2]
Temperature (°C)	20	15
Humidity (%)	50	50
Wind Speed (m/s)	4	3
Wind Direction[1]	All	All
Pasquil Stability Factor	E	F

Notes:
1. The modelling package allows for all wind directions to be modelled simultaneously.
2. The conditions above are as defined in *Guideline: Assessment of Environmental Noise Emissions*; May 2021

Alternatives to the above default conditions can be used where one year of weather data is available and the analysis considers the worst 2% of the day and night for the month of the year in which the worst-case weather conditions prevail (source: *Draft Guideline on Environmental Noise for Prescribed Premises*, May 2016). In most cases, the default conditions occur for more than 2% of the time and therefore must be satisfied.

3.2. Topographical Data

Topographical data was adapted from publicly available information (e.g. *Google*) in the form of spot heights and combined with the site plan.

Surrounding existing buildings were also incorporated in the noise model, as these can provide noise shielding as well as reflection paths. Receivers are modelled 1.4m above ground level. No site perimeter walls are included in the modelling.

Figure 3-1 shows a 3D overview of the noise model, with *Figure 3-2* showing a 2D overview with the nearest residential and industrial receivers to the noise emitting equipment included in the model.



Figure 3-1: 3D Overview of Nearfield Noise Model

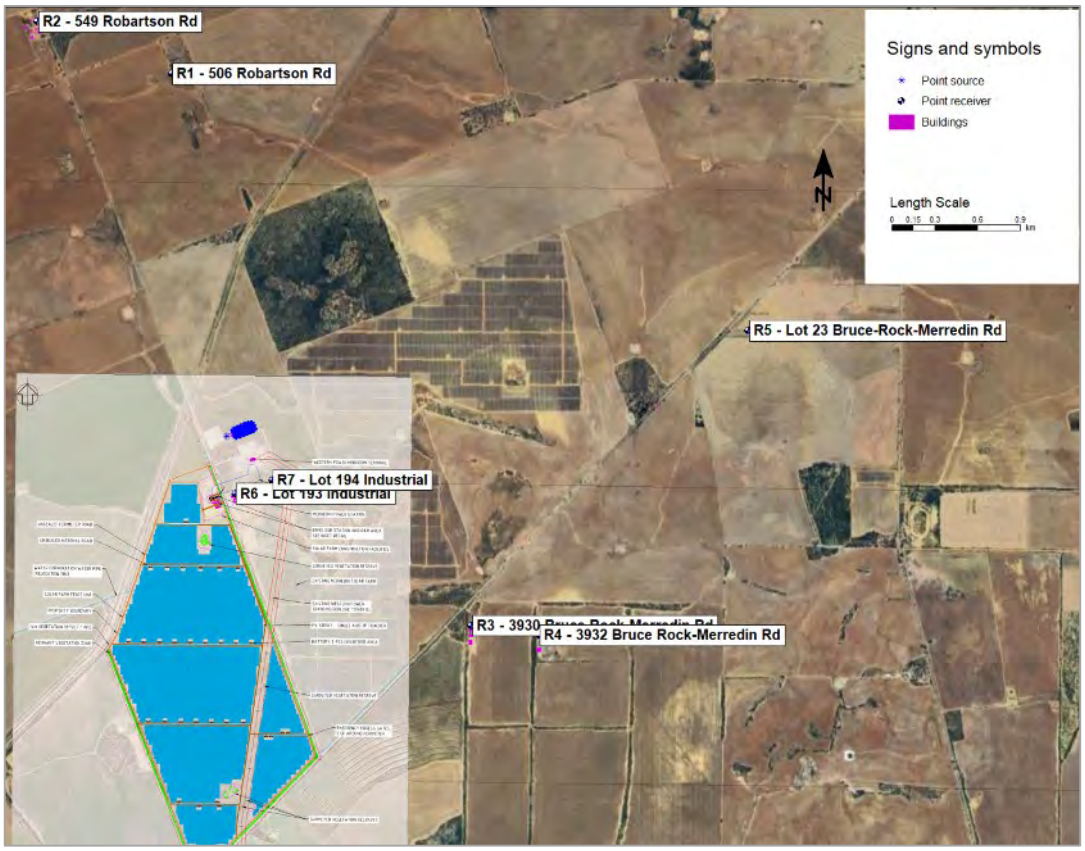


Figure 3-2: Overview of Nearest Residences

3.3. Ground Absorption

The ground absorption has been assumed to be 0.7 (70%) as an average as it is predominantly paddocks and forest, noting that 0.0 represents hard reflective surfaces such as water and 1.0 represents absorptive surfaces such as grass.

3.4. Source Sound Levels

The source sound power levels for the BESS containers & PCS's were derived from SPL dB (A) @ 1 metre distance data provided by Sungrow and converted to Sound Power (L_w dB(A)). The sound power levels for the transformers were derived from *AS2374-2003: Power transformers Minimum Energy Performance Standard (MEPS) requirements for distribution transformers* and are provided in *Table 3-2*.

Table 3-2: Source Sound Power Levels, dB

Description	Octave Band Centre Frequency (Hz)								Overall dB(A)
	63	125	250	500	1k	2k	4k	8k	
Sungrow BESS running at 100 percent, (124 off)	77	87	84	93	87	85	83	76	**93**
Sungrow PCS skid Inverters (6 inverters on each PCS skid running at 80 percent, (31 PCS meaning 186 Inverters off)	74	79	85	80	74	81	88	69	**90**
Sungrow PCS skid (6 inverters on each running at 60 percent, (31 PCS meaning 186 Inverters off)	72	77	82	77	71	76	84	66	**86**
MVA Auxiliary Transformer, (31 off)	78	80	75	75	69	64	59	52	**75**
100 MVA (Capped) Main Sub Station Transformer	105	107	102	102	96	91	86	79	**102**

The following is noted in relation to *Table 3-2*:

- Each BESS & PCS unit is modelled as an omni-directional point source at a height of 2.9 m AGH;
- Each MVT & HVT Substation unit is modelled as an omni-directional pointe source at height 2.5m AGH;
- Sound power for BESS and Inverters is based on converted and calibrated data supplied for SPL @ 1 metre distance by Sungrow;
- All noise sources are assumed to be L_{A10} unless noted otherwise;
- All sources are modelled to be operating concurrently;
- All noise sources are in uncovered areas;
- During operations, an L_{10} parameter has been used as these operations are predicted to occur for more than 24-minutes in a 4-hour period.

4. RESULTS

Currently the daytime & evening scenario allows for up to 100 percent BESS run speed & 80 percent PCS/Inverters run speed, whilst the night-time scenario allows for 100 percent BESS run speed & 60 percent PCS/Inverters run-speed, due in main to the cooler night-time conditions. The noise levels were predicted for two scenarios:

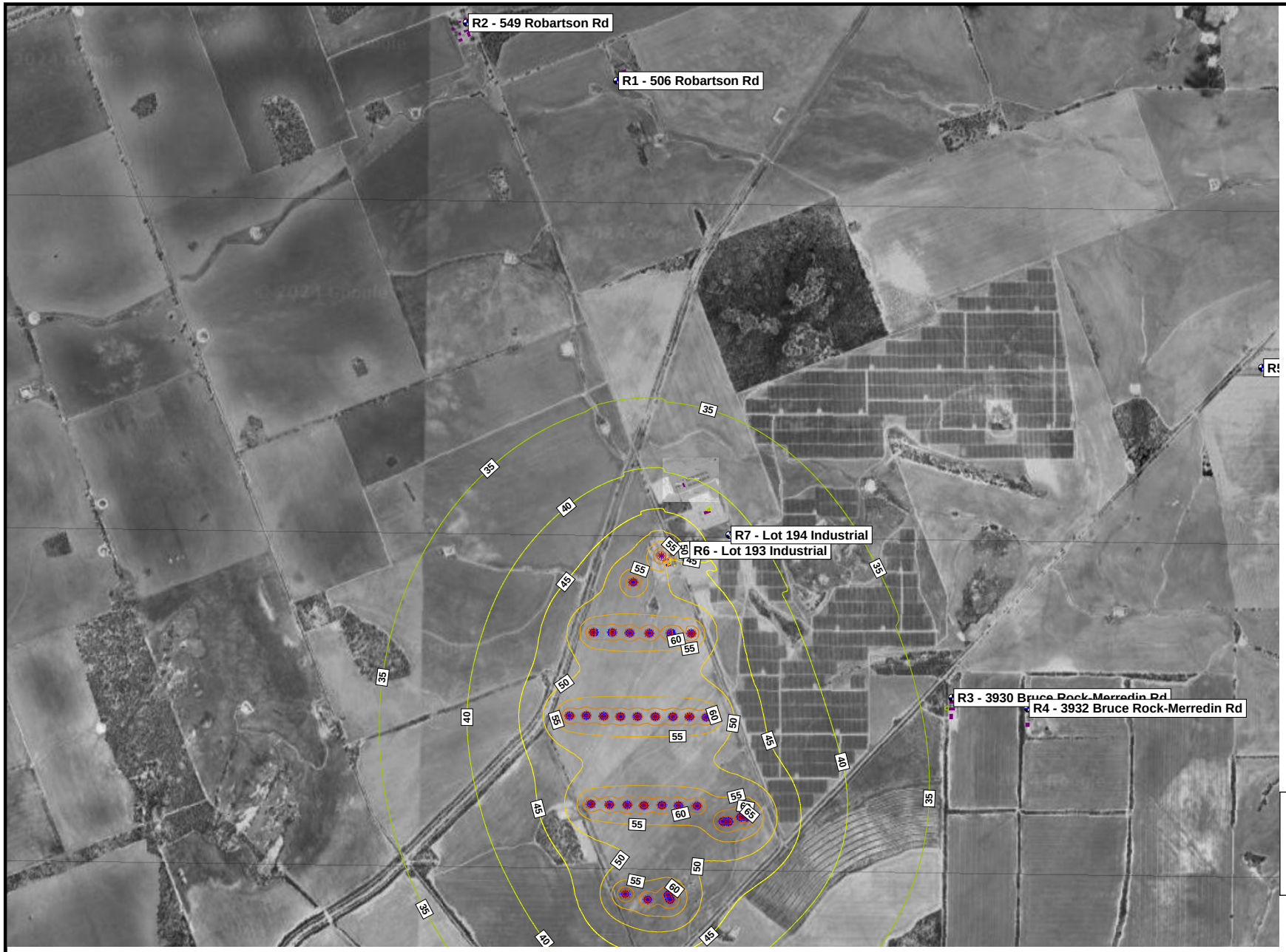
- Scenario 1: Daytime/Evening Meteorological Conditions - Normal Operations with Run Speeds of up to 100 percent – All BESS 100 percent, all PCS/Inverters 80 percent, MV transformer and HV transformer substation concurrently operating (L_{10}).
- Scenario 2: Night-time Metrological Conditions - Normal Operations with Run Speeds of up to 100 percent – All BESS 100 percent, all PCS/Inverters 60 percent, MV transformer and HV transformer substation concurrently operating (L_{10}).

The results for Scenarios 1 and 2 are provided in *Table 4-1*. Noise contour plots are also provided in *Figure 4-1* and *Figure 4-2* showing noise levels at ground floor.

Table 4-1: Scenario 1 and 2 Predicted Levels, dB(A)

Receiver	Scenario 1 (L_{10})	Scenario 2 (L_{10})
R1- 506 Robartson Rd	22	23
R2 - 549 Robartson Rd	20	20
R3 - 3930 Bruce Rock-Merredin Rd	34	34
R4 - 3932 Bruce Rock-Merredin Rd	31	31
R5 - Lot 23 Bruce-Rock-Merredin Rd	20	21
R6 - Lot 193 Industrial	48	48
R7 - Lot 194 Industrial	39	39

Figure 4-1



Predicted Noise level L_{A10} dB

- = 35
- = 40
- = 45
- = 50
- = 55
- = 60
- = 65
- = 70
- = 75

N

Signs and symbols

- Point source
- Point receiver
- Building

Scale 1:35000

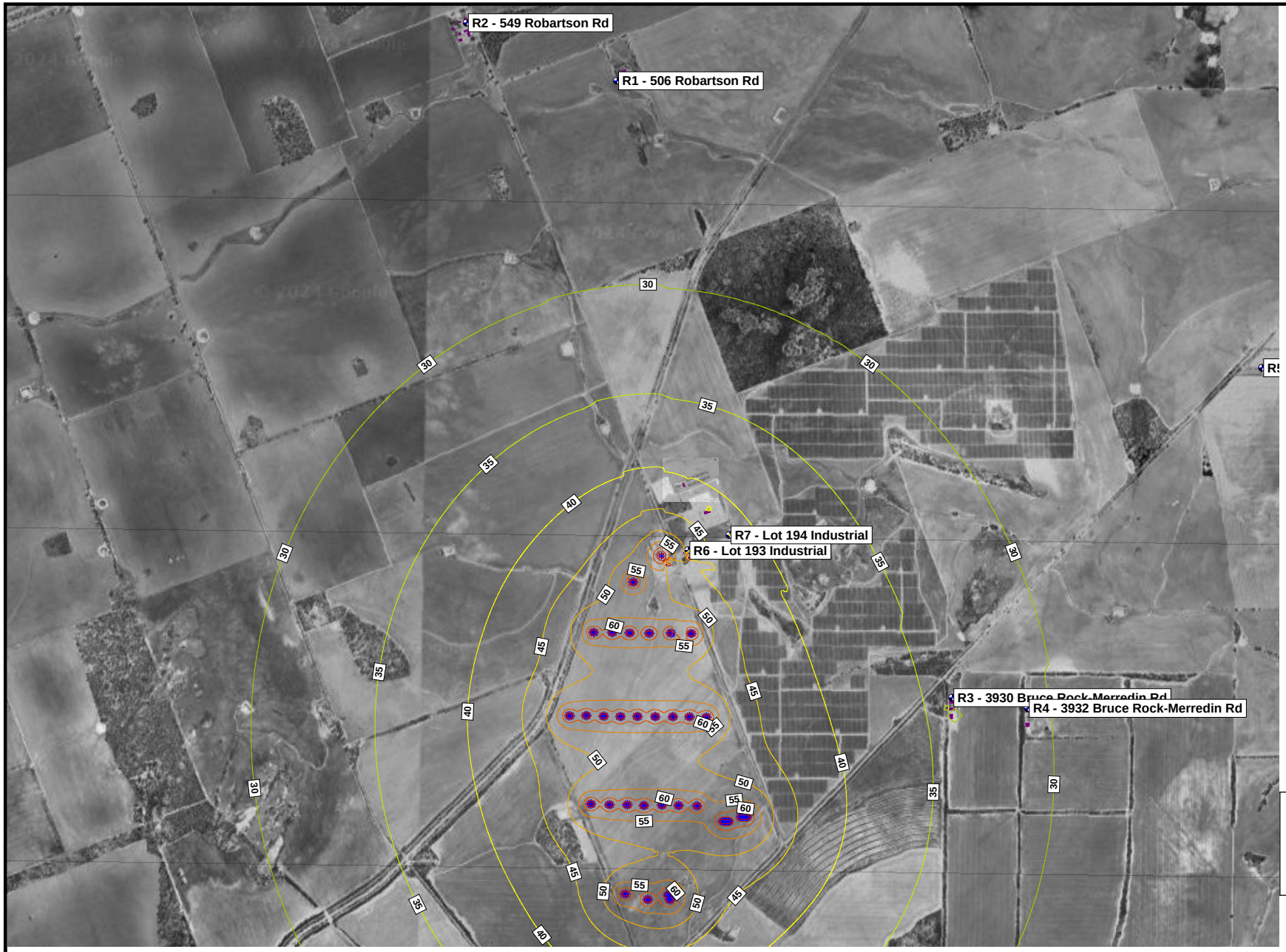
0 0.2 0.4 0.8 1.2

Ngaank Boodja Battery & Solar Farm – Daytime Operations - Scenario 1 Run Speeds - Predicted Noise Levels

L_{A10} Noise Level Contours - All BESS+PCS/Inverters/MVT's & HVT Substation Plant Only - No Tonality Penalty Included - 1.5m Above G

Lloyd George Acoustics
by Rob Connolly
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(61) 410 107 440

Figure 4-2



Predicted Noise level L_{A10} dB

- = 30
- = 35
- = 40
- = 45
- = 50
- = 55
- = 60
- = 65
- = 70

N

Signs and symbols

- Point source
- Point receiver
- Building

Scale 1:35000

0 0.2 0.4 0.8 1.2

Ngaank Boodja Battery & Solar Farm – Night-time Operations - Scenario 2 Run Speeds - Predicted Noise Levels

L_{A10} Noise Level Contours - All BESS+PCS/Inverters/MVT's & HVT Substation Plant Only - No Tonality Penalty Included - 1.5m Above Ground

Lloyd George Acoustics
by Rob Connolly
rob@lgacoustics.com.au
(61) 410 107 440

5. ASSESSMENT

5.1. Scenario 1 – Daytime/Evening Operation

Table 5-1 provides the noise levels for Scenario 1, for worst-case daytime and evening operations. Intrusive noise characteristics are allowed for, which includes an adjustment to the noise levels of +5 dB for possible tonal characteristics. It is noted that intrusive characteristics are generally less detectable during the daytime period due to higher background noise. Therefore, this adjustment can be considered to be a conservative inclusion, especially given the distance to the residential noise sensitive receivers (NSR's).

Table 5-1: Scenario 1 Daytime/Evening Assessment, dB L_{A10}

Receiver	Predicted Total	Adjusted Level*	Assigned Day Level	Assigned Sunday/Evening Level	Assessment
R1- 506 Robartson Rd	22	27	45	40	*Complies / Complies*
R2 - 549 Robartson Rd	20	25	45	40	*Complies / Complies*
R3 - 3930 Bruce Rock-Merredin Rd	34	39	45	40	*Complies / Complies*
R4 - 3932 Bruce Rock-Merredin Rd	31	36	45	40	*Complies / Complies*
R5 - Lot 23 Bruce-Rock-Merredin Rd	20	25	45	40	*Complies / Complies*
R6 - Lot 193 Industrial	48	53	65	65	*Complies / Complies*
R7 - Lot 194 Industrial	39	44	65	65	*Complies / Complies*

* Adjusted by + 5 dB for tonality

As shown in *Table 5-1,* compliance is achieved during the daytime & evening at all identified receivers.

5.2. Scenario 2 – Night-time Operation

Table 4-2 provides the noise levels for Scenario 2, for normal night-time operations. Intrusive noise characteristics are allowed for, as these may be more detectable during the night-time period due to lower background noise; so noise levels are adjusted by +5 dB for possible tonal characteristics. This noise characteristic may not be detectable however, given the distance to the residential noise sensitive receivers (NSR's).

Table 5-2: Scenario 2 Night-time Assessment, dB L_{A10}

Receiver	Predicted Total	Adjusted Level*	Assigned Night Level	Assessment
R1- 506 Robartson Rd	23	28	35	*Complies*
R2 - 549 Robartson Rd	20	25	35	*Complies*
R3 - 3930 Bruce Rock-Merredin Rd	34	39	35	*+4 dB*
R4 - 3932 Bruce Rock-Merredin Rd	31	36	35	*+1 dB*
R5 - Lot 23 Bruce-Rock-Merredin Rd	21	26	35	*Complies*
R6 - Lot 193 Industrial	48	53	65	*Complies*
R7 - Lot 194 Industrial	39	44	65	*Complies*

* Adjusted by + 5 dB for tonality

As shown in *Table 5-2,* a marginal 1 dB exceedance is predicted at existing dwelling R4 & a 4 dB exceedance at R3. Compliance is achieved during the night time at all other identified receivers.

6. DISCUSSION

Table 6-1 provides a breakdown of the noise contribution of each source group type at the closest and most impacted identified noise sensitive receiver R3 for both operational scenarios. The source group breakdown can be utilised as a tool for identifying which type of plant may need to be to be mitigated. Note that no tonal penalty is applied to the noise levels in *Table 6-1*. It is noted that the BESS are the dominant noise source during both running scenarios. The night-time model meteorological conditions slightly increase the impact from the BESS.

Table 6-1: Breakdown of Noise Source Group Contributions, dB L_{A10}

Receiver	Scenario	BESS	Inverters	HV Transformers	MV Transformers	Total
R3 - 3930 Bruce Rock-Merredin Rd	**1**	**33**	23	10	13	**34**
	2	**34**	20	10	14	**34**

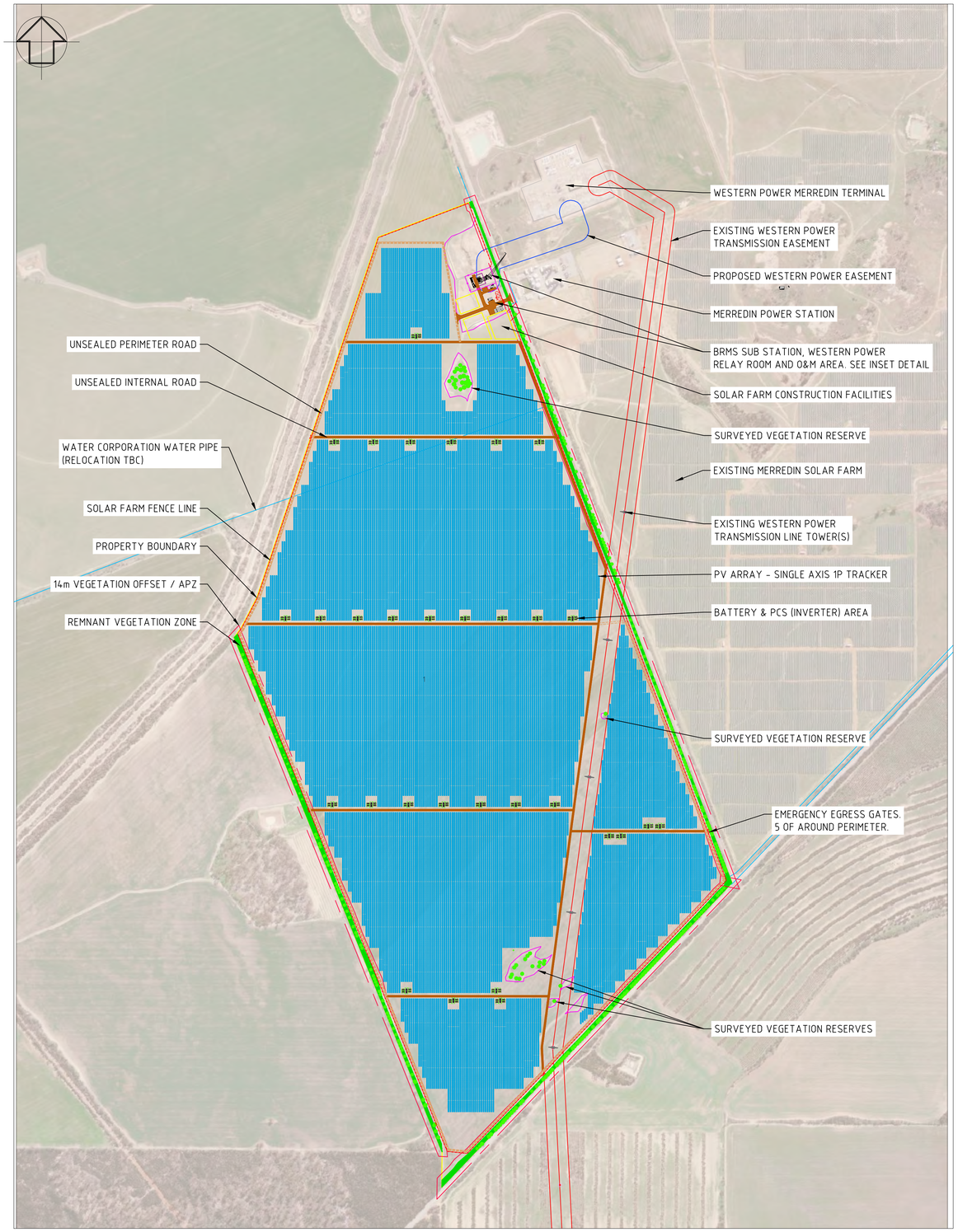
7. CONCLUSION

Calculations based on the data provided show that compliance can practicably be achieved at all identified receivers by implementing the compliant operational modes shown in *Table 7-1*. Specific noise control measures may be required (*if tonality is present*) for compliance to be achieved at R3 & R4, which may include reducing the sound power of BESS containers by 4 dB by either reducing the running speed or installing a noise mitigation kit.

Table 7-1: Compliant Operation Modes

Time Period	6 x Inverters on PCS Skid	BESS	MVT's On PCS Skid	Main HV Substation	Specific Controls
Monday to Saturday 7.00am to 7.00pm	**Up to 80 percent fan speed.** (sound power level to be 90 dB(A) or lower)	**Up to 100 percent fan speed.** (sound power level to be 93 dB(A) or lower)	**Operating up to 100 percent** (sound power level to be 75 dB(A) or lower)	**Operating up to 100 percent** (sound power level to be 102 dB(A) or lower)	**N/A**
Sunday/Public Holiday 9.00am to 10.00pm & Monday to Saturday 7.00pm to 10.00pm	**Up to 80 percent fan speed.** (sound power level to be 90 dB(A) or lower)	**Up to 100 percent fan speed.** (sound power level to be 93 dB(A) or lower)	**Operating up to 100 percent** (sound power level to be 75 dB(A) or lower)	**Operating up to 100 percent** (sound power level to be 102 dB(A) or lower)	**N/A**
Monday to Saturday 10.00pm to 7.00am & Sunday/Public holidays 10.00pm to 9.00am	**Up to 60 percent fan speed.** (sound power level to be 86 dB(A) or lower)	**Reduced Rate fan speed or Noise Mitigated to L_w 89 dB (A).**	**Operating up to 100 percent** (sound power level to be 75 dB(A) or lower)	**Operating up to 100 percent** (sound power level to be 102 dB(A) or lower)	**Reduce Noise Impact @ R3 by 4 dB & R4 by 1 dB using additional noise control measures, reduced running speeds.**

Appendix A – Development Plans



SITE GENERAL ARRANGEMENT SCALE 1 : 7500

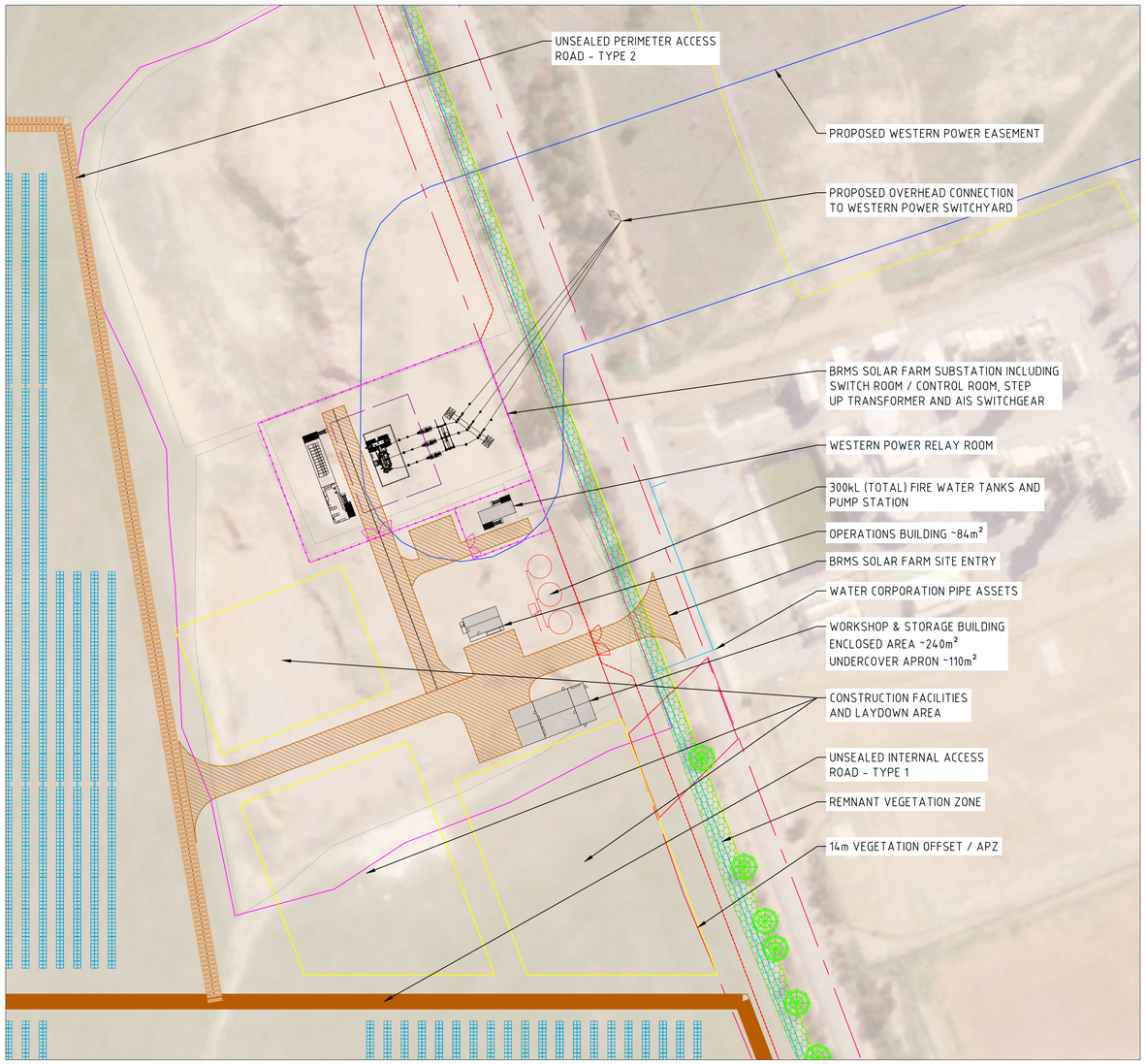
SITE OVERVIEW:

SITE AREA:	~229.5 Ha
FENCED AREA:	~221.6 Ha
SURVEYED VEGETATION AREAS	~1.6 Ha
ASSET PROTECTION ZONE:	14m TBC

SOLAR FARM SYSTEM OVERVIEW:

OVERALL CAPACITY:	
TOTAL PV PLANT (DC):	158.534MWp
TOTAL PV PLANT (AC):	153.450MVA
DC:AC RATIO:	1.033
POWER CONVERSION STATIONS:	
MFR:	SUNGROW
MODEL:	SG 4950UD HV-MV
NAMEPLATE kVA:	4950 kVA
QUANTITY:	31
BATTERY SYSTEM:	
MFR:	SUNGROW
TYPE:	ST 5178 UX
CELL TYPE:	LFP
COOLING:	LIQUID COOLING
CAPACITY (BOL):	5.178MWh
QUANTITY:	124
TOTAL CAPACITY (BOL)	642MWh

PV MODULES:	
MFR:	RISEN
TYPE / MODEL:	TOPCON (RSM132-11-625BNDG)
NAMEPLATE W:	630W (STC FRONTAL)
STRING LENGTH:	28 MODULES
STRING QUANTITY:	8,990
MODULE QUANTITY:	251,720
PV MODULE STRUCTURE:	
TRACKING TYPE:	SINGLE AXIS TRACKER (SAT)
CONFIGURATION:	1 IN PORTRAIT (1P)
MFR:	NEXTRACKER
MODEL:	NX HORIZON
TRACKING RANGE:	+/- 60°
MOTOR POWER SUPPLY:	SELF POWERED (NON PARASITIC)
TRACKER PITCH:	5.80m
TRACKER ORIENTATION:	0.0° AZIMUTH
4 STRING TRACKERS:	1954
3 STRING TRACKERS:	286
2 STRING TRACKERS:	139
1 STRING TRACKERS:	38



SUBSTATION & OPERATIONS AREA SCALE 1 : 1000

SCALE (m) 1 : 7,500 0 20 100 250

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PRELIMINARY

DRAWING NUMBER	DRAWING TITLE
REFERENCE DRAWINGS	

REV	DATE	DESCRIPTION	DRAWN	CHK'D.	APP'D	CLIENT
C	30.10.2025	PRELIMINARY CONCEPT REVISED	SS	AS	AS	
B	24.10.2205	PRELIMINARY CONCEPT REVISED	SS	AS	AS	
A	22.10.2025	PRELIMINARY CONCEPT	SS	AS	AS	

REVISIONS & APPROVALS

PROJECT: BRMS
SITE: MERREDIN W.A.
TITLE: BRUCE ROCK MERREDIN SOLAR & BESS GENERAL ARRANGEMENT

SCALE	SIZE	DRAWING No.	SHEET No.	REV.
1:7500	A1	6682502-G-GAD-001	1 OF 1	C

Appendix B – Terminology

The following is an explanation of the terminology used throughout this report:

- **Decibel (dB)**

The decibel is the unit that describes the sound pressure levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.

- **A-Weighting**

An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. An A-weighted sound level is described as L_A, dB.

- **Sound Power Level (L_w)**

Under normal conditions, a given sound source will radiate the same amount of energy, irrespective of its surroundings, being the sound power level. This is similar to a 1kW electric heater always radiating 1kW of heat. The sound power level of a noise source cannot be directly measured using a sound level meter but is calculated based on measured sound pressure level at known distances. Noise modelling incorporates source sound power levels as part of the input data.

- **Sound Pressure Level (L_p)**

The sound pressure level of a noise source is dependent upon its surroundings, being influenced by distance, ground absorption, topography, meteorological conditions etc. and is what the human ear actually hears. Using the electric heater analogy above, the heat will vary depending upon where the heater is located, just as the sound pressure level will vary depending on the surroundings. Noise modelling predicts the sound pressure level from the sound power levels taking into account ground absorption, barrier effects, distance etc.

- **L_{ASlow}**

This is the noise level in decibels, obtained using the A-frequency weighting and the S (slow) time weighting. Unless assessing modulation, all measurements use the slow time weighting characteristic.

- **L_{AFast}**

This is the noise level in decibels, obtained using the A-frequency weighting and the F (fast) time weighting. This is used when assessing the presence of modulation.

- **L_{APeak}**

This is the greatest absolute instantaneous sound pressure level in decibels using the A-frequency weighting.

- **L_{Amax}**

An L_{Amax} level is the maximum A-weighted noise level during a particular measurement.

- **L_{A1}**

The L_{A1} level is the A-weighted noise level exceeded for 1 percent of the measurement period and is considered to represent the average of the maximum noise levels measured.

- **L_{A10}**

The L_{A10} level is the A-weighted noise level exceeded for 10 percent of the measurement period and is considered to represent the "intrusive" noise level.

- **L_{A90}**

The L_{A90} level is the A-weighted noise level exceeded for 90 percent of the measurement period and is considered to represent the "background" noise level.

- **L_{Aeq}**

The equivalent steady state A-weighted sound level ("equal energy") in decibels which, in a specified time period, contains the same acoustic energy as the time-varying level during the same period. It is considered to represent the "average" noise level.

- **One-Third-Octave Band**

Means a band of frequencies spanning one-third of an octave and having a centre frequency between 25 Hz and 20000 Hz inclusive.

- **Representative Assessment Period**

Means a period of time not less than 15 minutes, and not exceeding four hours, determined by an inspector or authorised person to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission.

- **L_{Amax} assigned level**

Means an assigned level, which, measured as a L_{ASlow} value, is not to be exceeded at any time.

- **L_{A1} assigned level**

Means an assigned level, which, measured as a L_{ASlow} value, is not to be exceeded for more than 1 percent of the representative assessment period.

- **L_{A10} assigned level**

Means an assigned level, which, measured as a L_{ASlow} value, is not to be exceeded for more than 10 percent of the representative assessment period.

- **Tonal Noise**

A tonal noise source can be described as a source that has a distinctive noise emission in one or more frequencies. An example would be whining or droning. The quantitative definition of tonality is:

– the presence in the noise emission of tonal characteristics where the difference between -

(a) the A-weighted sound pressure level in any one-third octave band; and

(b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A\ Slow}$ levels.

This is relatively common in most noise sources.

- **Modulating Noise**

A modulating source is regular, cyclic and audible and is present for at least 10% of the measurement period. The quantitative definition of modulation is:

– a variation in the emission of noise that —

(a) is more than 3 dB $L_{A\ Fast}$ or is more than 3 dB $L_{A\ Fast}$ in any one-third octave band; and

(b) is present for at least 10% of the representative assessment period; and

(c) is regular, cyclic and audible.

- **Impulsive Noise**

An impulsive noise source has a short-term banging, clunking or explosive sound. The quantitative definition of impulsiveness means:

– a variation in the emission of a noise where the difference between L_{Apeak} and L_{Amax} is more than 15 dB when determined for a single representative event.

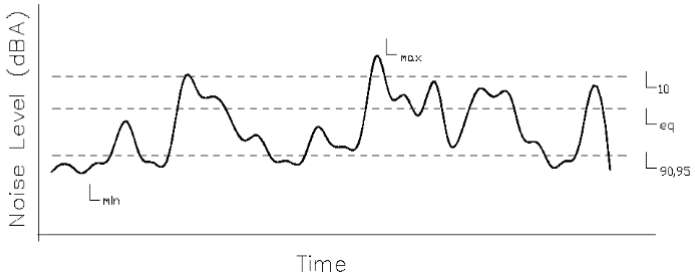
- **Major Road**

Is a road with an estimated average daily traffic count of more than 15,000 vehicles.

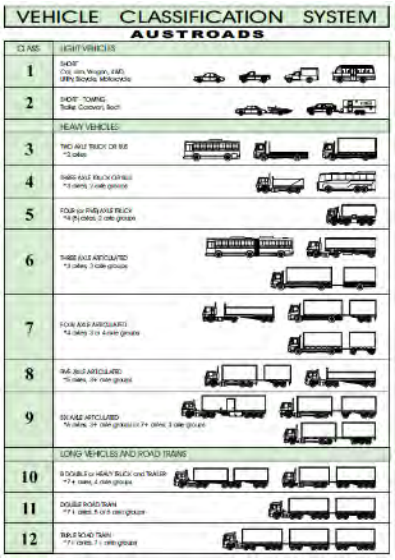
- **Secondary / Minor Road**

Is a road with an estimated average daily traffic count of between 6,000 and 15,000 vehicles.

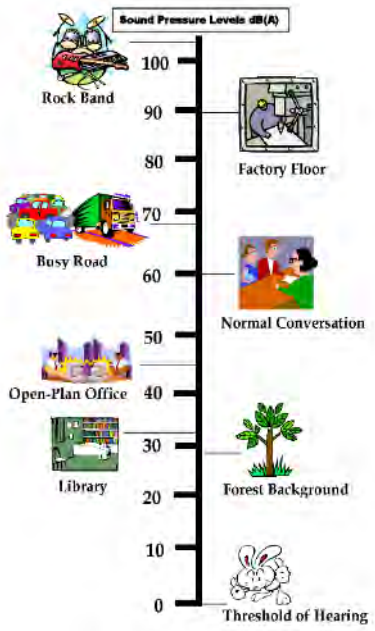
- **Chart of Noise Level Descriptors**



- **Austroads Vehicle Class**



- **Typical Noise Levels**



APPENDIX H
Visual Impact Assessment

NGAANGK BOODJA BATTERY & SOLAR FARM

Visual Impact Assessment

PREPARED FOR
BRM Solar Farm Nominee Pty Ltd

December 2025

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PLANNING DESIGN ENVIRONMENT

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Document Name: 1319 - Ngaangk Boodja - Visual Impact Assessment

Document History:

Date	Document Revision	Document Manager	Summary of Document Revision	Client Delivered
Dec-25	Rev 0	RM	Draft for Client Review	Dec-25
Dec-25	Rev 1	RM	Final draft	Dec-25
Dec-25	Rev 2	RM	Final	Dec-25

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1 Introduction

1.1 Brief

The proposed Ngaangk Boodja Battery & Solar Farm (NBBSF) will be examined to gauge and report on the visual impact with recommendations made as to how to address and mitigate adverse impacts. The following steps are followed:

- Methodology
- Describe the proposal and structures
- Context of the locality
- Existing landscape character of the site
- Visual Character of the Study Area
- Situation of the Plant on the site
- Comparable structures within the locality
- Recent relevant cases and landscape context

The technical response will examine the:

- Visual Affect
- Visual Sensitivity
- Visual Impact
- Mitigation Measures

1.2 Methodology

The 2007 WAPC publication, *Visual Landscape Planning in Western Australia*, is referenced by the DPLH for VIA reporting. The methodology for Visual Impact Assessment on page 58 of the manual is two applications of viewshed analysis: -

1 *The landscape seen from major public viewing locations should be identified. The visibility of the proposed development should be identified, assessed and mapped.*

2 *Viewsheds should be assessed from the point of view of a proposed development itself. The purpose should be to identify all locations from which the development will be visible (Figure 2.25) The analysis should also identify locations from which only part of the development is visible such as the top of an industrial chimney or blades of a wind turbine rather than the whole structure.*

Identification of all locations from which a development will be visible is vital if the visibility of a proposed development is to be minimised. Alternative development locations or designs can be tested and assessed.

The Manual lists tools which can inform this approach are summarised as: -

- Photography
- Field Investigations
- Simulations and Computer-Generated Techniques
- Sketches and Artists Impressions
- Oblique Aerial Perspective
- Seen area or Viewshed Analysis

- Visual Landscape Evaluation
- Visual Impact Assessment
- Cross-sections
- Landscape data mapping
- Visual absorption capacity analysis

Several of these tools have been used for this analysis and report.

The 2007 Manual does not stipulate that all the cited tools must be used or applied and entrusts the practitioner to select those tools which can best inform and guide the visual impact analysis and its reporting.

Noting this discretion for the NBBSF, the following technical assessment will include a:-

Method	**Manual Reference, Objective and Relevance**
Digital terrain model of the site and surroundings	p56 of Manual
Viewshed analysis of the site and the plant located on the site	p57 Manual - Seen Area or Viewshed Analysis
Impact Summary Plan	p58 – VIA (see above)
Mitigation Management Plan	pp144-152;
Context of site and proximity of viewing points	p58 - Visual Absorption Capacity; critical viewing points

Visual landscape planning in Western Australia a manual for evaluation, assessment, siting and design - https://www.wa.gov.au/system/files/2021-06/ML_Visual-landscape-planning-in-Western-Australia.pdf

2 The Proposal

NBBSF is a hybrid Battery and Solar Farm project located on approximately 230ha of land across Lots 19448 & 27381 on the corner of Robartson Road and Merredin - Bruce Rock Road. The site sits to the west of Robartson Road and is approximately 7.5 km south west of the Merredin townsite.

The solar panels are to be arranged in conventional array format above the ground and with regard for retaining any remnant vegetation areas. Battery units will be interspersed amongst the solar array rather than all located in one area of the site. There will be a building to accommodate control and site management facilities. The facility will connect to the South West Interconnected System (SWIS) via the adjacent Merredin Terminal

2.1 Region and Context

Merredin is in the eastern wheatbelt region of WA. This region is characterised by flat or slightly undulating landform with extensive clearing for cropping or sheep grazing. in a productive area of predominant cropping lands. The landscape has been heavily cleared of native vegetation to make way for wheatfields. The landscape is now flat, open and visually has a strong horizontal scale for many of the significant views. These views are often dominated by skylines (views of big skies) and flat or slightly sloping fields.

Native trees of the Eucalypt species are largely relegated to fringing fields, roads or rail corridors. Their visual character is to be single or more usually coppiced multi-stemmed forms with canopies of thin sparse leaves. The understorey of such open woodland is low to medium height (0 – 1.5 m) often dense twiggy growth.

The area of Merredin has culturally shifted to embrace renewable energy as part of the regional economy. Extensive solar farm, battery storage, and energy distribution facilities, along with a Western Power switchyard and a diesel power plant, are situated immediately east of the project site on Robertson Road. This visually replaces one aesthetic (extensively cleared crop lands) with another (arrays of solar panels and associated transmission lines and towers). Over time this investment in renewable energy facilities will become a recognisable part of the visual character of the region.

2.2 Existing landscape character of the site

The site is a cleared and predominantly flat open area, previously used for cereal cropping. Its character is simple and not dissimilar to much of the eastern wheatbelt of WA.

This area has been assessed as acceptable and approved for renewable energy facilities previously and has been supported by the Shire of Merredin on behalf of the community. The balance of renewable energy and farming in this area has general community support.

2.3 Visual Character of the Study Area

The visual character of this site and the area generally is not one of a natural landscape, nor as an intensive farm production. This farming area has been highly modified through clearing to create large broad acre farms which at that time represented a visual impact of clearing on a broad scale.

The site has been extensively cleared with small and narrow pockets of endemic vegetation left within the road and rail reserves. The site is located well away from major highways, and the neighbouring roads carry light and occasional vehicular traffic.

The site is open to view albeit through screening vegetation that has been retained within the road and rail reserves. Long views from roads affords experience of flat land. The horizon is visible but so far away that its features are poorly defined. The recent installation of the Merredin Solar Farm, and current installation of the adjoining Battery Energy Storage System has reinforced an industrial character to the locality, but this is concentrated into a node on Robartson Road just to the south of the railway road crossing.

2.4 Situation of the Plant on the site

In such a landscape it is not always possible to visually screen or blend large infrastructure elements. Solar panels are by their nature to some degree highly visible due to their coverage of landform and at some times their reflection from sunlight, although new panel design and technology reduce reflection, and noting that sheds, vehicles or other elements of a landscape can readily glint and reflect sunlight. Their arrangement in banks of array follows the landform, much as a market garden or a field of cereal crop might do.

The panels will be set back from the boundary to meet local laws and regulations, with a mind for bushfire risk management. The buildings, vehicle access road and transmission line are proposed to be located close to similar facilities of the Merredin Power Station In this way they agglomerate similar shapes and forms thereby reducing the extent of visual seen impact.

It is likely the proposed NBBSF will be visible for surrounding prospects, with some screening possible due to remnant trees and vegetation in the road and rail reserves.

2.5 Comparable structures within the locality

There is a Battery Energy Storage Facility, a Diesel peaker facility, a switching yard and transmission lines with pylons located just to the east of the site, along with the existing Merredin Solar Farm. A freight railway line runs east-west just 0.5 km to the north of the site.

2.6 Recent relevant cases and landscape context

The adjacent Merredin Solar Farm renewable energy facility to the east of this site is on approximately 460ha of land and is of a larger scale in terms of visual impact, but is nevertheless comparable and relevant to this assessment. The approval for that facility found its visual effect on the landscape to be acceptable, so it's reasonable to believe that adding another facility west of Robartson Roads will also fit in visually with the existing group of buildings and structures.

3 Visual Impact Assessment

The following text outlines the theory which generally informs assessment of visual criteria. This may assist in explaining the calibration for analysis of otherwise subjective assessments.

3.1 Visual effect

The visual effect is the expression of the visual interaction between the proposed works and the existing visual environment in and around the study area. It can also be expressed as a level of visual contrast in terms of the development and the setting in which it is placed.

Effect can be described as either low, moderate or high.

Impact	Determinants	Mitigation
Low	Barely visible, or minimal visual contrast, i.e. integration possible in terms of the form, line, shape, pattern, colour or texture between the existing environment and the development.	• No need • Minor works or careful design and placement to render no impact.
Moderate	Visible element which contrasts with the landscape, however, achieves integration by some degree of visual screening or integration with surroundings.	• Works designed and executed to integrate or otherwise tone down the visual experience of the development.
High	Visibility of a major element which dominates and contrasts strongly with the surrounding setting, due to its poor integration into the landform. This includes where works reduce screening or introduce necessary modification of the landform which might remove vegetation, interfere with intervening terrain or screening.	• Obscuring the line of sight, screen planting from strategic viewpoints, design modification to reduce bulk, scale or visual dominance. Siting within the terrain and taking account of setbacks and separation from sensitive receptors.

The visibility of a development does not imply its impact will be large or unacceptable, and so visual effect appraisal refrains from making such a judgement, rather it describes what may be seen and how this may affect the context of the surrounding site.

Mitigation is the softening or mollification of impact by muting the contrast and can be achieved by either obscuring direct sight of the development, or screening distant views. Where a development is of such a scale as to preclude obscuring views, screening by planting or similar device can dissipate the impact – rendering the development as a smaller and less noticeable part of the overall view.

3.2 Visual Sensitivity

This is the measure of how critically a change to the existing landscape would be viewed from various areas and by users of the area. It also considers the expectation of the viewers based upon the principal activity or reason for being in the vicinity.

Because it depends upon the users of an area (the viewers) it is a subjective element, one which can either be gauged through direct feedback (i.e. submissions or consultation) or a generalised assessment of the prevailing values. It is also dynamic, changing according to the experience of the viewers and their expectations. Given this is a subjective area, there is a risk to overstate the sensitivity due to the most vocally sensitive and dismiss a more broad and possibly numerous acceptances (i.e. lack of dissent).

There is a natural bias for the most sensitive viewers to dominate the narrative about impact, and for those not perturbed to refrain from comment. Sensitivities over time diminish with acceptance.

Influences for viewers can include some of the following; -

- Principal purpose of being in the vicinity of the development;
- Expectation of viewing experience in that place; (is a view more important to a resident farm worker or to a tourist).
- Experience of the viewer and familiarity of exposure to similar types of development;
- Perceived conflicts or trade-offs resulting from the development (not always visual);
- Duration of exposure to viewing the development (is it surrounding or just from one prospect;
- Distance and separation from the development and the vantage point (visual awareness Vs prominence and dominance);
- Other matters, some intangible, due to non-visual opposition or prejudices to development based upon assumption (or association of non-visual values).

As an illustration of how these different viewer perspectives may vary the sensitivity, the visual expectation of a tourist may differ from that of a commercial traveller, due to their purpose for being in the vicinity of the development, their length of exposure, their focus of attention and ultimate objective of the journey which exposes them to views of the development and its site.

A farm worker may be less concerned about a development's visual impact near their workplace than a farm owner, who might worry about economic effects on their land or residence. Though subjective, assessing visual impacts is useful, and balancing different opinions helps determine long-term acceptability. Sensitivity to changes often decreases over time as familiarity grows, with even controversial developments eventually becoming an accepted part of the landscape.

The most useful application of sensitivity is to determine where and how mitigations are justified and applied. It is also important to ensure that mitigations do not themselves introduce an unacceptable impact or change to a view or scenery of a place sufficient to degrade its character.

3.3 Visual Impact Consideration

The visual impact (VI) is established by considering both the visual effect (VE) and the visual sensitivity (VS).

VE x VS = VI

The following table indicates how this consideration might be formally organised.

Table 3.3

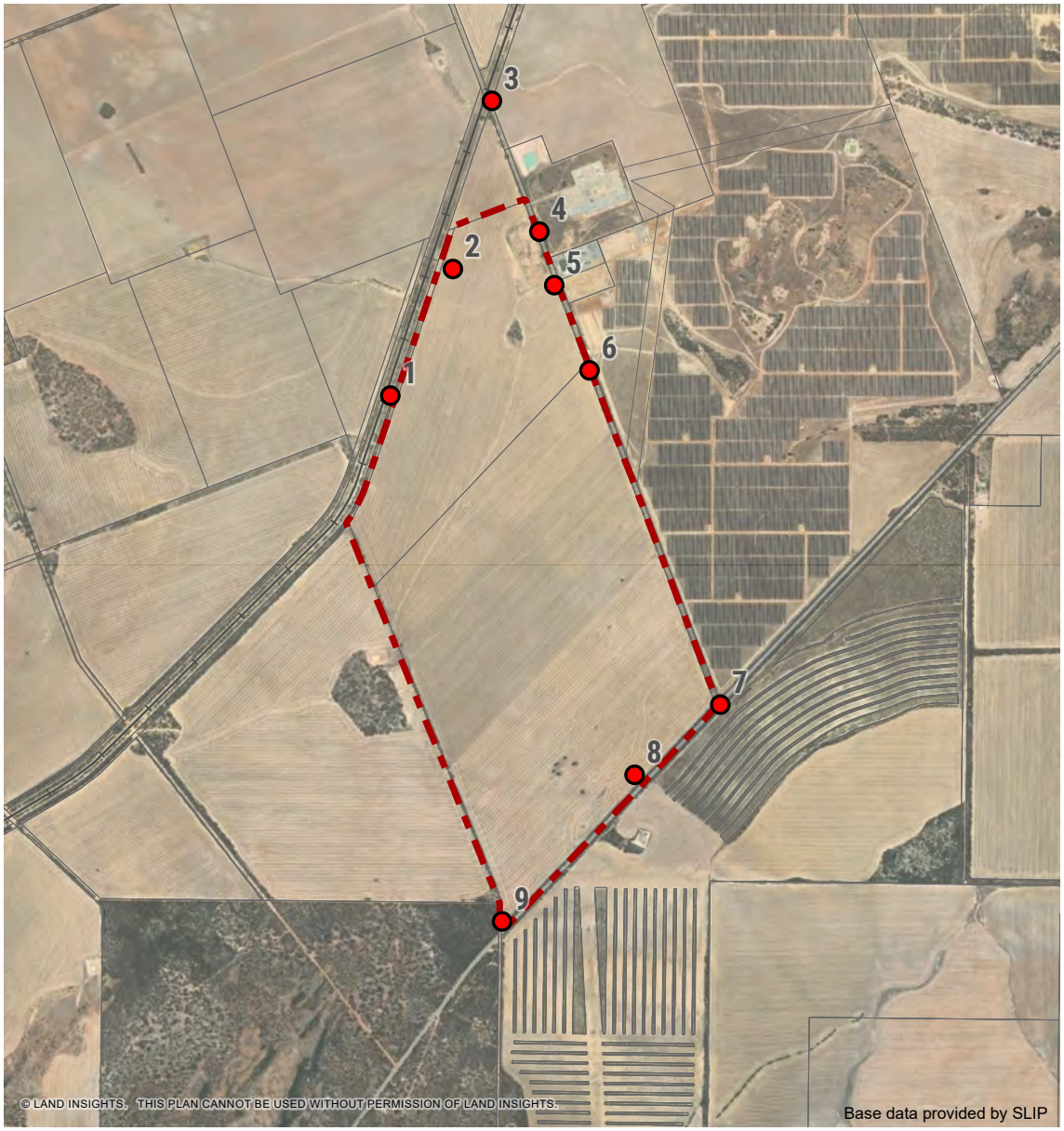
	High	Moderate	Low
High	High Impact	High Impact	Moderate Impact
Moderate	High Impact	Moderate Impact	Low Impact
Low	Moderate Impact	Low Impact	Low Impact

Having regard for the above, the report addresses NBBSF and draw comment about relative acceptability and level of impact.

3.4 Viewing Point – Experience description, Impact Acceptability and Mitigation.

The following table summarises the assessment of visual impact from each of the designated viewing points, as shown on the following plan.

Table 3.4



Site Boundary
Cadastre
Rail Line
Viewing Point

N

0 0.5 1 km

Ngaangk Boodja Battery and Solar Farm

Project: 1319; Layout Name: BRM 1319-008-01-01 Fig 10 Visual Impact - Viewpoints

VISUAL IMPACT ASSESSMENT - VIEWPOINTS

VP	Visual Experience (VE)	Sensitivity (VS)	Impact L, M, H (VI))	Management/Mitigation
1	Possible glimpses of solar panels	Low	Unlikely to cause visual impact issues. L	Screen planting in locations within the site to address views from the north of site
2	Possible glimpses of solar panels	Low	Unlikely to cause visual impact issues. L	Road reserve screen planting may be supplemented where needed by in-site planting adjacent to boundary.
3	Possible glimpses of solar panels	Low	Unlikely to cause visual impact issues. L	None - Road reserve already screen planted
4	Direct long views of NBBSF.	Low	Solar panels visible in middle ground beyond road screen, L	Improve the density of planting in select locations to improve screen for views along the road.
5	Direct views of NBBSF to the west and south.	Low-Moderate	Solar panels visible in middle ground beyond road and through screening vegetation. LM	Improve the density of planting within the site and adjacent to the road
6	Direct and screened views of NBBSF in the middle ground to the west of the VP.	Low-Moderate	Views of solar panels will be lateral rather than from an elevated position. LM	Improve the density of planting within the site and adjacent to the road.
7	Direct views of the solar panels to the north west of the VP.	Moderate	Glimpse views will be significant element of the overall vista. M	Impact can be mitigated in short-term installing a low earth berm. Planting in front and on the berm will over time resolve visual impacts from V7.
8	Direct lateral views of NBBSF	Low	Side views would register from this VP Negligible impact-. L	Examine existing planting in reserve and improve gaps by planting within the site.

VP	Visual Experience (VE)	Sensitivity (VS)	Impact L, M, H (VI))	Management/Mitigation
9	Direct lateral views of NBBSF	Low	Side views would register from this VP Negligible impact-. L	Examine existing planting in reserve and improve gaps by planting within the site.

3.5 Visual Affect

NBBSF will be moderately visible from most viewing points, all of which are located on public land such as road and rail reserves. The additive visual effect of this proposal would be to introduce foreground and middle ground visual elements to an otherwise open scene

The panels themselves may be visible to the extent that they calibrate the surface of the landform.

Some of the viewing points would only afford glimpses of NBBSF at the most extreme end of seen-analysis.

Compared to the approved and constructed solar farm and energy facilities to the east of Robartson Road, the visual impact of NBBSF would be less due to the smaller coverage and scale of the panel area and associated structures.

Viewing Points are indicated from public road and rail reserves to highlight the prospects from which the visual impact of the solar farm can be gauged. Whereas roads may be accessed by the public, the rail reserve is used for freight transit, which occurs on an infrequent basis, subject to seasonal demand. The expectation of visual amenity from this viewing point is less likely to be impaired due to the ability to view the NBBSF in the medium to long distance

3.6 Visual Sensitivity

In Merredin, the community has a growing familiarity and acceptance of solar panels and renewable energy facilities as part of the evolving rural landscape These elements are shaping a 'new' landscape character for the locality centred on renewable energy generation, storage and transmission.

It is reasonable to conclude that this site and its surrounds have a lower level of visual sensitivity than if it had been on a major highway, or close to the entry of a town, or situated on a picturesque or scenic landscape area.

In this case the site is well away from populated areas, is not subject to high volumes of passing traffic and due to the precedent of the adjacent renewable energy facility this visual change is not likely to be a disruptive or an unexpected element in the local landscape and its visual experience.

3.7 Visual Impact

NBBSF and its visual impact has been assessed from the position of each of the 9 viewing points.

Although the facility will be moderately visible from some locations, its overall contribution to landscape change is expected to be less than that of the existing solar farm and neighbouring energy infrastructure east of Robartson Road. This is due to the smaller footprint and scale of the proposed panel area and associated structures. The presence of the existing solar farm has also shaped local expectations, with the community already visually accustomed to this type of development and therefore more likely to regard the NBBSF as a compatible addition to the locality.

From several viewing points, only brief or partial glimpses of the NBBSF would be available. From other viewing points, more direct views will occur; however, these impacts are manageable. The following section outlines the mitigation measures recommended to ensure visual effects remain within an acceptable range.

4 Mitigation Measures

The views of NBBSF most likely to generate low to moderate levels of visual impact are those where the viewer is close to the site and can directly see as a line of sight towards and into NBBSF and its components.

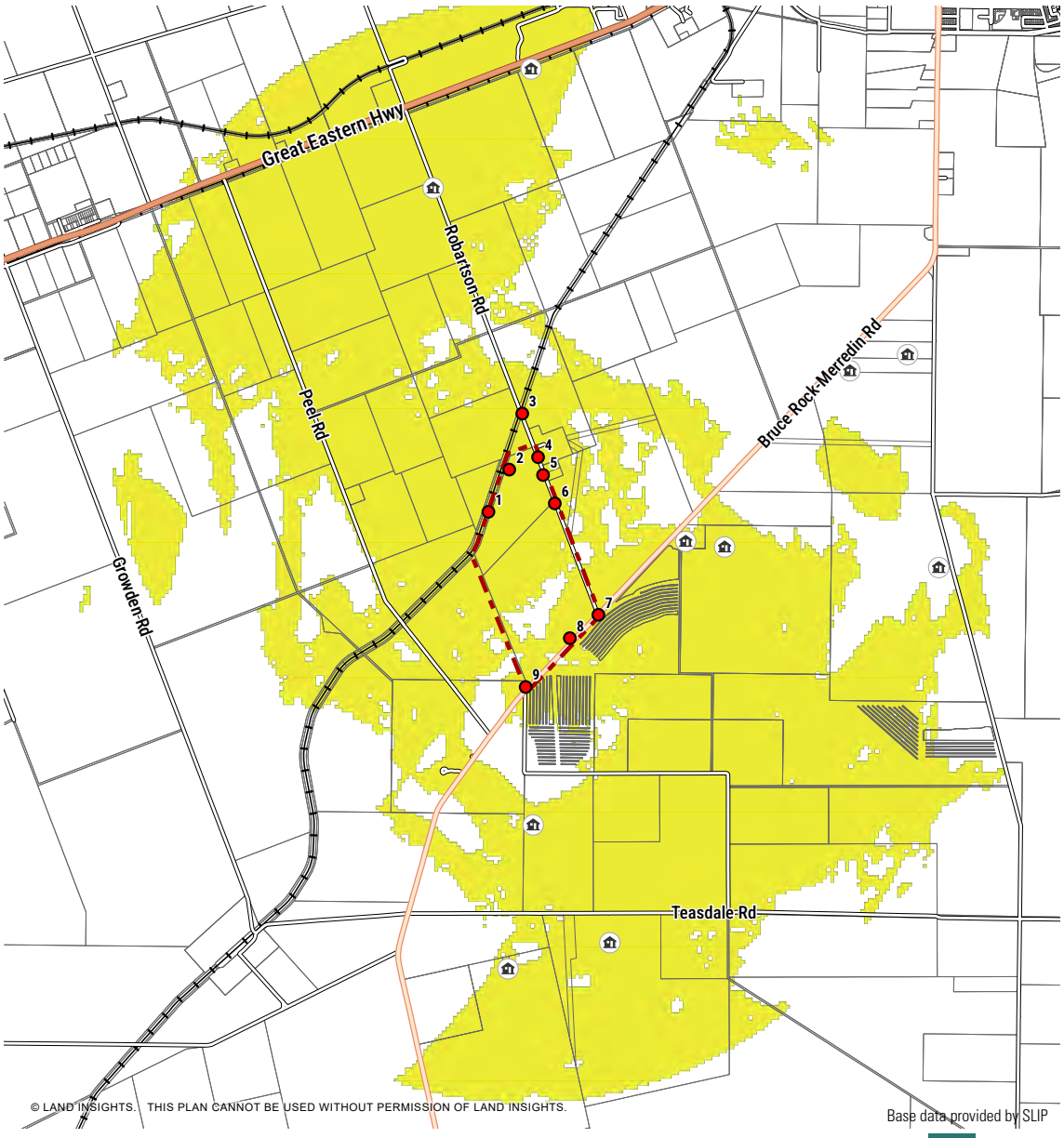
The mitigation methods for such an impact relate to reduction of direct views, either by physical intervention (such as bunds) or application of enhanced landscape planting to screen and reduce direct visual experience of NBBSF at close range, noting these take time to establish.

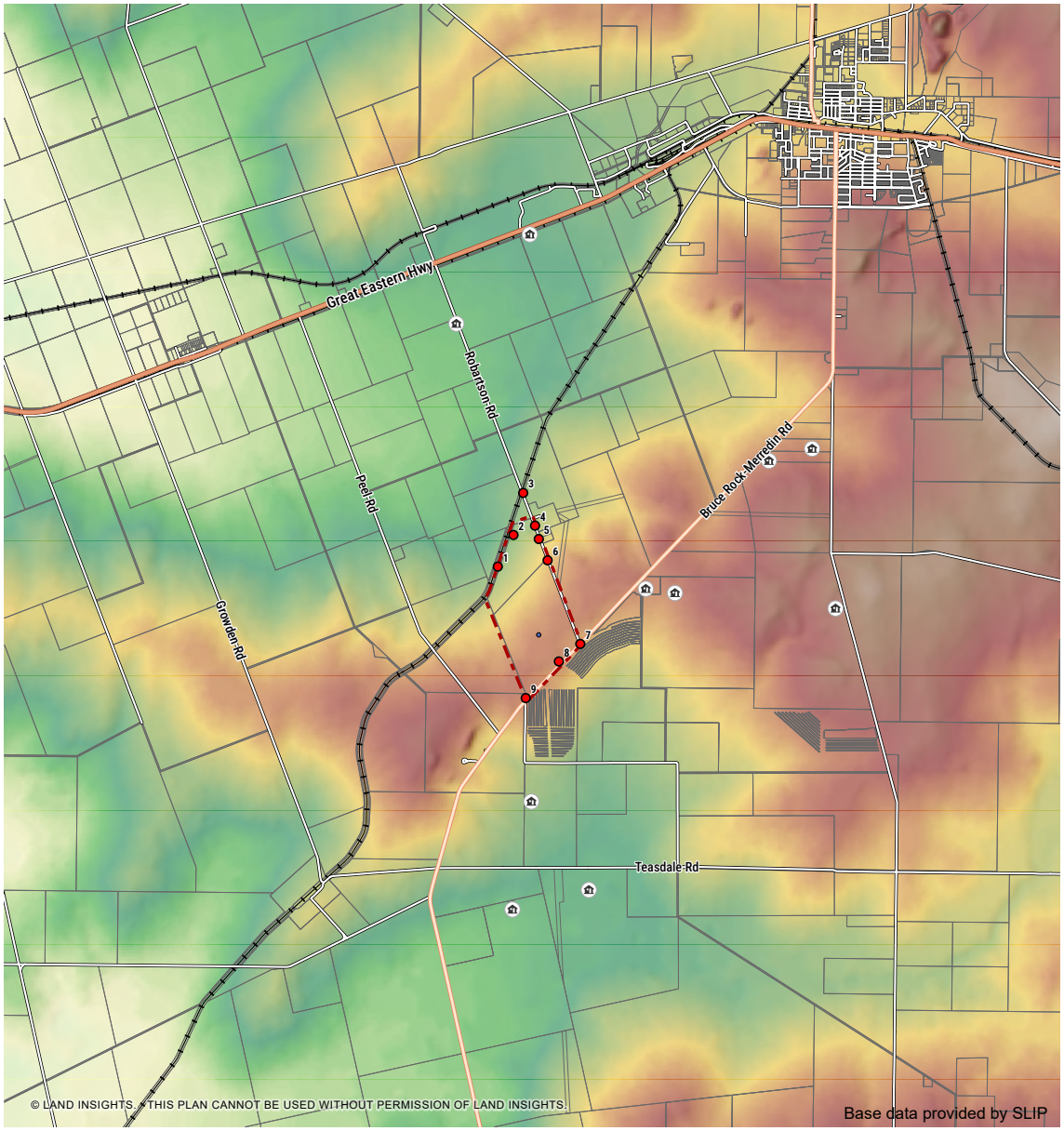
The extent to which mitigation is needed may also take account of the exposure of the community to the direct views Where adjacent roads carry only light traffic, the value of extensive screening needs to be weighed against the cost of addressing what may be only occasional or brief views.

The following three recommendations summarise the appropriate and focussed landscaping remedies available to mitigate potential impacts in their intensity and frequency at nominated receptor points to achieve an acceptable visual impact (low to moderate impact) from identified study receptor points: -

No.	Recommendation	Stage of Execution
1	Consider the inclusion of materials and colours to buildings that visually recede into the landscape and minimise reflection or other visual cues that draw attention to the facility	Detail Design
2	Consider increased planting screening in the following locations: - 1. Bruce Rock – Merredin Road northern verges where direct views into the site are likely. • Robartson Road at some bare sections of the western road verge. Selecting locations which admit a direct line of sight between the site and passing road traffic.	Detail Design
3	The facility will be unmanned with maintenance mostly carried out during daylight hours, thus there will be no continuously operating lighting for the building, though lighting will be installed to be available when required	Subject to review once operating.

Additional Plans




Great Eastern Hwy
Robartson Rd
Peel Rd
Bruce Rock-Merredin Rd
Growden Rd
Teasdale Rd
1
2
3
4
5
6
7
8
9
© LAND INSIGHTS. THIS PLAN CANNOT BE USED WITHOUT PERMISSION OF LAND INSIGHTS.
Base data provided by SLIP
Site Boundary
Highway
Main Road
Local Road
Rail Line
Viewing Point
Digital Terrain Model
mAHD
384.000
262.000
N
0 1 2 3 4
km
Project: 1319; Layout Name: BRM 1319-008-02-01 Digital Terrain
Ngaangk Boodja Battery and Solar Farm
VISUAL IMPACT ASSESSMENT - DIGITAL TERRAIN

Photos



Ngaangk Boodja Battery and Solar Farm

ect: 1319; Layout Name: BRM 1319-008-01-01 Visual Impact - Viewpoints_photopoints

VISUAL IMPACT ASSESSMENT - VIEWPOINTS & PHOTOPOINTS



M-01



M-02



M-03



M-04



M-05



M-06



M-07



M-08



M-09



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M-11



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M-34



M-35

APPENDIX I
Flora and Fauna Assessment

Detailed Flora and Vegetation Survey Lots 19448 and 27381 Robartson Road, Merredin



Prepared for: Land Insights

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June 2024

EXECUTIVE SUMMARY

This report has been prepared by Del Botanics Environmental Consulting on behalf of Land Insights to present the results of a spring Detailed Flora and Vegetation survey and Black Cockatoo Habitat Assessment within Lots 19448 and 27381 Robartson Road, Merredin. The location of the site is shown on **Figures 1** and **2.**

The recent Flora and Vegetation Assessment undertaken in the area described above identified 43 flora species, with 21% represented by weed species. The vegetation condition was recorded as "Good" to "Completely Degraded."

Two vegetation communities were recorded at a local level during the survey. No species of Threatened (T), or Priority Flora or Threatened Ecological Communities (TEC's) pursuant to the *Biodiversity Conservation* (BC) Act 2016 and the *Environment Protection and Biodiversity Conservation* (EPBC) Act 1999 were located at the time of the survey.

Twenty-six potential Black Cockatoo Habitat Trees were recorded on site. 16 of these trees have hollows, with no trees recorded with hollows suitable for Black Cockatoo breeding.

STATEMENT OF LIMITATIONS

This environmental report has been prepared in accordance with the scope of services set out in the original quotation. In preparing the report, Del Botanics Environmental Consulting has relied on data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report. Del Botanics Environmental Consulting has not verified the accuracy or completeness of the data to the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report are based in whole or in part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Del Botanics Environmental Consulting will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, unavailable, misrepresented or otherwise not fully disclosed.

In accordance with the scope of services, Del Botanics Environmental Consulting has relied on the data and have conducted environmental field monitoring in the preparation of the report. The nature and extent of monitoring conducted is described in the report. Within the limitations imposed by the scope of services, the monitoring and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care. No other warranty, express or implied, is made.

The report has been prepared for the benefit of the Client and for no other party. Del Botanics Environmental Consulting assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report. Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

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1. INTRODUCTION

1.1 BACKGROUND

This report has been prepared by Del Botanics Environmental Consulting on behalf of Statewest Planning to present the results of a spring Detailed Flora and Vegetation survey and Black Cockatoo Habitat Assessment within Lots 19448 and 27381 Robartson Road, Merredin. The location of the site is shown on **Figures 1** & **2**. The site is approximately 260 kilometres east of the Perth central area. The project area is approximately 233 hectares.

The botanical survey of the flora species and vegetation and the Black Cockatoo Habitat Tree Assessment was undertaken on 28th and 29th October 2023.

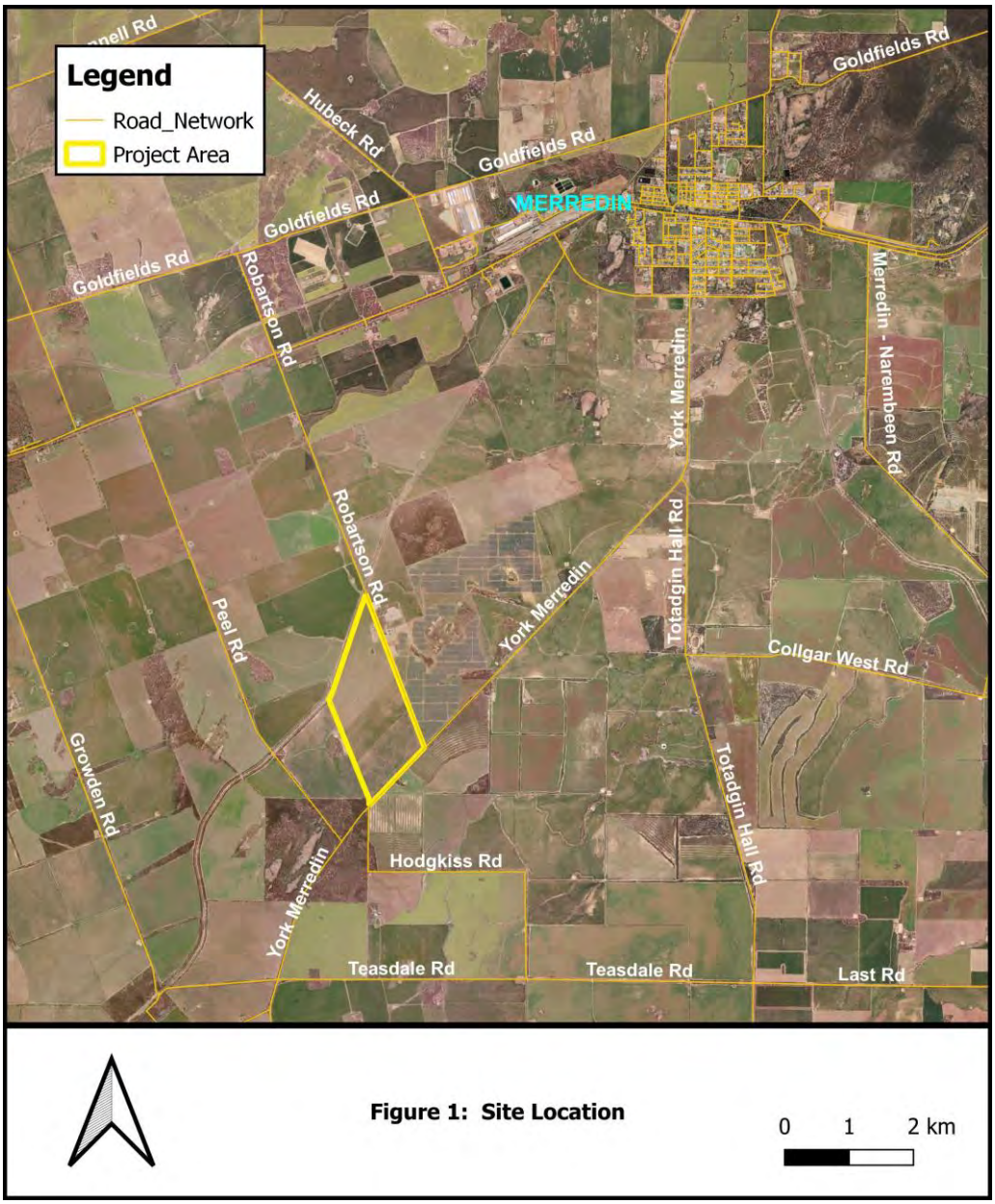


Figure 1: Site Location

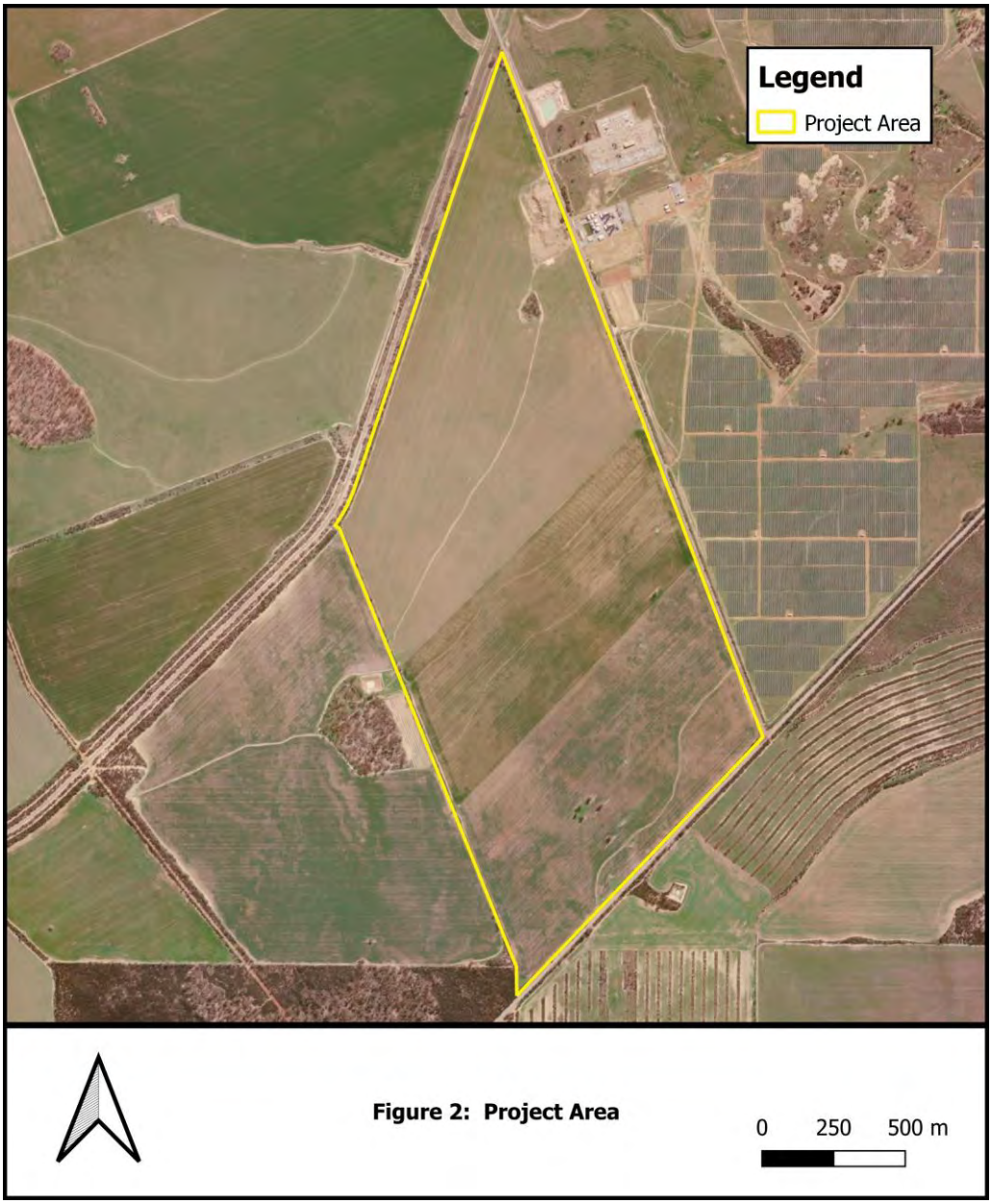


Figure 2: Project Area

1.2 PURPOSE OF THIS REPORT

This report was prepared to present the results of the flora and vegetation survey, describing the flora and vegetation that occurs within the area described above. The flora species and vegetation were used to determine the significance of the site.

In summary this report provides the results of:

- A Department of Biodiversity, Conservation and Attractions (DBCA) Threatened Flora (T) and Threatened Ecological Communities (TEC's) database search;
- A Department of Climate Change, Energy, the Environment and Water (DCCEEW) database search;

- A spring botanical survey;
- An assessment of vegetation communities and conditions; and
- A Black Cockatoo Habitat Assessment.

2. EXISTING ENVIRONMENT

2.1 LANDFORM, TOPOGRAPHY AND SOILS

The Avon Wheatbelt is an area of active drainage dissecting a Tertiary plateau in Yilgarn Craton. The Yilgarn block is bounded by the Darling Fault in the West and by the greenstone belts of the Southern Cross and Murchison districts in the east. It has a gently undulating landscape of low relief, with Proteaceous scrub heaths, rich in endemics, on residual lateritic uplands and derived sandplains with mixed Eucalypt, *Allocasuarina huegeliana* and Jam-York Gum woodlands (Beecham, 2001).

Within this bioregion is an ancient peneplain with low relief and gently undulating landscape. There is no connected drainage and salt lake chains occur as remnants of ancient drainage systems which only function in very wet years. Lateritic uplands are dominated by yellow sandplain. The Wheatbelt landscape creates a mosaic of plant habitats that include open woodlands, gravely or sandy heaths, extensive salt lakes and the specialised habitats associated with granite outcrops (Beecham, 2001).

Soil-landscape system mapping of Western Australia describes broad soil and landscape characteristics from regional to local scales. The survey area is within the Tandegin System.

The Tandegin system consists of sandplain dominated uplands with gravelly crests and upper slopes, and long colluvial yellow sandplain upper to lower slopes. Unlateritised surfaces occur where the laterite profile has been stripped (often below a low breakaway) these areas contain colluvial duplex soils and soils which have formed from fresh rock. Underlying crystalline rock is medium to coarse-grained granite with minor mafic phases, intruded by mafic and quartz dykes These soils are accompanied by Kwongan on sandplains, mallee scrub and eucalyptus woodlands on unlateritised country. (Department of Agriculture and Food WA, 2012).

2.2 VEGETATION

The survey area lies in the Avon Botanical District, in the eastern central Wheatbelt Region of the Southwest Botanical Province as described by Beard (1981, 1990), in the Muntadgin Vegetation System.

The Avon Botanical System comprises of scrub heath on sandplains, Acacia-Casuarina thickets on ironstone, woodlands of York Gum (*Eucalyptus loxophleba*), Salmon Gum (*Eucalyptus salomonphloia*) and Wandoo (*Eucalyptus wandoo*) on loams and halophytes on saline soils (Beard 1981).

2.2.1 Regional vegetation

The Biogeographic Regionalisation of Australia (IBRA) divides Australia into 89 bioregions based on major biological and geographical/geological attributes. Western Australia has 26 biogeographic regions and 53 subregions based on dominant landscape characteristics of climate, lithology, geology, landform and vegetation (DCCEEW, 2023).

The study area is in the Avon Wheatbelt (AVW) subregion. This subregion is characterised by proteaceous scrub heaths, rich in endemics, on residual lateritic uplands and derived sandplains of mixed eucalypt, *Allocasuarina huegeliana* and Jam-York Gum woodlands on Quaternary alluvials and eluvials. The southeastern boundary has been modified incorporating a small portion into the Mallee region. This area has been extensively cleared for agriculture (DPaW, 2001).

2.2.2 Vegetation Complex

The survey area is mapped as occurring within the Muntadgin Vegetation System as described by Beard (1972). The Muntadgin Vegetation System occurs on relatively high lying country with large areas of residual sandplain forming part of an old plateau surface, dissected by shallow valleys draining to the west and northwest. The vegetation of the sandplains consists of dense thickets of shrubs rarely exceeding 2.5 metres in height. There are many granite outcrops. The valleys contain red brown sandy loams overlaying clay which carry mallee vegetation. If the clay is close to the surface the mallee changes to woodland (Weaving, 1994).

2.3 CLIMATE

The closest Bureau of Meteorology (BoM) weather station is approximately 10.3km Northeast of the survey area at Merredin (Site No.010092). The long-term mean minimum temperature for Merredin ranged from 5.6˚C in July and August to 18.1˚C in February between 1944 and 2024. The long-term mean maximum temperature ranged from 16.4˚C in July to 34˚C in January between 1944 to 2023 (Bureau of Meteorology, 2024).

The long-term annual average rainfall is 324.9 millimetres (mm) from 1944 to 2024 (Bureau of Meteorology, 2020). Data for the previous 12 months is show below on **Figure 3**.

The temperature recorded in October 2023 was within the normal climatic conditions historically recorded for this area. The rainfall recorded in October 2023 was 21.8mm less than recorded in October 2022, and 0.4mm more than that recorded in October 2020. The annual average rainfall recorded in October 2023 was consistent with that recorded between 2003 to 2023. These results overall would not have a significant impact on the flora recorded within the survey area.

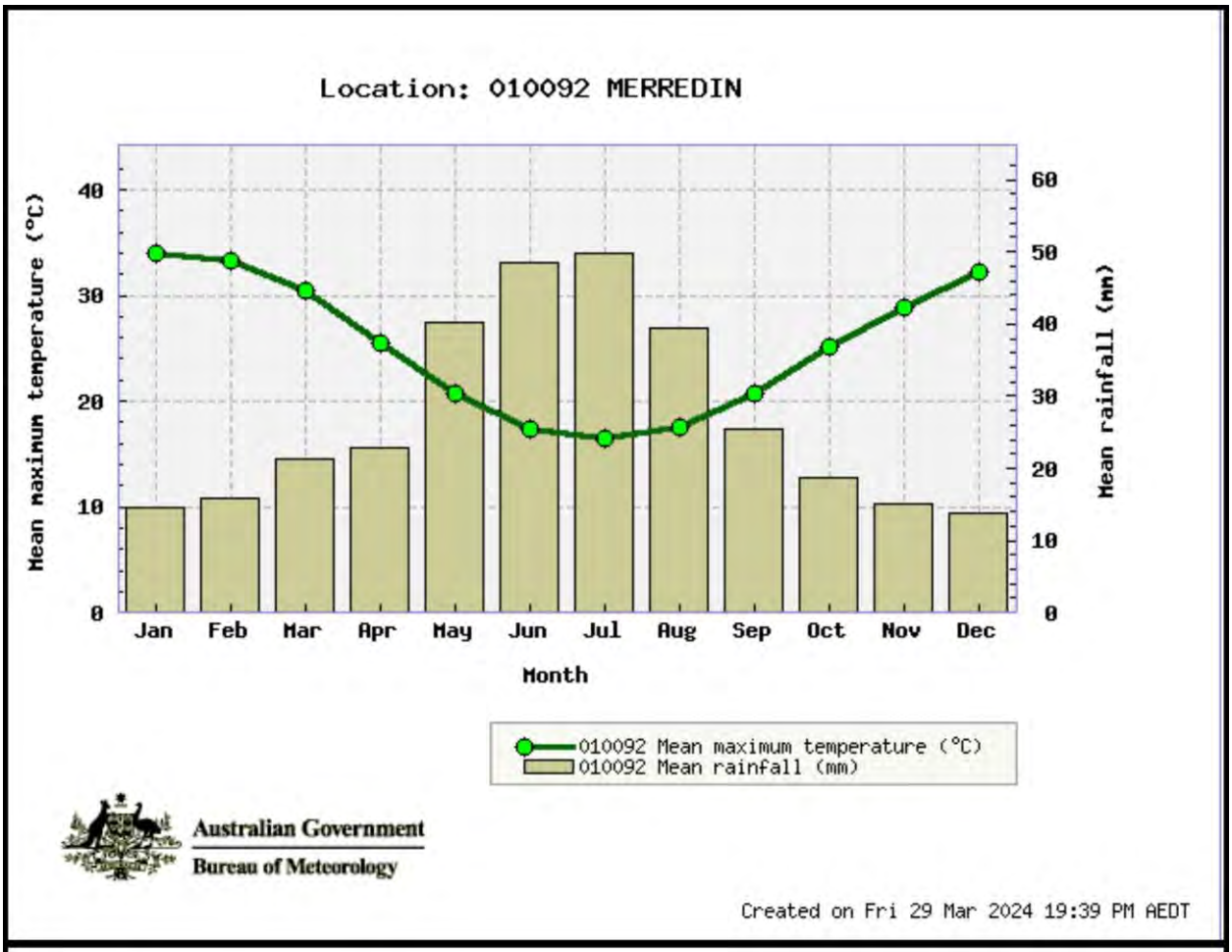


Figure 3: Weather Data

3. FLORA AND VEGETATION ASSESSMENT

3.1 VEGETATION METHODS

A Detailed Flora and Vegetation Survey was undertaken on the 28th and 29th October 2023. The site was surveyed for flora species including, Threatened Flora (T), Priority Flora (PF), potential areas of Threatened Ecological Communities (TEC's) and vegetation condition.

Each variation or difference in vegetation was recorded with three 10 metre by 10 metre quadrats. Data was recorded to statistically determine vegetation communities and condition. In total, four quadrats were assembled to record each vegetation community. Each quadrat recorded flora species, heights, percentage cover and percentage dead and alive. Quadrats were not assembled permanently; quadrat data is available in **Appendix B.**

The survey methodology was undertaken in accordance with EPA Position Statement No.3: *Terrestrial Biological Surveys as an Element of Biodiversity Protection* and EPA Guidance Statement No. 51: *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia.*

All plant specimens collected during the field survey were dried, pressed and then sorted in accordance with the requirements of the Western Australian State Herbarium. Identification of specimens occurred through comparison with named material and through the use of taxonomic keys.

The use of standard data collection forms ensured the data was collected in a systematic and consistent manner. At each quadrat the following information was recorded:

- Vegetation condition;
- Vegetation community;
- Flora species;
- Local disturbances;
- Topography;
- Soils; and
- Age since fire.

The vegetation communities occurring on this site were described in detail. Aerial photography was used to extrapolate and map plant communities in combination with running notes made during the course of the survey.

3.2 DECLARED RARE AND PRIORITY FLORA

Species of flora acquire “Threatened” “Presumed Extinct” or “Priority” conservation status where populations are restricted geographically or threatened by local processes.

The Department of Biodiversity, Conservation and Attractions (DBCA) recognise these threats and subsequently applies regulations towards population protection and species conservation. The DBCA enforces regulations under the *Biodiversity Conservation Act 2016* to conserve Threatened species and

protect significant populations. Priority Flora species are potentially rare or threatened and are classified in order of threat. Threatened and Priority Flora category definitions are listed in **Table 1**.

The likelihood of each Threatened and Priority flora species and vegetation community occurring onsite is determined by background research on the known soil types and vegetation communities. This information together with botanical knowledge provides an informative result on whether the flora species is likely to occur on the site.

Table 1: Definition of Threatened and Priority Flora Species (DEC 2012)

Conservation Code	Category
T	**Threatened Flora (Declared Rare Flora – Extant)**. Schedule 1 under the Wildlife Conservation Act 1950 Rare Flora Notice Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such. **Threatened Flora (Schedule 1) are further ranked by the Department according to their level of threat using IUCN Red List criteria:** **CR**: Critically Endangered - considered to be facing an extremely high risk of extinction in the wild. **EN**: Endangered –considered to be facing a very high risk of extinction in the wild. **VU**: Vulnerable - considered to be facing a high risk of extinction in the wild
X	**Presumed Extinct Flora (Declared Rare Flora – Extinct)** Schedule 2 under the Wildlife Conservation Act 1950 Rare Flora Notice Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such.
P1	**Priority One: Poorly known species** Species that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes
P2	**Priority Two: Poorly-known species** Species that are known from one or a few collections or sight records, some of which are on land not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State Forest, vacant Crown land, water reserves, etc. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.
P3	**Priority Three: Poorly known species** Species that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.
P4	**Priority Four: Rare, Near Threatened and other species in need of monitoring** (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.
P5	**Priority Five: Conservation Dependent species** Species that are not threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years

A search of the Department of Biodiversity, Conservation and Attractions (DBCA) NatureMap database identified one species of significance likely to occur within a 10km radius of the area. This species is listed in **Table 2** below.

Table 2: NatureMap listed species.

Species Name	Conservation Status	Likely to occur onsite	Survey undertaken in flowering time
Thysanotus tenuis	P3	Yes	Yes

3.2.1 Environment Protection and Biodiversity Conservation Act (1999) – Species level significance

The *Environment Protection and Biodiversity Conservation* (EPBC) *Act*, 1999, promotes the conservation of biodiversity by providing strong protection for plants at a species level. Section 178 and 179 provides the lists and categories of threatened species under the Act and is presented in **Table 3** below.

Table 3: Categories of Threatened Species (EPBC Act, Section 179, 1999)

1	**Extinct** A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
2	**Extinct in the Wild** A native species is eligible to be included in the **extinct in the wild** category at a particular time if, at that time:(a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
3	**Critically Endangered** A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
4	**Endangered** A native species is eligible to be included in the endangered category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
5	**Vulnerable** A native species is eligible to be included in the vulnerable category at a particular time if, at that time: (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.
6	**Conservation Dependant** A native species is eligible to be included in the conservation dependent category at a particular time if, at that time: (a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or (b) the following subparagraphs are satisfied: (i) the species is a species of fish; (ii) the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long-term survival in nature are maximised; (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory; (iv) cessation of the plan of management would adversely affect the conservation status of the species.

A search using the Department of Climate Change, Energy, the Environmental and Water (DCCEEW) Protected Matters Tool was undertaken within a 10km radius of the site. The search result noted seven flora species of significance likely to occur in the area. Three flora species have been listed as

Endangered; two species are listed as Vulnerable, and two are recorded as Critically Endangered. These species are listed in **Table 4** below.

Table 4: DCCEEW Protected Matters listed flora species.

Species Name	Conservation Code	Likely to occur onsite	Survey undertaken in flowering time
Banksia dolichostyla	Threatened	Yes	Unknown
Boronia adamsiana	Vulnerable	Yes	Yes
Dasymalla axillaris	Critically Endangered	Yes	Unknown
Eremophila resinosa	Endangered	Yes	Yes
Eremophila viscida	Endangered	Yes	Yes
Gastrolobium diabolophyllum	Critically Endangered	No	No
Roycea pycnophylloides	Endangered	Yes	No

3.2.2 Department of Biodiversity, Conservation and Attractions (DBCA) Database Search

In addition to the background searches undertaken through the DBCA NatureMap and the DCCEEW Protected Matters searches, a Threatened and Priority flora search was undertaken through the DBCA. The search is undertaken on records from the Threatened and Priority Flora Database (TPFL) and the WA Herbarium database (WAHerb), which provides known locations of each species. The results are provided below in **Table 5**. The search was conducted within a 10km radial area from the central coordinate.

Table 5: DBCA Threatened and Priority Flora Search Results

Taxon	Conservation Status		Likely to occur onsite	Survey undertaken in flowering time
	DBCA	EPBC		
Acacia ancistrophylla var. *perarcuata*	3		No	No
Acacia ataxiphylla subsp. *magna*	T		Yes	No
Acacia denticulosa	T		Yes	Yes
Acacia filifolia	3		Yes	No
Acacia lirellata subsp. *compressa*	2		No	Unknown
Acacia sclerophylla var. *teretiuscula*	1		Yes	Yes
Acacia undosa	3		Yes	No
Aluta aspera subsp. *localis*	2		Yes	Yes
Angianthus micropodioides	3		No	No
Austrobaeckea narembeen	2		Unknown	Unknown
Balaustion exsertum	3		Unknown	Unknown
Banksia shanklandiorum	4		Yes	No
Boronia adamsiana	T	VU	Yes	Yes
Calothamnus superbus	1		No	No
Conospermum eatoniae	3		Yes	Yes
Conostylis albescens	2		No	No
Daviesia oxylobium	4		Yes	No
Eremophila viscida	T		Yes	Yes
Eucalyptus brockwayi	3		Yes	No
Eucalyptus caesia subsp. *caesia*	4		No	No
Eucalyptus caesia subsp. *magna*	4		No	No
Eucalyptus crucis subsp. *crucis*	T	EN	Yes	Yes
Gastrolobium tenue	1		Yes	Yes
Grevillea haplantha subsp. *recedens*	3		Yes	No
Hakea aculeata	T		Yes	Yes
Lepidium genistoides	3		Yes	Yes
Lepidosperma sp. Billyacatting	2		Unknown	Unknown
Melaleuca sciotostyla	T		No	No
Melichrus sp. Bruce Rock	1		Unknown	Unknown
Persoonia pungens	3		Yes	Yes
Rinzia torquata	3		Unknown	Unknown

Scaevola tortuosa	1		No	Yes
Stylidium merrallii	4		Yes	Yes
Styphelia subglauca	3		Unknown	Unknown
Thysanotus tenuis	3		Yes	Yes
Verticordia gracilis	3		Yes	Yes
Verticordia mitodes	3		No	Yes
Verticordia multiflora subsp. *solox*	2		Yes	Yes
Vittadinia cervicularis var. *oldfieldii*	1		No	No
Xanthoparmelia subimitatrix	3		Unknown	Unknown

3.3 THREATENED ECOLOGICAL COMMUNITIES

In Western Australia Threatened Ecological Communities (TEC's) are assessed through a procedure coordinated by the DBCA and are assigned to one of the categories outlined below in **Table 6**. While they are not afforded direct statutory protection at a state level (unlike Threatened Flora under the *Biodiversity Conservation Act,* 2016) their significance is acknowledged through other State environmental approval processes (i.e. Environmental Impact Assessment pursuant to Part IV of the *Environmental Protection Act* 1986). Scheduled TEC's are afforded statutory protection at a federal level pursuant to the EPBC Act. The Department has been identifying and listing threatened ecological communities since 1994 through the non-statutory process.

The Minister for Environment previously listed ecological communities as Threatened through a non-statutory process if the community was presumed to be totally destroyed or at risk of becoming totally destroyed. The *Biodiversity Conservation* Act*,* 2016 (BC Act) provides for the statutory listing of threatened ecological communities (TEC's) by the Minister. The new legislation also describes statutory processes for preparing recovery plans for TEC's, the registration of their critical habitat, and penalties for unauthorised modification of TEC's.

The Department has been identifying and listing TEC's since 1994 through the non-statutory process. The WA Minister for Environment has endorsed 69 ecological communities as threatened in the following categories:

- 20 Critically Endangered
- 17 Endangered
- 28 Vulnerable
- 4 Presumed Totally Destroyed.

25 of these are listed under the Commonwealth's *Environment Protection and Biodiversity Conservation (EPBC)* Act, 1999. As of January 2019, an additional 393 ecological communities (community types and sub-types) with insufficient information available to be considered a TEC, or which are rare but not currently threatened, have been placed on the Priority list and referred to as Priority Ecological Communities (PEC's)**.**

Table 6: Categories of DBCA's Threatened Ecological Communities

PD	**Presumably Totally Destroyed** An ecological community that has been adequately searched for but for which no representative occurrences have been located.
CE	**Critically Endangered** An ecological community that has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future.
E	**Endangered** An ecological community that has been adequately surveyed and is not critically endangered but is facing a very high risk of total destruction in the near future.
V	**Vulnerable** An ecological community that has been adequately surveyed and is not critically endangered or endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future.

The EPBC Act provides for the strong protection of TEC's, which are listed under section 181 of the Act and are described as 'Critically Endangered', 'Endangered' or 'Vulnerable' under section 182. Schedules of protected TEC's maintained pursuant to the EPBC Act are based on the same Floristic Community Type's (FCT's) as adopted by DBCA, however not all TEC's listed by the DBCA are scheduled under the EPBC Act.

The Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Report indicated there is one known Threatened Ecological Community (TEC) likely to occur within a 10km radius of the area, the TEC is listed in **Table 7** below.

Table 7: DCCEEW listed Threatened Ecological Communities

Species Name	Conservation Code	Likely to occur on site
Eucalypt Woodlands of the Western Australian Wheatbelt	Critically Endangered	Yes

3.3.1 Department of Biodiversity, Conservation and Attractions (DBCA) Database Search

In addition to the background searches undertaken through the DCCEEW Protected Matters search a Threatened Ecological Community (TEC) search was undertaken through the DBCA. The search is undertaken on records from the DBCA, which provides known locations of TEC's. The results noted one known TEC to occur within a 10km radial area from the central coordinate. This information is provided in **Table 8** below.

Table 8: DBCA listed Threatened Ecological Community

Species Name	Conservation Code	Likely to occur on site
Wheatbelt Woodlands - Eucalypt woodlands of the Western Australian Wheatbelt	Priority 3 [DBCA] Critically Endangered [EPBC]	Yes

4. FLORA AND VEGETATION ASSESSMENT RESULTS

A total of 43 taxa, comprising of 14 families and 37 genera were recorded on site. A list of these species has been provided in **Appendix A**. Species representation was greatest among the Asteraceae, Myrtaceae and Poaceae families.

4.1 INTRODUCED SPECIES

Nine introduced flora species were recorded on the site, shown in **Table 9** below. This represents 21% of the total number of flora species recorded on site. No species recorded are listed as Declared Pest species under the *Biosecurity and Agriculture Management* Act, 2007 (BAM Act). Definitions are provided in **Appendix C.**

Table 9: Introduced Flora Recorded in the Survey Area

Taxa	Common Name	BAM Act
**Aira caryophyllea*	Silver Hair-Grass	Permitted - s11
**Avena barbata*	Wild Oats	Permitted - s11
**Ehrharta longiflora*	Annual Veldt Grass	Permitted - s11
**Hordeum* sp.	Barley Grass	Not listed
**Mesembryanthemum nodiflorum*	Slender Ice Plant	Permitted - s11
**Sonchus oleraceus*	Common Sowthistle	Permitted - s11
**Ursinia anthemoides*	South African Marigold.	Permitted - s11
**Vulpia myuros*	Rat's Tail Fescue	Permitted - s11
**Vulpia sp*	Fescue	Not listed

4.2 THREATENED AND PRIORITY FLORA

No species of Threatened (T) or Priority Flora were recorded during the survey; No other flora, pursuant to the *Biodiversity Conservation* (BC) Act, 2016 or the *Environment Protection and Biodiversity Conservation* (EPBC) Act, 1999 or listed by the Department of Biodiversity, Conservation and Attractions (DBCA) were located during the time of the survey.

The botanical survey was undertaken in spring to coincide with the majority of the flowering times of the threatened species. Although the desktop assessment determined that a number of priority and threatened species are likely to occur within the environment found on the site, due to continual grazing, cropping and the degraded nature of the vegetation, it is now highly unlikely for any of these species to occur within the project area.

4.3 THREATENED ECOLOGICAL COMMUNITIES

The Eucalypt Woodlands of the Western Australian Wheatbelt ecological community is not present within the project area. Very limited native vegetation remains on site. The remnant Eucalypt woodland community no longer meets the size threshold described for the TEC. Although there are areas that contain Eucalypt woodland in "Good" vegetation condition, there is no area that is greater than 2ha, with an intact understorey.

No Threatened Ecological Communities listed by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) or Department of Biodiversity, Conservation and Attractions (DBCA) were located during the time of the survey.

4.4 LOCAL VEGETATION COMMUNITIES

Vegetation structure recorded in each vegetation community is used to determine the coverage class as described below in **Table 10.** These vegetation structure classes are defined in the Technical Guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (2016).

Table 10: Vegetation Structure Classes

Life Form/ Height Class	Canopy Cover (percentage)			
	100% - 70%	70% - 30%	30% - 10%	10% - 2%
Trees 10-30m Trees < 10m	Closed Forest Low Closed Forest	Open Forest Low Open Forest	Woodland Low Woodland	Open Woodland Low Open Woodland
Shrub Mallee	Closed Shrub Mallee	Shrub Mallee	Open Shrub Mallee	Very Open Shrub Mallee
Shrubs > 2m Shrubs 1-2m Shrubs <1m	Closed Tall Scrub Closed Heath Closed Low Heath	Tall Open Scrub Open Heath Open Low Heath	Tall Shrubland Shrubland Low Shrubland	Tall Open Shrubland Open Shrubland Low Open Shrubland
Grasses	Closed Grassland	Grassland	Open Grassland	Very Open Grassland
Herbs	Closed Herbland	Herbland	Open Herbland	Very Open Herbland
Sedges	Closed Sedgeland	Sedgeland	Open Sedgeland	Very Open Sedgeland

Two vegetation communities were represented on the site at a local level, which have been described below in **Table 11.** Photographic representations of the vegetation community are shown in the Quadrat data sheets in **Appendix B**. The vegetation communities, conditions and quadrat locations are shown on **Figures 4** & **5.**

Table 11: Local Vegetation Community Recorded within Lots 19448 and 27381 Robartson Road, Merredin, October 2023.

Community Descriptions
Vegetation Community 1 Paddocks with isolated *Eucalyptus capillosa*
Vegetation Community 2 Small remnant patches of *Eucalyptus burracoppinensis* with *Allocasuarina campestris* over a sparse grass and herb understorey

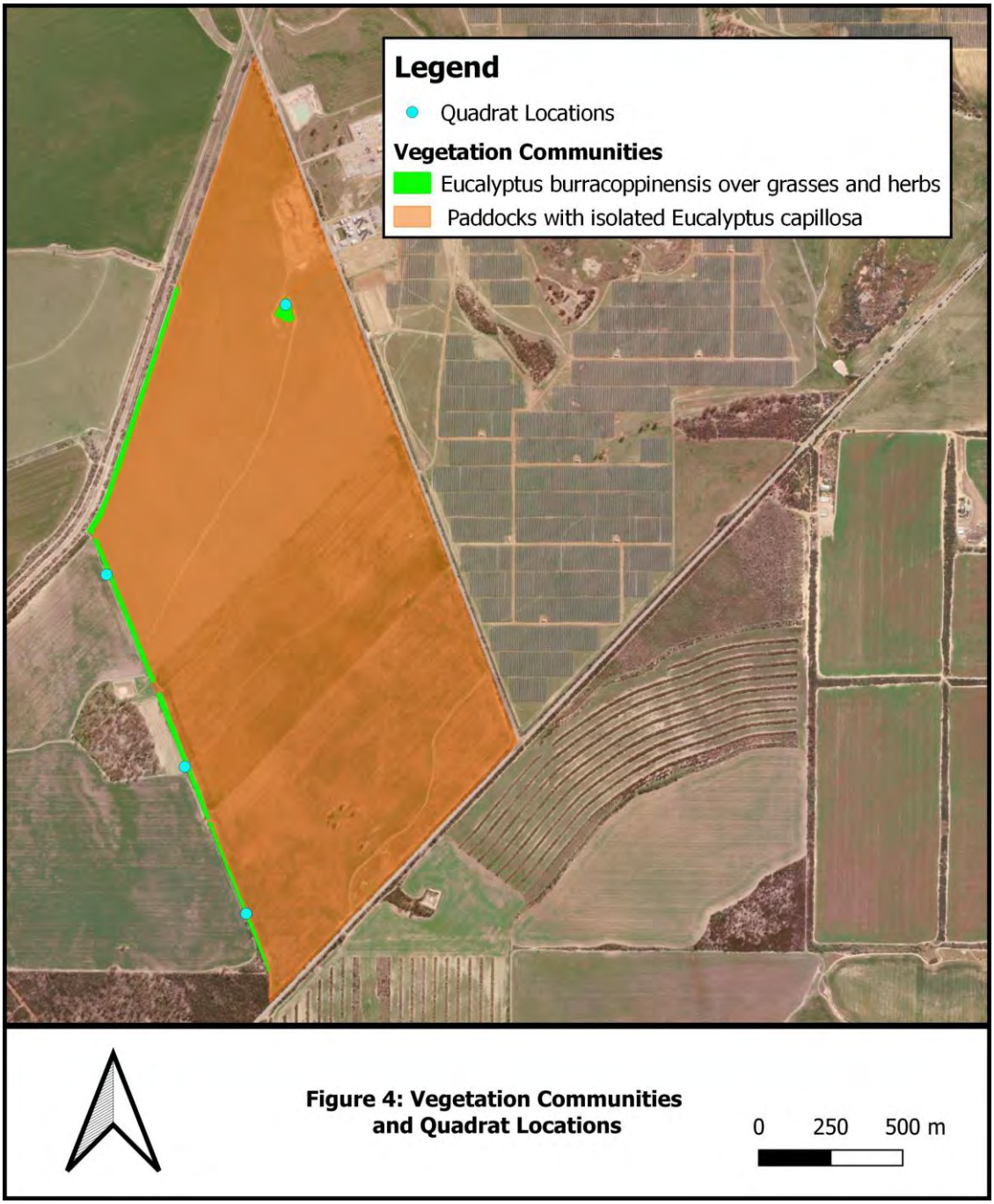


Figure 4: Vegetation Communities and Quadrat Locations

4.5 VEGETATION CONDITION

Many bushland remnants have been historically degraded and current land use activities continue degradation and fragmentation processes. As a result, these remnants are especially susceptible to disturbances arising from indirect impacts such as surrounding developments and human activity. Degradation is caused by a wide range of factors, including isolation and edge effects, weed invasion, plant diseases, changes in fire frequency and behaviour, landscape fragmentation, increased predation on native fauna by feral animals, resulting in a decrease in species richness and general modification of ecological function (Urban Bushland Council, 2018).

The site has had significant historic land disturbances, primarily for cropping and livestock. The project area is completely cleared, resulting in isolated *Eucalytpus capillosa* standing in paddocks with weed dominated understorey. Small intact patches of vegetation were recorded within the project area, predominately along the fence lines.

The vegetation condition was rated according to the Vegetation Condition Scale used in the Technical Guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (2016). The definitions are described in **Table 12** below.

Table 12: Vegetation Condition Scale

Vegetation Condition	South West and Interzone Botanical Provinces	Eremaean and Northern Botanical Provinces
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.	
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement
Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds
Poor		Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs

The vegetation condition recorded across the site was varied from “Good” to “Completely Degraded”. Vegetation condition mapping is provided on **Figure 5.**

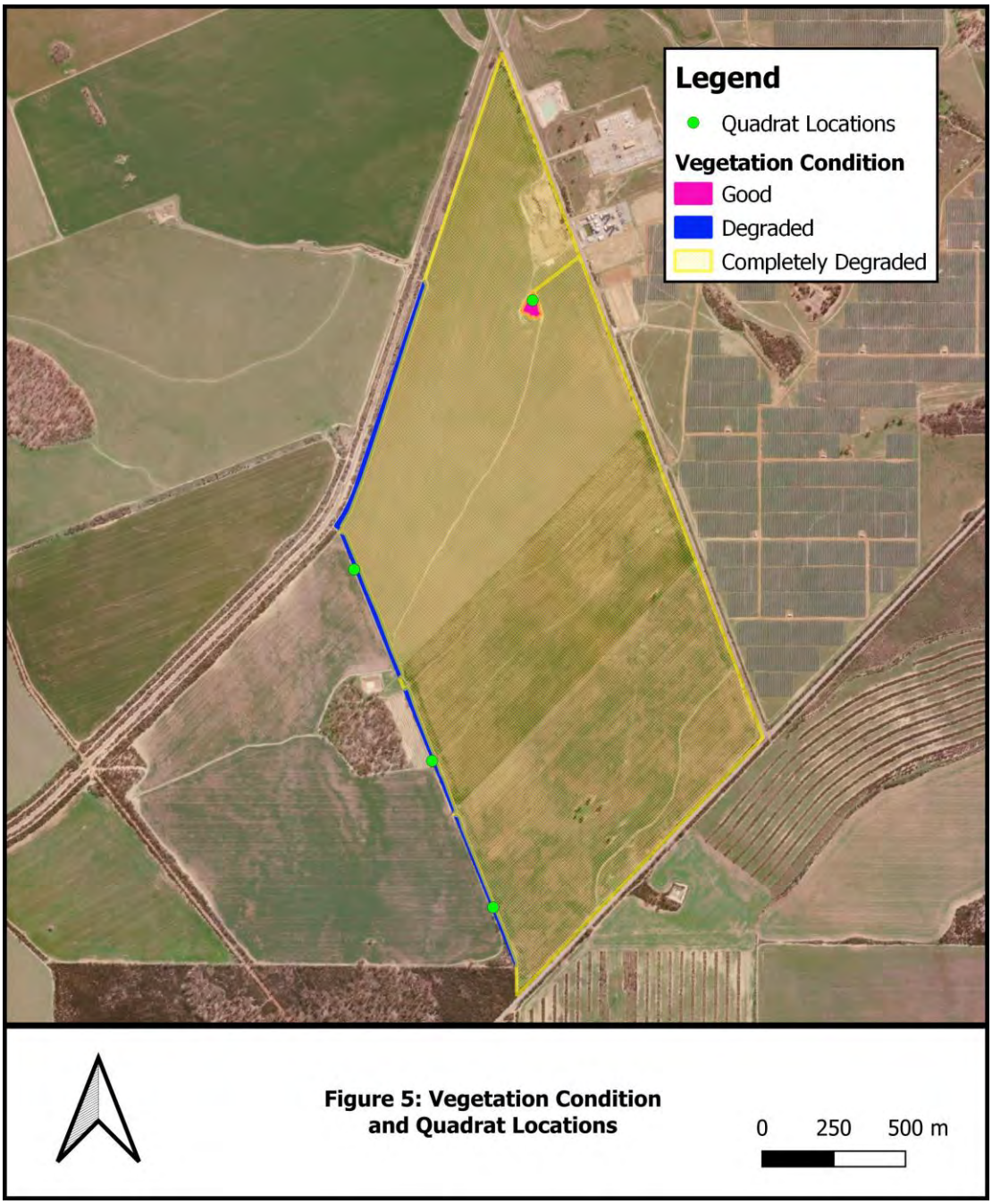


Figure 5: Vegetation Condition and Quadrat Locations

5. BLACK COCKATOO HABITAT ASSESSMENT

A Black Cockatoo Habitat Assessment was undertaken on the 28th October 2023. The Black Cockatoo Habitat Assessment recorded all potentially significant Black Cockatoo habitat trees within the project area, with a DBH of >500mm for Jarrah and Marri and >300mm DBH for Wandoo, Powderbark Wandoo and Salmon Gum.

Hollows form as trees age, over time, the trees are subject to various natural forces such as fire or storm that cause injury to the protective bark. While the living, outer sapwood may remain healthy, wood-rotting fungi and termites gain access to the heartwood, beginning the decay process. In Western Australia, fire often contributes to the initial cause of injury, as well as, by burning decayed wood, enlarging existing hollows. Wildlife can also renovate hollows using beaks, or claws. Only old trees have hollows (CALM, 2005).

Research has shown that Jarrah, Wandoo and Salmon Gum rarely form hollows before they are 120-150 years of age. A hollow large enough for a black cockatoo (which requires an entrance hole 25cm in diameter) will only be found in a tree that is even older than that (CALM, 2005).

The assessment included categorising foraging habitat for the three WA Threatened Black Cockatoo species; Carnaby's Cockatoo (*Zanda latirostris*), Baudin's Cockatoo (*Zanda baudinii*) and Forest Red-tailed Black-cockatoo (*Calyptorhynchus banksii naso*).

The following information was collected for each native tree species within the survey area, with a minimum DBH of 500 mm (300mm for Wandoo, Powderbark Wandoo and Salmon Gum).

- Tree number;
- Tree species;
- GPS Coordinates;
- DBH;
- Tree Health;
- Presence and size of hollows; and
- A photo of each tree.

5.1 FORAGING, ROOSTING AND BREEDING HABITAT

The project area lies within the wheatbelt region, which potentially provides breeding and foraging habitat for Carnaby's Cockatoo. This region contains open woodland of York Gum (*Eucalyptus. loxophleba*), Wandoo (*Eucalyptus. wandoo*), Salmon Gum (*Eucalyptus salmonophloia*) and Flooded Gum (*Eucalyptus rudis*), which are used by Carnaby's Cockatoo for breeding.

Vegetation in this region is fragmented and represented poorly in reserves. The project area is within 1km of Totadgin Conservation Park and the Merredin Nature Reserve. These areas are likely wheatbelt woodland and potentially provide suitable forage and breeding habitat for Carnaby's Cockatoo.

The project area consists of cleared paddocks with isolated *Eucalyptus capillosa,* and *Eucalyptus burracoppinensis* trees. There are small remnant pockets of native vegetation occurring predominately along the fence lines. There was no suitable forage recorded within the project area.

No signs of roosting were recorded during the survey, no field observations of piles of pruned branches, feathers or droppings were recorded.

The size of the tree (measured as the diameter at breast height) can be a useful indication of the hollow-bearing potential of the tree. Habitat trees are recorded with a diameter at breast height (DBH) of 500 mm (for salmon gum and wandoo, suitable DBH is 300 mm). Each tree within the survey area was recorded with a GPS location and information was collected for each individual tree. Tree locations are shown on **Figure 6** and information is provided in **Appendix D**.

Twenty-six potential Black Cockatoo Habitat Trees were recorded on site with a suitable DBH, consisting of *Eucalyptus capillosa*. Sixteen of these trees have hollows, with no hollows recorded as suitable for Black Cockatoo's breeding. No signs of use of hollows by Black Cockatoos were noted.

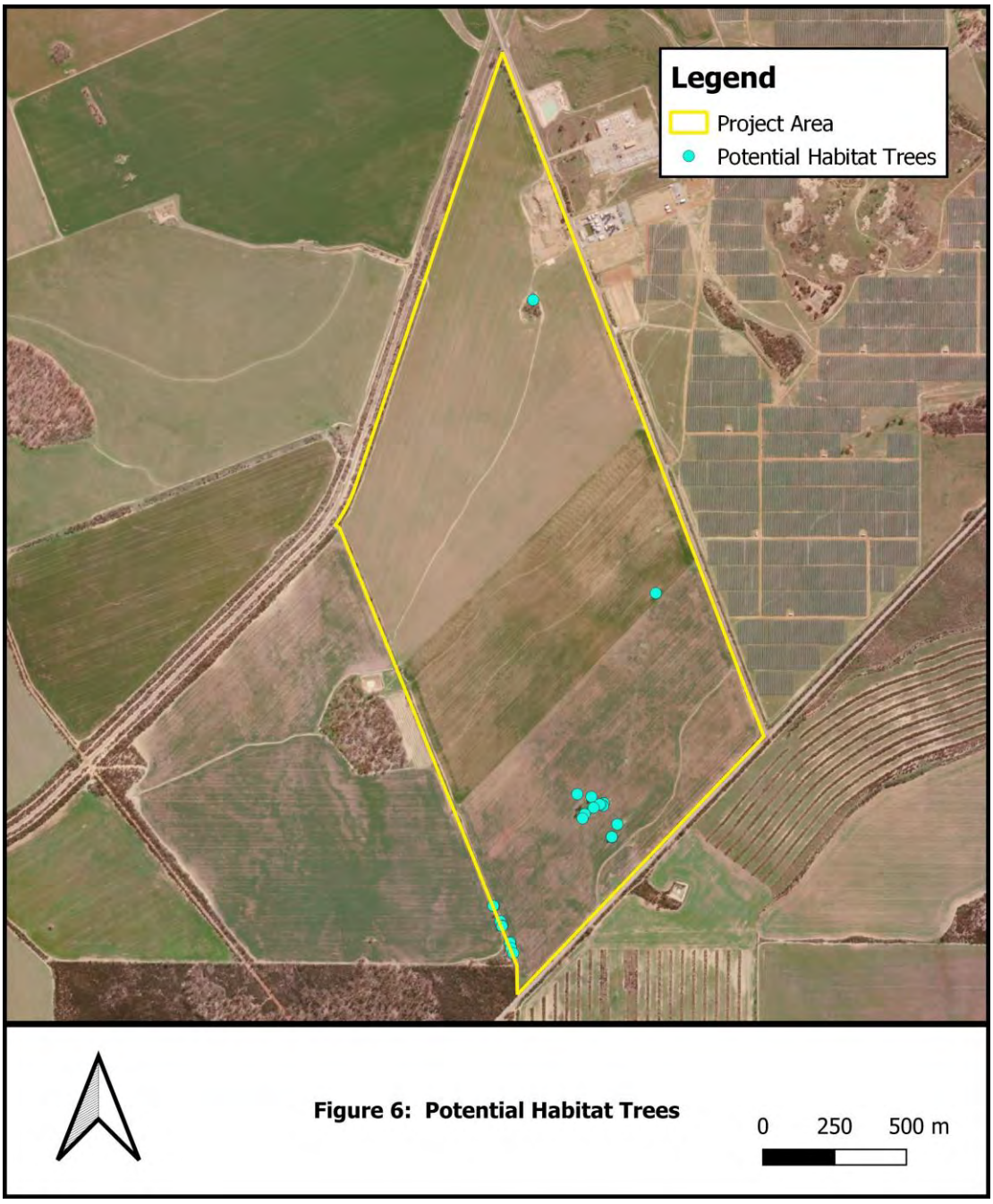


Figure 6: Potential Habitat Trees

6. CONCLUSIONS AND RECOMMENDATIONS

The Detailed Flora and Vegetation survey and Black Cockatoo Habitat Assessment was undertaken on Lots 19448 and 27381 Robartson Road, Merredin. The survey identified a total of 43 taxa representing 37 genera and 14 families. Weeds species comprised of 21% of the total flora recorded. The vegetation condition across the site is “Good” to “Completely Degraded”.

Two vegetation communities were recorded at a local level during the survey. Vegetation consisted of paddocks with isolated *Eucalyptus capillosa* and small remnant patches of *Eucalyptus burracoppinensis* with *Allocasuarina campestris* over a sparse grass and herb understorey. This area has been extensively cleared for agriculture, however, retains some similarities to the vegetation recorded in the Avon Wheatbelt Bioregion.

No species of Threatened (T), or Priority Flora pursuant to the *Biodiversity Conservation* (BC) Act, 2016 or the *Environment Protection and Biodiversity Conservation* (EPBC) Act, 1999 were located during the time of the survey. No Threatened Ecological Communities listed by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) or Department of Biodiversity, Conservation and Attractions (DBCA) were located during the time of the survey.

Twenty-six potential Black Cockatoo Habitat Trees were recorded on site. 16 of these trees have hollows, with no trees recorded with hollows suitable for Black Cockatoo breeding.

Based on the results of this survey, Del Botanics Environmental Consulting proposes the following recommendations:

- Where possible, retain all Potential Habitat Trees; and
- Encourage best practice weed management.

7. REFERENCES

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APPENDIX A
VASCULAR PLANT SPECIES RECORDED

APPENDIX A:
VASCULAR PLANT SPECIES RECORDED WITHIN LOTS 19448 AND 27381 ROBARTSON ROAD, MERREDIN OCTOBER 2023
*(*Denotes a weed species)*

Family	**Genus Species**
Aizoaceae	**Mesembryanthemum nodiflorum*
Apocynaceae	*Alyxia buxifolia*
Asparagaceae	*Thysanotus manglesianus*
Asteraceae	**Sonchus oleraceus*
	**Ursinia anthemoides*
	Actinobole uliginosum
	Asteraceae sp.
	Hypochaeris sp.
	Waitzia ?nitida
Casuarinaceae	*Allocasuarina campestris*
Chenopodiaceae	*Enchylaena tomentosa*
	Maireana sp.
	Rhagodia baccata
Cyperaceae	*Ecdeiocolea monostachya*
	Lepidosperma sp. Bandalup Scabrid (N.Evelegh 10798)
	Schoenus hexandrus
Fabaceae	*Acacia enervia*
Hemerocallidaceae	*Dianella revoluta*
Montiaceae	*?Calandrinia* sp.
Myrtaceae	*?Hysterobaeckea* sp.
	Baeckea muricata
	Eucalyptus burracoppinensis
	Eucalyptus capillosa
	Myrtaceae sp.
Poaceae	**Aira caryophyllea*
	**Avena barbata*
	**Ehrharta longiflora*
	**Vulpia myuros*
	**Vulpia* sp.
	?Austrostipa eremophila
	Amphipogon caricinus var. *caricinus*
	Aristida contorta
	Austrostipa ? hemipogon
	Austrostipa hemipogon
	Austrostipa elegantissima
	Enneapogon ?nigricans
	**Hordeum* sp.
	Monachaeta paradoxus
	Neurachne alopecuroidea
Proteaceae	*Grevillea paradoxa*
	Grevillea sp.
	Petrophile divaricata
Restionaceae	*Desmocladus asper*

APPENDIX B
QUADRAT DATA

Del Botanics

FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: Merredin Solar Farm	**Date:** 28/10/2023	**Site:** Q1
GPS Datum: 50 616214.75 6509360.48	**Topography:** Flat	**Litter cover:** 20% twigs, 15% leaves 10% logs
Age since fire: >10 yrs	**Disturbance: Hi** Med Lo	**Soils:** Sandy/Clay/Brown Yellow
Vegetation Description: *Eucalyptus burracoppinensis* with *Allocasuarina campestris* over a sparse grass and herb understorey		
Vegetation Condition: Good structure and diversity		
Observations:		



Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
Top	*Eucalyptus burracoppinensis*	600	80	20	5
	Allocasuarina campestris	500	10	10	30
Middle	*?Hysterobaeckea* sp.	200	40	60	2
SP3	*Baeckea muricata*	100	95	5	8
Bottom	*Austrostipa elegantissima*	100	100		7
SP4	*Amphipogon caricinus* var. *caricinus*	60	80	20	6
SP5	**Avena barbata*	60	50	50	5
	Waitzia ?nitida				
SP7	*Actinobole uliginosum*				
	Enchylaena tomentosa				
	**Mesembryanthemum nodiflorum*				
	**Hordeum* sp				

	**Aira caryophyllea*				
	Hypochaeris sp				
Opp	**Ehrharta longiflora*				
	Desmocladus asper				
SP8	*Austrostipa ? hemipogon*				

Del Botanics

FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: Merredin Solar Farm	**Date:** 28/10/2023	**Site:** Q2
GPS Datum: 50 615841.85 6507781.11	**Topography:** Flat	**Litter cover:** 10% twigs, 30% leaves 20% logs
Age since fire: >10 yrs	**Disturbance: Hi** Med Lo	**Soils:** Sandy/Clay/Brown Yellow
Vegetation Description: *Eucalyptus burracoppinensis* with *Allocasuarina campestris* over a sparse grass and herb understorey		
Vegetation Condition: Degraded		
Observations: Occurs along the strip of vegetation along the fence line		



Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
Top	*Eucalyptus burracoppinensis*	700	100		35
	Allocasuarina campestris	500	50	50	40
SP12	*Acacia enervia*	200	100		4
Middle (SP2)	*?Hysterobaeckea* sp.	200	100		1.5
SP9	*Myrtaceae* sp.	100	100		1
SP10	*Alyxia buxifolia*	60	100		0.2
Bottom	**Ehrharta longiflora*	100	50	50	7
	Waitzia ?nitida	15	50	50	4
SP11	*Aristida contorta*	60	50	50	4
SP5	*Avena barbata*				
SP15	*?Austrostipa eremophila*				
	Austrostipa elegantissima				

	Enchylaena tomentosa				
SP4	*Amphipogon caricinus* var. *caricinus*				
	Dianella revoluta				
	***Ursinia anthemoides*				
Opp	*Lepidosperma* sp. Bandalup Scabrid				
	***Aira caryophyllea*				
	Asteraceae sp				
	***Mesembryanthemum nodiflorum*				
SP14	*Austrostipa hemipogon*				
SP13	*?Calandrinia* sp.				
Opp	*Petrophile divaricata*				

Del Botanics

FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: Merredin Solar Farm	**Date:** 28/10/2023	**Site:** Q3
GPS Datum: 50 616066.74 65077259.75	**Topography:** Flat	**Litter cover:** 20% twigs, 10% leaves 20% logs
Age since fire: >10 yrs	**Disturbance: Hi** Med Lo	**Soils:** Sandy/Clay/Brown Yellow
Vegetation Description: *Eucalyptus capillosa* with *Allocasuarina campestris* over a sparse grass and herb understorey		
Vegetation Condition: Degraded		
Observations:		



Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
Top	*Eucalyptus capillosa*	2000	100		10
Middle	*Allocasuarina campestris*	300	50	50	20
SP16	*Grevillea paradoxa*	300	100		12
Bottom	*Waitzia ?nitida*	40	100		4
SP11	*Aristida contorta*	60	50	50	2
	**Aira caryophyllea*	40	50	50	3
	**Ehrharta longiflora*	30	50	50	7
	**Avena barbata*				
	Austrostipa elegantissima				
	Enchylaena tomentosa				
SP17	*Petrophile divaricata*				

	Maireana sp.				
	**Mesembryanthemum nodiflorum*				
SP10	*Alyxia buxifolia*				
	**Sonchus oleraceus*				
	Rhagodia baccata				
Opp	*Dianella revoluta*				
SP5	*Avena barbata*				
SP15	*?Austrostipa eremophila*				
SP18	*Austrostipa ?hemipogon*				
SP19	*Enneapogon ?nigricans*				
SP20	**Ehrharta longiflora*				
	**Vulpia* sp				

Del Botanics

FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: Merredin Solar Farm	**Date:** 28/10/2023	**Site:** Q4
GPS Datum: 50 615575.27 6508436.32	**Topography:** Flat	**Litter cover:** 10% twigs, 20% leaves 2% logs
Age since fire: >10 yrs	**Disturbance: Hi** Med Lo	**Soils:** Sandy/Clay/Brown Yellow
Vegetation Description: *Allocasuarina campestris* over a sparse grass and herb understorey		
Vegetation Condition: Degraded		
Observations:		



Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
Upper	*Allocasuarina campestris*	400	100		8
Middle (SP2)	*?Hysterobaeckea* sp.	60	50	50	15
Bottom	*Austrostipa elegantissima*	60	50	50	6
SP4	*Amphipogon caricinus* var. *caricinus*	40	50	50	4
SP5	*Monachaeta paradoxus*	40	50	50	4
SP11	*Aristida contorta*				
	Waitzia ?nitida				
	**Aira caryophyllea*				
SP21	*Ecdeiocolea monostachya*				
SP14	*Austrostipa hemipogon*				
	Thysanotus manglesianus (Dead)				
SP22	*Lepidosperma* sp. Bandalup Scabrid				

	**Avena barbata*				
	Neurachne alopecuroidea				
	**Ehrharta longiflora*				
Opp	*Grevillea paradoxa*				
SP9	*Myrtaceae* sp.				
SP23	**Vulpia myuros*				
SP24	*Schoenus hexandrus*				
SP7	*Actinobole uliginosum*				

APPENDIX C

BAM ACT DEFINITIONS

BAM Act Definitions

Legal status

Each listed organism is declared under the Biosecurity Management act with certain legal requirements:

Declared Pest, Prohibited - s12

Prohibited organisms are declared pests by virtue of section 22(1), and may only be imported and kept subject to permits. Permit conditions applicable to some species may only be appropriate or available to research organisations or similarly secure institutions.

Permitted - s11

Permitted organisms must satisfy any applicable import requirements when imported. They may be subject to an import permit if they are potential carriers of high-risk organisms.

Declared Pest - s22(2)

Declared pests must satisfy any applicable import requirements when imported, and may be subject to an import permit if they are potential carriers of high-risk organisms. They may also be subject to control and keeping requirements once within Western Australia.

Permitted, Requires Permit - r73

Regulation 73 permitted organisms may only be imported subject to an import permit. These organisms may be subject to restriction under legislation other than the *Biosecurity and Agriculture Management Act 2007*. Permit conditions applicable to some species may only be appropriate or available to research organisations or similarly secure institutions.

Unlisted - s14

If you are considering importing an unlisted organism/s you will need to submit the name/s for assessment, as unlisted organisms are automatically prohibited entry

APPENDIX D
POTENTIAL BLACK COCKATOO HABITAT TREE DATA

Tree Number	Photo	Tree Species	DBH (mm)	Height (m)	Potential, Suitable, or Known	Hollows	Health	Comments	UTM
1		*Eucalyptus capillosa*	681.53	25	Potential	na	Very Good		50 J 616480.50 6507505.775
2		*Eucalyptus capillosa*	509.55	20	Potential	1 medium	Very Good		50 J 616481.79 6507504.303

3		*Eucalyptus capillosa*	477.71	25	Potential	2 medium 2 small	Very Good		50 J 616499.86 6507549.548
4		*Eucalyptus capillosa*	407.64	25	Potential	1 small	Very Good		50 J 616378.26 6507570.294
5		*Eucalyptus capillosa*	528.66	25	Potential	na	Very Good		50 J 616386.13 6507585.281

6		*Eucalyptus capillosa*	369.43	25	Potential	2 small	Very Good	stick bird nest	50 J 616386.13 6507585.281
7		*Eucalyptus capillosa*	777.07	25	Potential	na	Very Good		50 J 616386.13 6507585.281
8		*Eucalyptus capillosa*	378.98	25	Potential	2 medium	Very Good		50 J 616386.13 6507585.281

9		*Eucalyptus capillosa*	592.36	25	Potential	na	Very Good		50 J 616416.68 6507607.583
10		*Eucalyptus capillosa*	388.54	25	Potential	2 medium	Very Good	two trunks the same size	50 J 616416.68 6507607.583
11		*Eucalyptus capillosa*	541.40	25	Potential	1 small	Very Good		50 J 616409.54 6507645.859

12		*Eucalyptus capillosa*	375.80	25	Potential	1 small	Very Good		50 J 616438.26 6507619.187
13		*Eucalyptus capillosa*	445.86	25	Potential	na	Very Good		50 J 616443.26 6507619.257
14		*Eucalyptus capillosa*	366.24	25	Potential	na	Very Good		50 J 616450.37 6507614.617

15		*Eucalyptus capillosa*	509.55	20	Potential	na	Very Good		50 J 616452.31 6507623.400
16		*Eucalyptus capillosa*	659.24	20	Potential	3 medium 1 small	Very Good		50 J 616633.94 6508357.488
17		*Eucalyptus capillosa*	378.98	25	Potential	na	Very Good		50 J 616136.91 6507099.304

18		*Eucalyptus capillosa*	334.39	25	Potential	na	Very Good		50 J 616129.48 6507117.281
19		*Eucalyptus capillosa*	490.45	25	Potential	2 medium 1 small	Very Good		50 J 616125.48 6507135.440
20		*Eucalyptus capillosa*	477.71	25	Potential	2 medium 1 small	Very Good		50 J 616127.35 6507138.080

21		*Eucalyptus capillosa*	477.71	25	Potential	2 medium 1 small	Very Good		50 J 616097.93 6507193.862
22		*Eucalyptus capillosa*	394.90	25	Potential	1 medium	Very Good		50 J 616099.23 6507195.526
23		*Eucalyptus capillosa*	426.75	25	Potential	na	Very Good		50 J 616092.11 6507211.060

24		*Eucalyptus capillosa*	331.21	25	Potential	2 small	Very Good		50 J 616360.18 6507654.995
25		*Eucalyptus capillosa*	420.38	25	Potential	1 medium	Very Good	3 trunks	50 J 616067.22 6507264.892
26		*Eucalyptus capillosa*	331.21	25	Potential				50 J 616069.06 6507264.017

NB: Each tree's health is determined by the condition of the leaves, bark and observations of any diseases or notable disturbances of the tree.

Hollows	**Information**
Large Hollow	< 25cm entrance
Medium Hollow	10-20cm entrance
Small Hollow	5-10cm entrance

Tree Health	**Information**
Very Good	Tree overall health is excellent
Good	Tree presents minor signs of stress
Degraded/Stressed	Tree has some markers of its health deteriorating
Dead	Tree has no alive branches

APPENDIX J
Aboriginal Heritage Desktop Assessment

Internal Aboriginal Heritage Desktop Assessment: Bruce Rock Merredin Solar Farm & BESS Project

September 2025

Glossary of Terms

ACMC	Aboriginal Cultural Heritage Committee
AH Act	Aboriginal Heritage Act 1972
BRM	BRM Solar Farm Nominee Pty Ltd
DPLH	Department of Planning, Lands and Heritage
ILUA	Indigenous Land Use Agreement
Minister	Minister for Aboriginal Affairs
NNTT	National Native Title Tribunal
SWALSC	South West Aboriginal Land and Sea Council

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Executive Summary

Key Finding: there are no Aboriginal sites within the area of land proposed for the Bruce Rock Merredin Solar Farm & BESS facility. The project believes no further Aboriginal due diligence is required prior to commencing project construction activities and there is no risk of committing an offence under section 17 of the Aboriginal Heritage Act 1972.

An internal Aboriginal Desktop Heritage Assessment was carried out on the proposed Bruce Rock Merredin Solar Farm and BESS (**BRM**) in September 2025.

The proposed project site is located on Robartson Road in Merredin, Western Australia, adjacent to an established large-scale solar farm facility (**Project Land**) – refer to Appendix A. The Project Land has been extensively cleared and modified over the many decades of use for agriculture. It is located wholly within the Ballardong region, one of six Noongar regions in the southwest of Western Australia under the Southwest Noongar Native Title Settlement. Nativie title was extinguished across these lands in exchange for settlement benefits outlined in the registered Indigenous Land Use Agreement (**ILUA**).

The Aboriginal Heritage Act 1972 (AH Act) is Western Australia's main legislation for protecting significant Aboriginal sites. Appendix C lists the sections and clauses applicable for this assessment, summarised here as

- Section 5 defines the protected site types, regardless of registration.
- Section 17 defines it is illegal to damage, alter, conceal, or destroy a site without consent under Sections 16 or 18.
- Section 62 allows a defence if an individual can prove they did not know, nor could reasonably be expected to know, their actions violated Section 17.

This due diligence assessment evaluates the recorded presence, or potential presence of Aboriginal sites on or adjacent to the Project Land. The Department of Planning, Lands and Heritage (DPLH) provides access to the Aboriginal Cultural Heritage Inquiry System (ACHIS)[1], which serves as a resource for searching for, and reviewing such information.

[1] Aboriginal Cultural Heritage Inquiry System

The results of ACHIS searches revealed no recorded Aboriginal sites on the Project Land; the closest is Talgermine Rock, (ACH Lodged - ID 5605), about 22 km northeast within the Shire of Merredin – refer to Appendix B. No other sites are listed for the Shire, and no heritage surveys are recorded for the Project Land. A 2018 survey on adjoining land of similar condition, by Daniel de Gand, found no Aboriginal sites or heritage management considerations needed.

The proposed area is highly disturbed, lacks natural water sources, and contains no rocky outcrops, which could be suitable for stone tools. Conditions favourable for past Aboriginal use evidence—such as elevated terrain, sandy areas, water sources, lithic materials, or rock shelters—are absent.

It is concluded that BRM has fulfilled its obligations under the AH Act; therefore, no further Aboriginal heritage analysis is required prior to the construction of the facility.

Introduction & Approach

BRM is proposing the development of a solar farm and battery energy storage (BESS) facility in the shire of Merredin, 10km south west of the Merredin townsite, along Robartson Road. The facility will connect into the South West Interconnected System (SWIS) at the existing Merredin substation, which is adjacent to the Project Land.

The Project Land has been utilised for agriculture (crops and sheep farming) for many decades and as such is severely modified environment.

This internal desktop assessment has been conducted as part of BRM's Aboriginal Heritage due diligence, prior to progressing with detailed designs and plans.

The assessment was carried out using the following approach

- Review of neighbouring project's 2024 Aboriginal Heritage assessment which included Project Land within its assessment
- Search of the ACHIS – Aboriginal Cultural Heritage Information Service Database
- Search of the NNTT - the National Native Title Tribunal

Results

The sections of the AH Act of importance for this assessment are listed in Appendix C whilst Aboriginal site types are listed in Appendix D.

Landscape

The Project Land has been extensively cleared for agriculture, with only small remnant sections of native bushland remaining, predominantly around the property boundary, none of which is planned to be disturbed by the Project.

Other landforms which may contain Aboriginal sites include

- Rock formations: outcrops, shelters, caves, overhangs
- Water-related landforms: billabongs, springs, creeks, rivers, swamps, wetlands, rock-holes/gnamma holes
- Elevated landforms: Sand dunes, ridges, hilltops
- Coastal formations: Foreshores, beaches, dunes

The Project Land does not contain any of these landforms.

Recorded Aboriginal Heritage Sites

There are three (3) categories of Aboriginal heritage sites as defined by the DPLH

- Aboriginal Cultural Heritage (ACH) Register
    - Sites assessed that meet ACMC threshold under AH Act
- Aboriginal Cultural Heritage (ACH) Lodged
    - Sites awaiting assessment
- Aboriginal Cultural Heritage (ACH) Historic
    - Sites assessed that do not meet threshold to be included in the register

There were no Aboriginal sites present on the Project Land in any of the ACHIS searches conducted. The figures on following pages show map results of each search, noting that no sites identified in any of the maps. The nearest recorded site, Talgermine Rock ACH Lodged ID 5605, approximately 22km to the North East, is the only site recorded in the Shire of Merredin.

Recorded Survey Reports

There were no surveys recorded on the Project Land in the ACHRIS survey search. As reported by Raynor, 2024, the adjoining land was surveyed from De Grand in 2018 whom concluded no sites were present as well as no artefacts present due to lack of suitable lithic materials.

National Native Title Tribunal Search

The NNTT database was searched for any Aboriginal sites being reported in the Project area during any native title processes within the vicinity of the Project Land. There were no findings of any sites being reported.

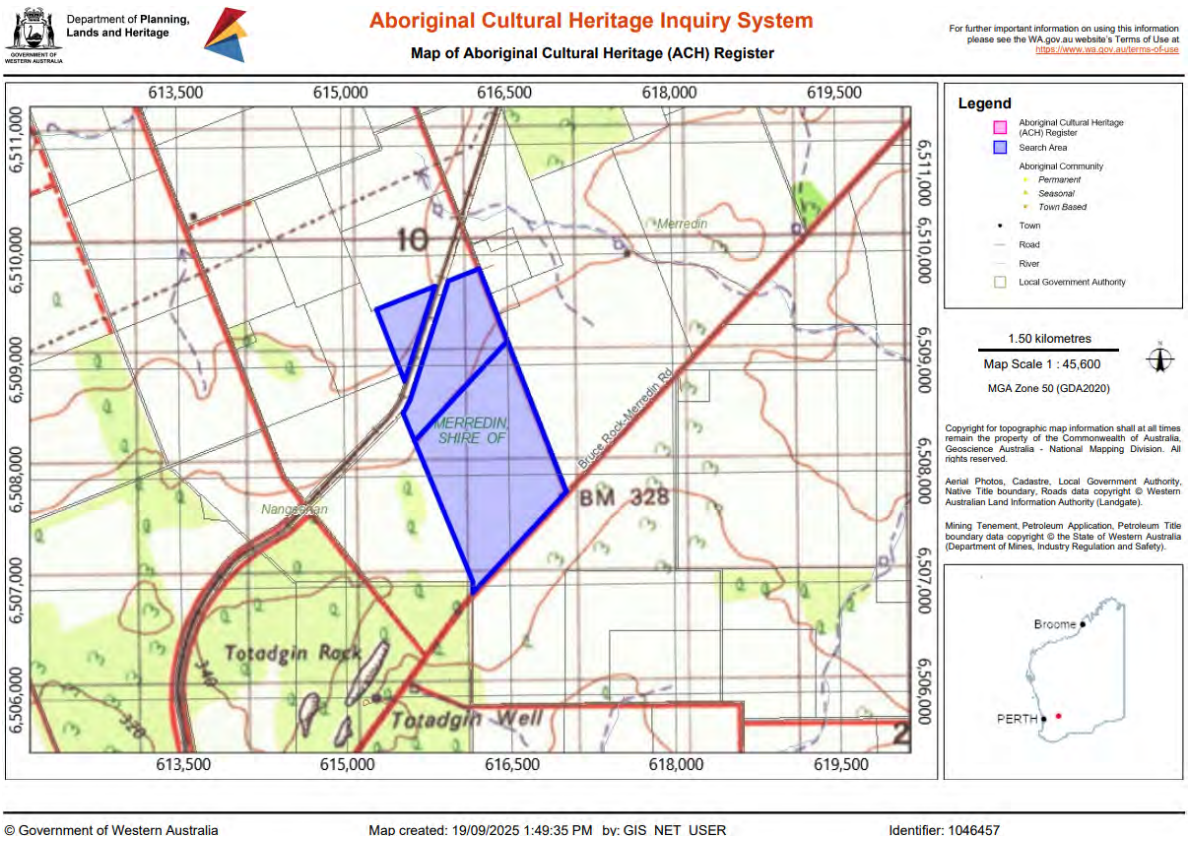


Figure 1: ACH Register

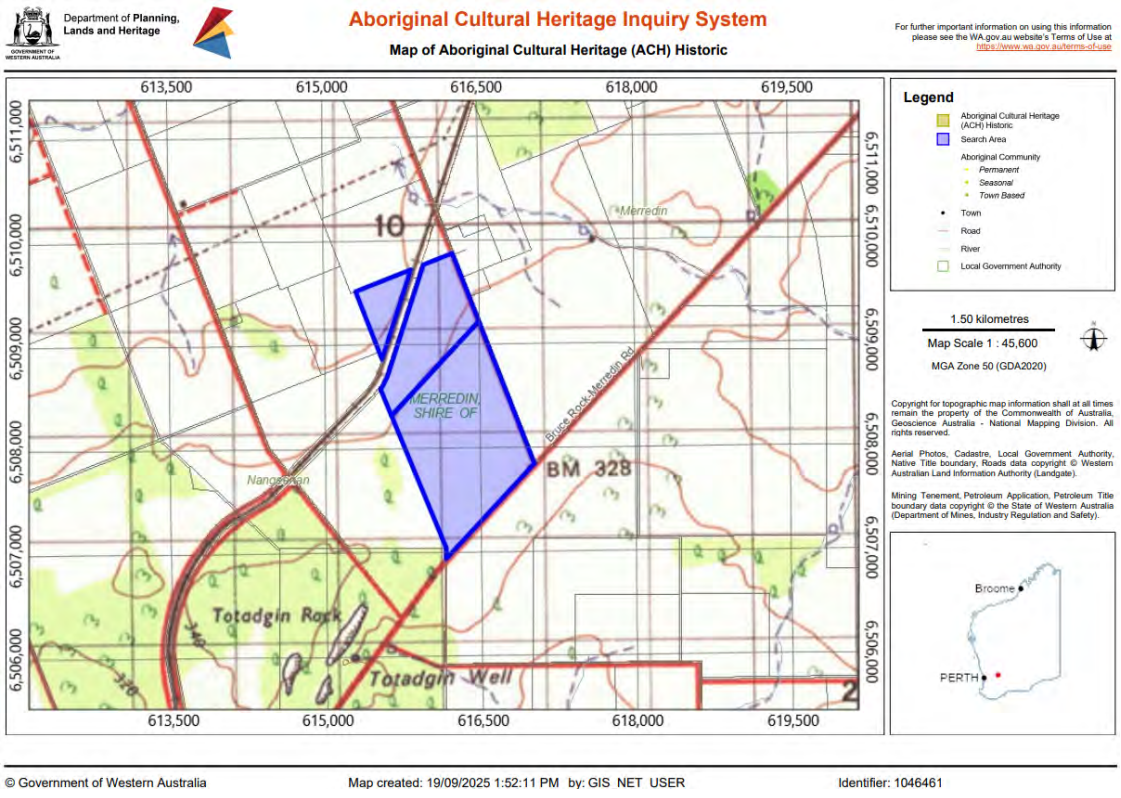


Figure 2: ACH Historic

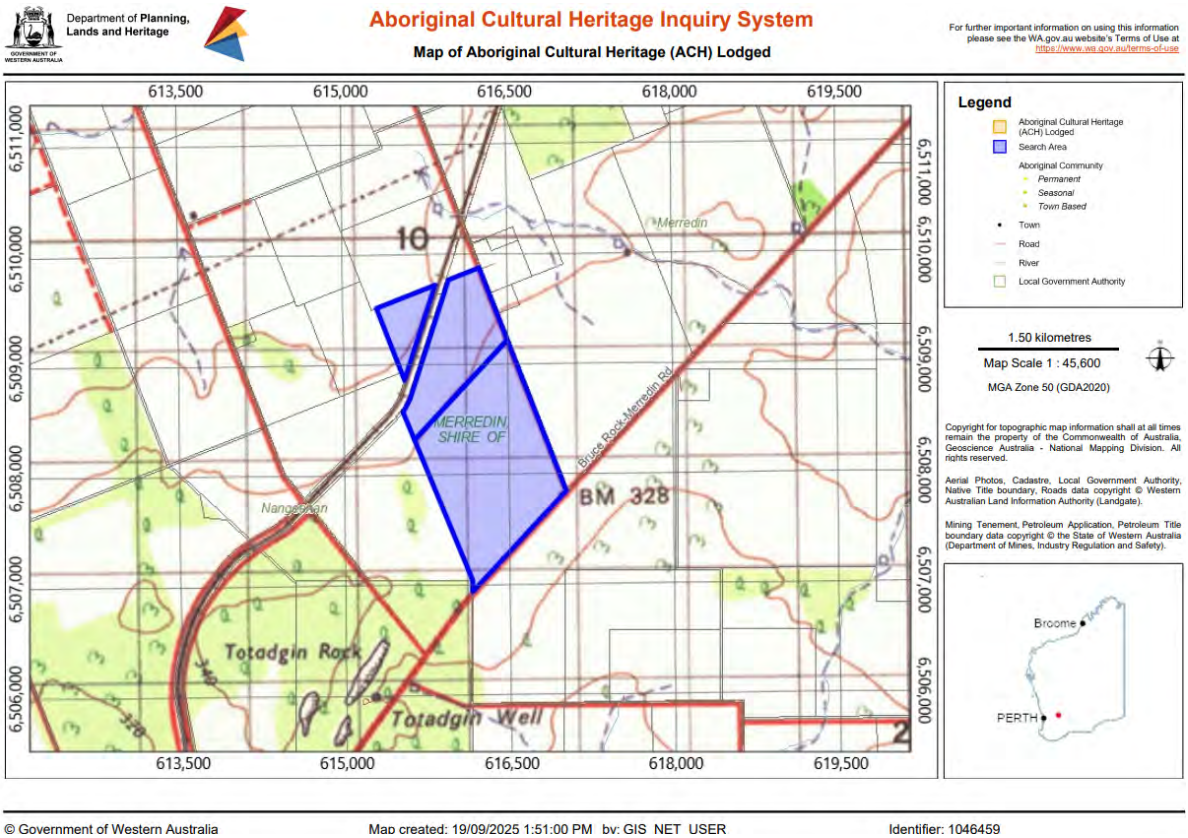


Figure 3: ACH Lodged

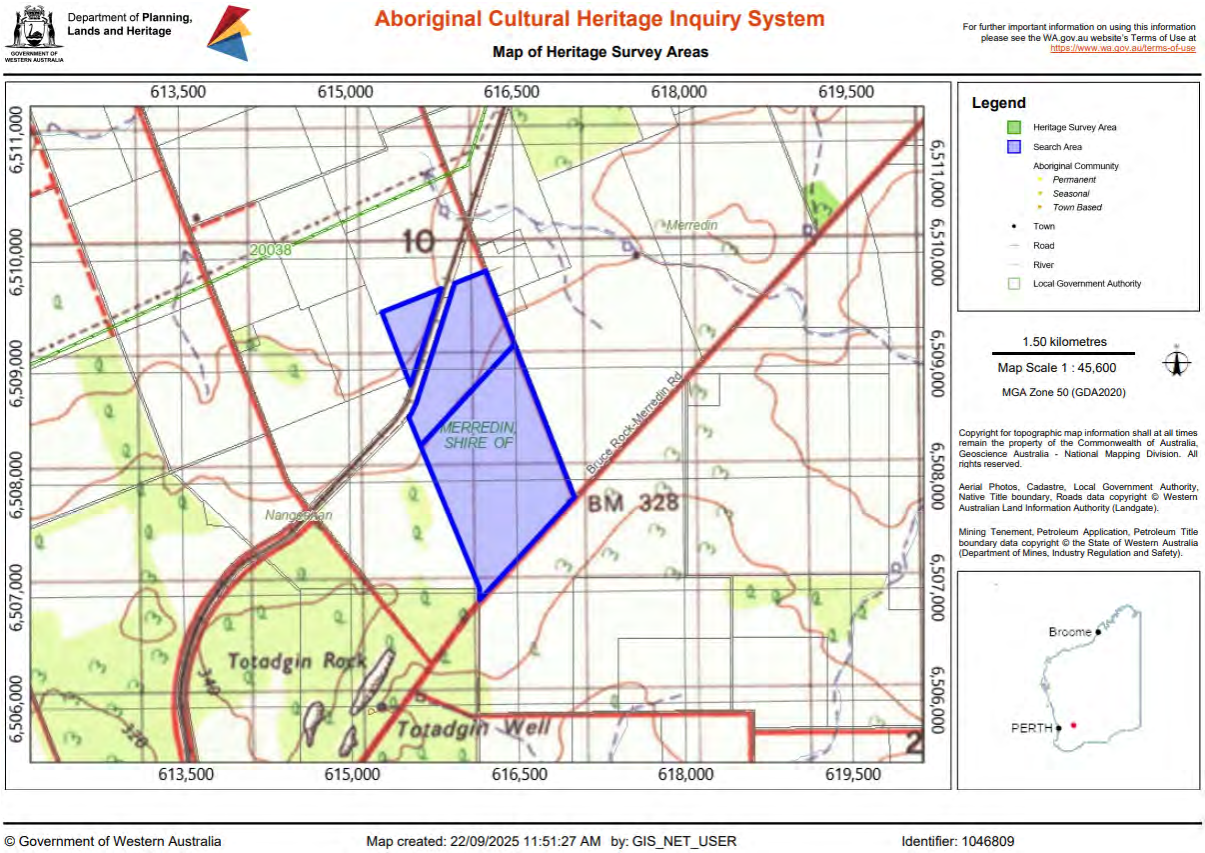


Figure 4: Heritage Surveys

Conclusion

A number of sources were reviewed in conducting this assessment including ACHIS, NNTT, Heritage Reports from adjoining land and proposed project design layouts. Site visits have also been conducted.

The database searches (ACHIS, NNTT) indicated the Project Land does not contain any Aboriginal Sites which aligns with the detailed heritage reports of adjoining land. The Project land also does not contain any land formations, water sources or stone tool suitable material.

The BRM project team determines that the proposed project development should not pose any risk to Aboriginal Heritage sites on the Project Land.

References

Legislation

Aboriginal Heritage Act 1972 (WA)

Rayner, A. 2024 An Aboriginal Heritage Desktop Assessment of the proposed Merredin Battery Project

De Gand, D. 2018 Report of an Aboriginal Heritage Assessment of the Proposed Merredin Solar Farm Project in Merredin WA

South West Aboriginal Land and Sea Council website, https://www.noongar.org.au/

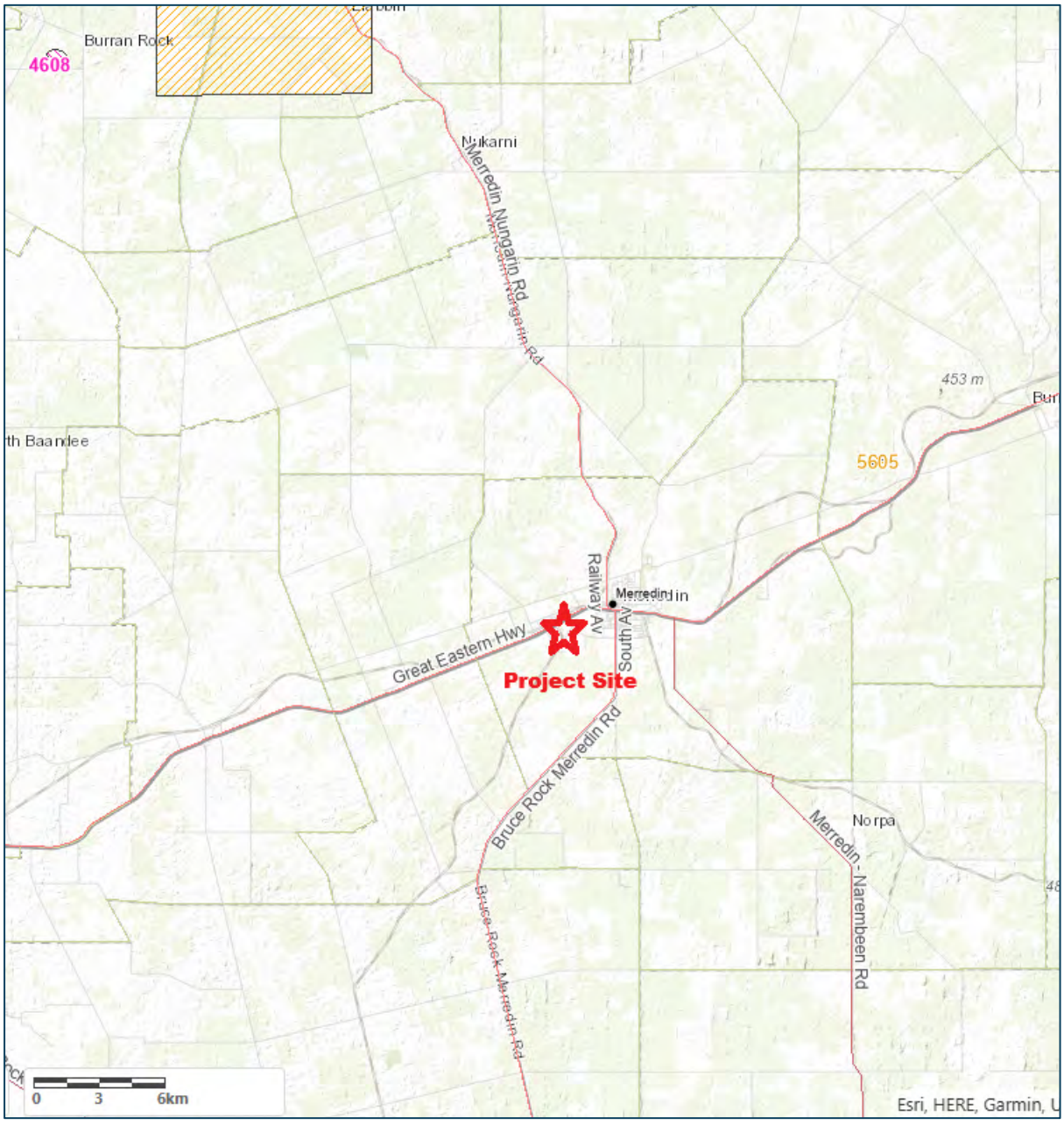
Appendix A – Project Land

Project Land for Bruce Rock Merredin Solar Farm & BESS



Appendix B – Nearest Site

Nearest recorded Aboriginal site – Talgermine Rock (5605) ~ 22km North East



Appendix C – Aboriginal Heritage Act 1972

The Aboriginal Heritage Act 1972 (Amended 14th May 2024) [2]is the current act of WA protecting and managing Aboriginal cultural sites (known or not known), objects, and traditions from damage or destruction. An Aboriginal and Cultural Heritage Act 2021 was proclaimed in 2023, though repealed shortly after with the state reverting to the amended version of the AH Act 1972

Sections of the AH Act below are pertinent to this assessment.

Part 2 – Application and traditional use

Section 5 - Application to places:

a) Any place of importance and significance where persons of Aboriginal descent have, or appeared to have, left any object, natural or artificial, used for, or made or adapted for use for, any purpose connected with traditional cultural life of the Aboriginal people, past or present;
b) Any sacred, ritual, or ceremonial site, which is of importance and special significance to persons of Aboriginal descent;
c) Any place which, in the opinion of the Committee, is or was associated with the Aboriginal people and which is of historical, anthropological, archaeological or ethnographical interest and should be preserved because of its importance and significance to the cultural heritage of the State; and
d) Any place where objects to which this Act applies are traditionally stored, or to which, under the provisions of this Act, such objects have been taken or remove.

Section 6 - Application to objects:

1) this Act applies to all objects, whether natural or artificial and irrespective of where found or situated in the State, which are or have

[2] https://www.legislation.wa.gov.au/legislation/prod/filestore.nsf/FileURL/mrdoc_47122.pdf/$FILE/Aboriginal%20Heritage%20Act%201972%20-%20%5B04-m0-00%5D.pdf?

been of sacred, ritual or ceremonial significance to persons of Aboriginal descent, or which are or were used for, or made or adapted for use for, any purpose connected with the traditional cultural life of the Aboriginal people past or present

2) this Act applies to objects so nearly resembling an object of sacred significance to persons of Aboriginal descent as to be likely to deceive or be capable of being mistaken for such an object.

Part 4 – Protection of Aboriginal sites

Section 17 – Offences relating to Aboriginal sites

A person who —

a) excavates, destroys, damages, conceals or in any way alters any Aboriginal site; or
b) in any way alters, damages, removes, destroys, conceals, or who deals with in a manner not sanctioned by control of, any object on or under an Aboriginal site

commits an offence unless he is acting with the authorisation of the Registrar under section 16 or under a consent given under section 18(3)(a).

Section 26 – Regulations as to protected areas

1. In relation to a protected area the Governor may make regulations prohibiting, or imposing conditions or restrictions upon —
    a. persons entering or remaining within the area;
    b. the use of vehicles, explosives, instruments, tools, and equipment of any kind specified, or generally;
    c. damage or destruction to vegetation, the working of the land, or the disturbance of the surface or the subsoil within the area;
    d. livestock entering or remaining within an area where the Registrar has taken reasonable measures to protect the area from damage by livestock,

and may make all such other regulations as may in his opinion be required or permitted by this Act for ensuring that the places and objects to which this Act applies, and the immediate environment necessary to maintain the nature and substance of the significance attached thereto, are protected from damage, disturbance or adverse influence.

2. A person who contravenes any provision of a regulation made pursuant to subsection (1) commits an offence against this Act, and where a person enters or remains within a protected area in the course of his employment in contravention of any such regulation the employer and that person are each guilty of an offence against this Act.

Part 5 – Aboriginal Cultural Heritage Committee

Section 26 – Aboriginal Cultural Heritage Committee established

1. A body called the Aboriginal Cultural Heritage Committee is established.

Section 38 – Register of places and objects

The Registrar shall, so far as practicable, maintain, in such manner and form as the Minister may determine, a register of —

a) all protected areas;
b) all Aboriginal cultural material; and
c) all other places and objects to which this Act applies, whether within the State or elsewhere.

Section 39 - Functions of the Committee

prescribes the functions of the Aboriginal Cultural Heritage Committee (ACHC) to

1. The functions of the Committee are —
    a. to evaluate on behalf of the community the importance of places and objects alleged to be associated with Aboriginal persons;
    b. where appropriate, to record and preserve the traditional Aboriginal lore related to such places and objects;
    c. to recommend to the Minister places and objects which, in the opinion of the Committee, are, or have been, of special significance to persons of Aboriginal descent and should be preserved, acquired and managed by the Minister;

Part 6 – Enforcement

Section 62 - Special defence of lack of knowledge

In proceedings for an offence against this Act it is a defence for the person charged to prove that he did not know and could not reasonably be expected to have known, that the place or object to which the charge relates was a place or object to which this Act applies

Appendix D - Aboriginal Site Types

The main site types as listed by the DPLH [3]

Artefacts: An artefact site is a place where human activity is identifiable by the presence of a portable object or objects (for example - stone, glass, bone, shell) utilised or modified by Aboriginal people in relation to traditional cultural life past or present.

Ceremonial: A place used for a formal act or series of acts prescribed by ritual, belief in a mythological manifestation, religious belief or observance, protocol or convention that is connected with the traditional cultural life of Aboriginal people past or present.

Engraving: A motif – either figurative or non-figurative – on a rock surface produced by percussion or abrasion. Engravings are also often referred to as petroglyphs.

Fish Trap: A stone, wood, or other similar structure made by Aboriginal people for catching fish. Such structures are generally found on the coast of Western Australia, and in its lakes and rivers.

Grinding patches or Grooves: A place where grinding patches or grooves can be found. Grinding patches or grooves are smoothed areas or grooves on non-portable rock surfaces that have been created by grinding activity associated with food production such as seed milling, preparation of pigments, tool manufacture and/or maintenance and ritual.

Historical places: A place that has historical associations with Aboriginal people and may or may not contain physical evidence of those associations.

Man-made structure: The placement or arrangement, by Aboriginal people, of stone, wood or other material made into a structure for ceremonial or utilitarian purposes.

Midden: A place where there is an accumulation of shell refuse that is derived from exploitation of a mollusc resource by Aboriginal people. Such sites may also contain artefacts, fireplaces, burnt shell and bones.

Modified or Scarred Tree: A place with one or more tree(s), living or dead, that has been modified by Aboriginal people by removing the bark or wood

[3] https://www.wa.gov.au/organisation/department-of-planning-lands-and-heritage/about-aboriginal-heritage

resulting in the formation of a scar. This sort of modification was, and is, frequently done for the making of implements, tools or other materials that were used in traditional cultural practices.

Mythological: A place that is connected to the spirit ancestors, in their various manifestations, of the 'Dreamtime' which continues to be important and of special significance to persons of Aboriginal descent.

Painting: Places where Aboriginal people have painted on surfaces. Paintings – including daubings, drawings, stencils and prints – can be figurative or non-figurative markings or motifs on surfaces such as rocks, rock walls and trees at fixed locations that are produced by adding pigments and/or mediums, such as ochre, blood, beeswax, animal fats, vegetable dyes and tree saps.

Quarry: Places where there is evidence for the extraction of stone or ochre.

Repository/Cache: A place where cultural or utilitarian objects are/were taken, or stored, by Aboriginal people, either past or present.

Skeletal material/Burial: A place where Aboriginal skeletal material is buried and/or where mortuary practices occurred.

Appendix E – Native Title & ILUA

The Native Title Agreement with SWALSC brought about the settlement of all native titles claims in the South West, with the creation of 6 Noongar regions by way of ILUAs



The Project Land sits within the Ballardong ILUA, an area of approximately 63,000 sq km managed by the Ballardong Aboriginal Corporation

Shire of Merredin Chief Executive Officer

PO Box 42, Merredin, WA 6415

Dear Chief Executive Officer,

I am writing to formally lodge my objection to Development Application DAP/26/03058 for the proposed Solar Farm and Battery Energy Storage System (BESS) facility at Lot 19448 & Lot 27381, Robertson Road, Nangeenan.

My concerns relate to the loss of productive agricultural land, the limited lifespan and disposal of solar and battery infrastructure, the lack of demonstrated benefit to the local community, and the absence of clear rehabilitation and funding guarantees.

Firstly, this proposal removes land from agricultural production. Our district is built on farming — not fashion projects. Productive farmland is a finite and valuable resource that supports food security, local employment, and regional sustainability. Once converted to industrial-scale energy infrastructure, this land may be lost to agriculture for decades. With increasing pressure on food systems and climate variability already challenging farmers, sacrificing viable farming land for industrial development is short-sighted.

Secondly, the lifespan of the infrastructure raises serious concerns. Solar panels generally have an operational life of approximately 25 to 30 years. Battery Energy Storage Systems have a much shorter lifespan, commonly between 10 and 15 years before requiring replacement. This means the project will generate significant volumes of waste within a relatively short timeframe.

Of particular concern is the disposal of these materials. Solar panels and lithium-ion batteries contain hazardous substances including heavy metals and chemicals that require specialised recycling or disposal processes. Australia currently has limited large-scale recycling facilities for this type of waste. There is no clear information in the proposal outlining where end-of-life panels and batteries will be transported, how they will be processed, or who will be financially responsible for this long-term waste management. Without binding guarantees, this places environmental risk and potential clean-up costs onto the community and local government.

Thirdly, there is no clarity on who will actually benefit from the electricity generated. Our community is already surrounded by solar farms and wind turbines, yet local households continue to face rising electricity bills. There is no assurance that this project will provide cheaper power to residents of Merredin or Nangeenan, nor that it will improve local energy reliability. It appears this development will export energy to the broader grid while leaving the host community with the visual, environmental, and land-use impacts but little direct benefit.

Rehabilitation of the land is also a major concern.

The proposal does not clearly outline how the site will be restored to productive agricultural use once the project reaches the end of its operational life. Rehabilitation of compacted soil, underground cabling, concrete footings, and access roads is complex and costly. There is no detailed, enforceable rehabilitation plan specifying timeframes, soil restoration methods, or independent monitoring. Without such certainty, there is a real risk the land will remain degraded or unsuitable for farming long after the project ends.

The funding model and financial accountability are unclear.

There is insufficient information provided on how the project will be funded and, more importantly, how rehabilitation and waste disposal will be guaranteed financially. There is no evidence of a secured bond or financial assurance mechanism that would ensure funds are available for full decommissioning and rehabilitation should the proponent cease trading or the project become unviable. History has shown that when private energy projects fail, the burden of clean-up can fall on landowners, councils, or taxpayers. This represents an unacceptable financial risk to the community.

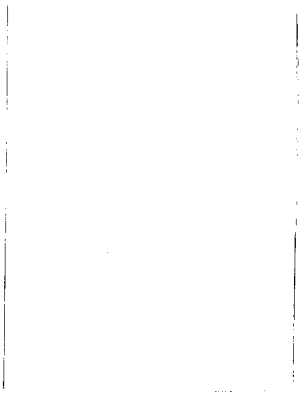
Cumulatively, these projects are changing the character of our rural landscape. We are becoming an energy zone rather than a farming community, without adequate consultation on how much is too much. Renewable energy should be developed responsibly and placed on less productive or industrial land, not on valuable agricultural property that underpins our region's economy and identity.

In summary, I object to this proposal on the grounds that:

- It removes productive agricultural land from long-term use.
- The infrastructure has a limited lifespan with unclear and potentially hazardous disposal outcomes.
- There is no demonstrated benefit to local residents in terms of power costs or energy security.
- There is no clear, enforceable rehabilitation plan to return the land to agricultural use.
- There is no guaranteed funding or bond to cover decommissioning, waste disposal, and rehabilitation costs.
- The cumulative impact of multiple renewable projects is altering the rural character of the district.

I respectfully request that the Development Assessment Panel refuse this application or require substantial amendments that address land use protection, binding rehabilitation obligations, secured financial guarantees, and tangible benefits for the local community.

Thank you for considering my submission.



03/03/2026

ICL 20260146 C5
23/3/26

Objection to Ngaangk Boodja Battery and Solar Farm.

To the CEO of Merredin Shire,

Let me introduce myself.

I am writing to object to the proposal for another solar farm and BESS out on Robartson Road, in our shire of Merredin.
I do not have the Proposal number as this information is no longer on your website.
Two weeks ago, there was information regarding this new one on there and it said objections could be sent in up until 27th March.
It had the proposal number etc, but this information seems to have disappeared. How are people to make submissions if it is no longer there?

Why ask for submissions /objections as it is already approved and being spruiked about on Nomad Energy and Atmos Renewables websites?
As an interest these are not both Australian companies.
Far from it, Atmos is owned by Mitsubishi UFJFC in Tokyo and Nomad has vast foreign investment. Outwardly they look Australian but dig deeper they are not.
And this makes me question do they have our Shire or indeed our state in their best interests?
These companies will get carbon credits and look "green".
They can build with huge subsidies from our government through our taxes, so then this money is going offshore and not staying within Australia and definitely not in our shire.

There was one drop-in meeting regarding this, only one. How is that fair if people were unable to attend on that day? This was not advertised very well either once again.

I have read though the lovely glossy work of Land Insights who are employed by the Proponent, and of course it is all going to sound fantastic. Looks lovely but is very short on the detail we need.
You cannot as a shire just take this all as fact without investigating it surely?
Where is the counter proposal, the other side of the coin?
Or does the shire just roll over to big business?
What will the shire get out of it monetarily? Where is the transparency? Will the shire get anything or is the benefit all for the landowner and multibillion companies Nomad and Atmos to the detriment of our land? These are questions I would like you to answer please.

Where is Merredin's Renewable Policy Plan? I would like to see it please. If you do not have one yet, then it seems risky to let all this get built in our shire and then have a Retrospective Renewable Policy Plan after the fact.

The land it is to be built on is zoned General Farming in the zoning table, but by convenience Renewable Energy is not a class in the zoning table so it can just be added to farming land. It seems incredible you can have farming land which is there for food and you can just adjust it to suit the proponent and the multibillion companies. How is that even right?
Yet if I want to put a wind turbine in town on my quarter acre block you would object to that, and I would have to jump through hoops with the Planning Department to get it through, but you can just let this slide for them?

In the development application it stated that a Flora and Fauna Assessment was done over **one** day!
How can that even be legal to do it over a short period in the spring?
Was it a full day or five minutes to take a few photos? My 4-year-old grandson could have taken better photos. Obviously, it was done to show the land in the least appealing light.
It should have been done over the four seasons to see the changes of both fauna and flora. Nothing is static in nature.

It stated that there were hollows in a strand of eucalyptus trees, but they were old, hadn't been used for a while and not suitable for the black cockatoo, but it won't be a problem as it won't be destroying their nesting as those few trees will stay.
The black cockatoos, pink and grey galahs, the Twenty Eights, Smoker Parrots and smaller birds will still be using those trees to roost in; they do move vast distances.
Just because a hollow is unused, and they sighted no birds there in ONE day does not mean the trees are unused throughout the rest of the year. Those birds now will be driven out by the battery and solar farm being built.

The Totadgin Reserve butts on to this land, and all those bird species and more are frequently seen there and in the small bushes on the sides of Robartson Road. So, it stands to reason they would be on the proposed land as well. Just because they were not observed over a one-day period does not mean they are not there!
They do move a fair distance at different times of the year.

I have black cockatoos that fly over my house

, and in the summer time this is daily but some times of the year those cockatoos go further afield and it may be months before we see them again.
The same as at the proposed site, you cannot do a "survey" in one day, that is ridiculous.
It depends on the time of year to what fauna you see, anyone knows that.

Has the EPA done their assessment? Where is it? Why can a proponent get a marketing company to tick all the boxes for them and then it is passed without assessment from anyone else?

It was interesting that it stated that there is no Aboriginal Cultural Heritage Significance within the Merredin Shire so there is no more investigating to be done on the site. I beg to differ; The Merredin Peak comes under the Aboriginal Cultural Heritage act so there is

Aboriginal Cultural Heritage Significance in this shire. We have local Aboriginal Elders who are regularly called to sites to assess if they are of Aboriginal Cultural Heritage significance.

Bushfire management was also a one visit assessment, again how?

Hardly any mention of fire management and containment. No mention of what they would do if the batteries caught on fire.
How do you put out a battery once it is one fire? A legitimate question don't you think?
A couple of water tanks there will not do it. Very flimsy on details once again.
What would be the impact to the environment if the batteries burn? Everything is just glossed over in the proposal; it is very good marketing.

This proposal butts on to the Totadgin Rock Reserve, so are you hoping all fauna will fly and hop across to there instead. If a fire breaks out in that reserve from the battery farm it will be catastrophic to the reserve and to other farmers in the area. Who will compensate those farmers if their crops are burnt and how long would it take for the Reserve to recover?

There will be a visual and noise disturbance for fauna and for people in the area.
Have you seen all the lights at the nearby diesel generator and current solar farm at night?
If not do go for a drive at night and see what animals and people must put up with.

Merredin is blessed to be one of the Dark Sky areas for night photography but now all you can see from a 15 kms radius from the current diesel generator and solar farm are the lights at night. It is awful.
Any studies done to see how that effects animals at nighttime? Nope, because the study was done for one day!

I also dispute the inference that the Merredin Community has a growing familiarity and acceptance of renewables because we already have others in our shire. Just because they are here does not mean we like them and want them here; we had no choice.
There is not enough research into the effects of these renewables when things go wrong.
Just like neighbours next to the Collgar Wind Factory had no choice.
And those farmers who benefited had to sign a confidentiality contract.
Why, if there is nothing to hide?

When the Collgar Wind farm was built we were told how great it would be for the community. Yes, they have sponsored sporting clubs and the like but so have other businesses in the town hardly earth shattering.
The people to benefit from it were the farmers who were paid for the infrastructure to go on their land, the Pubs/Hotels, IGA and several accommodation places.
But this was all during the construction phase, after that it employs less than 10 people.
Hardly a benefit to me as a rate payer, certainly hasn't made my electricity bills any cheaper.
What did the shire gain?
It states it will need 200 workers which need to be accommodated in town. Is that why certain councillors got the jump on it and started buying up rentals? Nice for them to have the heads up, wasn't it?

Where will they be accommodated when there is not enough housing for ordinary people in town let alone them? This will just push up rental prices and unavailability even higher.

And once it is up and running it will be autonomous and unmanned and only using locals for maintenance.
What does the shire get out of this by having them in the shire, please let me know? Will they be paying huge rates, what is our benefit or is the benefit all for the landowner? Where do we see what money and benefit this will bring in to my shire?
I want to see the benefit for the people of Merredin not just one landowner. Transparency please.
They have not yet got approval to connect to the Western Power grid, so I guess more infrastructure proposals will be submitted and more destruction when they do.

$335 million for a 30-year life span and then it gets dismantled. Who pays for that, it does not say in the proposal? How is it disposed of? Does it get dumped at to our rubbish dump and at what cost, and to whom? Will they get charged by the shire for this? Very scant on details in the proposal.
If it is the company, there needs to be a waterproof concrete agreement in place as other projects are finding out the hard way that once a company changes names or goes bust, they are no longer liable.
An example of that is Griffin Coal (Indian owned) and its BlueWaters Power station at Collie that the govt is propping up with $300 Million to keep the insolvent company running.

This land might only be a small area, but you are still taking away cropping land and this is happening everywhere. Where will it all end? There are solar and wind factories everywhere taking up valuable farming land, destroying environments. And for what? Not cheap power that's for sure.
We are a farming community first and all this is doing is making some farmers rich, but it doesn't provide investment security for future farm production. No point having so called "green" electricity when there is no food to eat is there?

Seeing as I have taken the time to be thorough and read the 306-page proposal and ask many questions I hope you have the dignity to actual respond fully to all my questions and not just give me lip service and a two-paragraph reply.
I know I will probably be the only one to object as you only wrote about this proposal briefly on Facebook, Instagram and your website and there was only 1 drop-in meeting. So many people I have spoken to did not know anything about it, once again where is the transparency?
In future there should be more effort to let those in the community without social media or indeed the internet know about important proposals like this.
A letter drop to all rate payers should have been done.
I look forward to receiving your prompt reply and **ALL** my questions answered.

01/03/2026

Attn: Craig Watts,

CEO Shire of Merredin

I refer to the proposed renewable energy facility at Lots 19448 and 27381 Robartson Road, Nangeenan and wish to lodge my concerns and objections to this project.

I would like to note my objection on the basis of the major loss of agricultural land with little to no concern for the benefit to our shire residents both in terms of safety and benefit as well as the future of farming in Australia. I also have questions surrounding the lifespan of the infrastructure and the disposal plan when it does come to an end.

Please see attached link referring to a group of Farmers in Victoria that have begun the fight to retain their agricultural land. The Victorian plan is to take over 70% of the agricultural land. This plan is not publicized or commonly known unless you are a farmer suffering under these proposals.
https://farmersfightback.com/petition

My questions regarding our agricultural land are:

Are you aware of the WA state government plan to overtake our agricultural land?
What percentage of agricultural land has been budgeted for here in WA?

What plan does the shire have in terms of rehabilitation of the generations of farmers that have worked this land and fought hard for their right to do so? (What will the farmers do now?) your proposal is taking over a 6th generation farm!!

What plan does the shire have to ensure our shire still thrives under the loss of agricultural land when the renewable funding dries up?

How will our state provide enough food for its income if we remove agricultural land for the purpose of energy?

What can the shire tell me about the state of the land once renewables have been put in place? Will it be possible to return this to agricultural land? In what timeframe will this occur?

Lets look at the renewables alone for a minute:

Solar panels are known to last approx. 25 years. During this time they can render the land useless by releasing heavy materials such as lead and cadmium into the soil. Any rainwater runoff can be contaminated and enters the soil which can and will affect surrounding farmlands.

Are you aware that as the renewable energys age they can splinter and release shards of materials into the fleece of sheep making it impossible to have sheep on the renewable land for a lot of years after renewables have been gone.

I note that the project has listed a major likely loss of vegetation in the area. There is only one small area of bushland noted and they listed it as likely to be lost. How do you find this ok?

Disposal of toxic materials and ewaste:

I refer to the amount of buried concrete under these projects as well as deteriorating pieces. It is commonly known that lithium ion batteries contain heavy metals and other hazardous substances that require special recycling which is costly and often not done or simple disposal at special waste sites. Some of these waste sites on the east coast of our beautiful country are in the rainforest. While we do have plenty of land here in Merredin I do not wish for this to turn into waste disposal for our mismanagement. I would like to know if our farmers have been consulted about this disposal? They are the experts in the land here and may have objections if they are informed of the risks.

Batteries have a much shorter lifespan than solar panels (approx. 10-15 years) but have similar risks by way of toxins leeching into the soils and causing the land to be polluted and harmful.

There is a lot of waste to be considered. What is the shires plan to manage this waste both for cost effectiveness as well as to minimize environmental impacts?

I know I have raised this issue at the shire meetings in the past: what is the benefit to our shire residents? The companies hired to build these projects are here for a short time and usually employ some locals while they are here. The land that they use is assumed to be purchased from a farmer or hired from a farmer giving a farmer a bit of money.

These projects are being worked on at a shire level to supposedly improve outcomes for our shire with little to no consideration for what and how our shire will actually benefit. We suffer raised energy costs (I thought renewables was free, at least that's what they tell me) so I assume this proposed project will result in free power for our shire for the life of the solar farm?

How will this power be transported to where it is needed? Will this result in extra costs as they build extra infrastructure to carry the loads?

Cumulatively, these projects are changing the character of our rural landscape. We are becoming an energy zone rather than a farming community, without adequate consultation on how much is too much. Renewable energy should be developed responsibly and placed on less productive or industrial land or perhaps the large roof spaces that are otherwise unused, not on valuable agricultural property that underpins our region's economy and identity.

To summarize, I object to this proposal on the basis of

-unknown or unrecognised damage to our farmland
- unknown or unrecognised damage to our shire way of life and identity
- unknown or unrecognised environmental impacts of waste disposal
- unknown or no benefit to our local community

Thankyou for your time considering my submission



Shire of Merredin
PO Box 42 MERREDIN WA 6415

P: (08) 9041 1611 **E:** ao1@merredin.wa.gov.au
W: www.merredin.wa.gov.au F: shireofmerredin

I acknowledge the Traditional Owners of the land on which I work, and pay my respects to Elders past, present and emerging.

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From: Windebank, Matthew <Matthew.Windebank@casa.gov.au>
Sent: Thursday, 19 March 2026 8:07 AM
To: Admin Officer <admin@merredin.wa.gov.au>
Subject: Development Assessment Panel Application DAP/26/03058 - CASA REPLY [SEC=OFFICIAL]

OFFICIAL

Good morning,

CASA has reviewed the solar farm proposal at Merridin and advises that because Merridin Airport does not have an air traffic control tower, the solar farm as proposed will not be a hazard to aviation facilities or aircraft operations.

CASA has no objection to the proposal as presented.

Regards

Matthew Windebank
Senior Aerodrome Specialist | Geospatial Assessment
Air Navigation, Airspace & Aerodromes Branch
CASA Air Navigation, Transformation and Risk Division

p: 131 757
e: matthew.windebank@casa.gov.au

Australian Government
Civil Aviation Safety Authority



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From: Jim Mackintosh <jim.mackintosh@dwer.wa.gov.au>
Sent: Friday, 13 March 2026 1:09 PM
To: Admin Officer <admin@merredin.wa.gov.au>
Subject: RE: Proposed Solar Farm and Battery Energy Storage Systems (BESS) facility - A10019

OFFICIAL

Dear Shire of Merredin,

Thank you for the above referral to the Department of Water and Environmental Regulation. The Department has considered the proposal and has no objections and no further comments. Please don't hesitate to contact me if you have any additional questions.

Regards

Jim Mackintosh

Department of Water and Environmental Regulation

Program Manager

Swan Avon Region

Planning Advice Section

T 08 6250 8043 |
Visit our website www.dwer.wa.gov.au

The Department of Water and Environmental Regulation acknowledges the Traditional Owners of the lands on which we live and work throughout Western Australia and we pay our respects to Elders past and present. The Department recognises the practice of intergenerational care for Country and its relevance to our work and working with the community. The Department continues to move forward with a shared commitment to protect and conserve Country for our future generations.

Disclaimer: This e-mail is confidential to the addressee and is the view of the writer, not necessarily that of the Department of Water and Environmental Regulation, which accepts no responsibility for the contents. If you are not the addressee, please notify the Department by return e-mail and delete the message from your system; you must not disclose or use the information contained in this email in any way. No warranty is made that this material is free from computer viruses.

Department of
Primary Industries and Regional Development
GOVERNMENT OF WESTERN AUSTRALIA

Your reference: A10019
Our reference: LUP 2380
Enquiries: Greg Doncon

Craig Watts
Chief Executive Officer
PO BOX 42, MERREDIN WA 6415

Email: admin@merredin.wa.gov.au

Date: 27 March 2026

Dear Craig

Development Assessment Panel Application DAP/26/03058

Address of Proposal: Lot 19448 & Lot 27381 Robartson Road, Nangeenan 6414.
Proposal Type: Solar Farm and Battery Energy Storage System (BESS) facility.

Thank you for inviting the Department of Primary Industries and Regional Development (DPIRD) to comment on the above proposal (Attachment 1), which will be constructed and managed by BRM Solar Farm Nominee Pty Ltd (BRM).

DPIRD does not object to the proposal and offers the following comments.

Biosecurity
DPIRD recommends approval is conditional on the preparation of an operational Biosecurity Management Plan (BMP) outlining arrangements for machinery inspection, equipment cleaning, ongoing monitoring of weeds across the site, contingencies and reporting and identifying responsibilities for various parties.

The detailed *Flora and Vegetation Survey*, undertaken by Del Botanics Environmental Consulting, was conducted in spring (fieldwork completed in October 2023) and followed EPA and DBCA guidelines for terrestrial flora and vegetation surveys. Unfortunately, DPIRD's Local Biosecurity team was not consulted. While the survey will assist in identifying declared species growing during the spring period, many other declared species, especially those growing in summer (i.e. skeleton weed) would be missed. DPIRD has assisted other solar farms manage declared species that were either missed during the Vegetation Survey or introduced during construction.

The Development Application outlines the use of a temporary laydown area, which is designated for the placement of deliveries to the site. This area could also be designated a biosecurity clean down area. Any machinery or equipment arriving at or

leaving the BRM construction site could be brought to the laydown area for inspection to ensure it enters or leaves the solar farm / BESS site in a clean condition.

Erosion risk
DPIRD recommends that, to prevent wind erosion, pastures should be managed to ensure a minimum of 50% ground cover, with a target of 70% ground cover.

The solar farm will be located on the soil-landscape units known as the Tandegin - Ulva and the Tandegin - Booraan subsystems. 61% of the soils within the Tandegin – Ulva subsystem carries a high to very high wind erosion risk.

Decommissioning Plan
DPIRD recommends approval is conditional on the preparation of a decommissioning plan. This will ensure the facility is being planned and constructed in a matter that will enable the site to be returned to agricultural production, without residual contamination.

The life of the proposed facility is expected to be up to 30 years. DPIRD anticipates that the facility will be renewed (at this point) to extend its operational lifespan. Eventually the facility will be decommissioned, the infrastructure removed and the land returned to farming purposes.

Consultation
BRM has provided limited information on consultation and community engagement.

Social Impact: The Land Insights report states that there are no social impacts from the proposed development (p.32), including “no detrimental effect on the community or any particular individuals” (p.33). On p.33 it also states the proposal benefits the community.

Community Benefit Fund: The current application materials do not include a commitment to establish a Community Benefit Fund or other options outlined in Powering WA’s Guideline on Community Benefits for Renewable Energy Projects, which was released in draft in June 2025 and finalised in February 2026. The Shire may wish to encourage the proponent to apply the guideline as this proposal progresses, including its consultation process.

Aboriginal heritage and consultation
A desktop Aboriginal heritage assessment was undertaken for the proposed facility through the Aboriginal Cultural Heritage Inquiry System (ACHIS), in accordance with the *Aboriginal Heritage Act 1972*. The assessment concluded that the proposed development does not pose any risk to Aboriginal heritage sites.

While the name “Ngaangk Boodja” was selected in consultation with the Traditional Owner representatives from the Ballardong Aboriginal Corporation, there is no indication that the Traditional Owners will receive any benefits from the project.

Renewable Energy Development
The solar farm proposal presents a positive renewable energy development for the State with the energy to feed into the SWIS. However, in support of the Wheatbelt

Development Commission comments (Attachment 2), DPIRD is concerned about the lack of proposed tangible community benefits for the Merredin community or Aboriginal people representing the area.

Opportunities for, and commitment towards, supporting local contractors should also be considered in more detail.

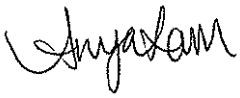
Summary recommendations

DPIRD encourages BRM Solar Farm Nominees Pty Ltd to:

- Follow the Community Benefit Guideline Community Benefits Guideline: Realising the Opportunities of the Energy Transition and work with the Shire of Merredin to develop a local benefits package, while being flexible and open to suggestions for improved local benefits.
- Carefully analyse how its accommodation needs will be met given concerns about the availability of local housing and worker accommodation.
- Contact DPIRD's Local Adviser Network (local.content@dpird.wa.gov.au) to find out how they might best engage local regional businesses to supply the project.
- Prepare a Decommissioning Plan and a Biosecurity Management Plan
- Minimise the risk of wind erosion by maintaining pasture cover

For more information, please contact Greg Doncon on 08 9081 3117 or greg.doncon@dpird.wa.gov.au

Yours sincerely



Anya Lam
Director Agriculture Resource Management and Assessment
Fisheries and Sustainability

Attachment 1: Project summary
Attachment 2: Wheatbelt Development Commission feedback

Attachment 1: Project summary

This development application is being submitted to the Regional Joint Development Assessment Panel (JDAP) through the Shire of Merredin by BRM Solar Farm Nominee Pty Ltd, a joint venture between Nomad Energy and Atmos Renewables, to build a solar farm and Battery Energy Storage System (BESS), located 7.5km south-west of Merredin and 260km east of Perth. The project will be hosted on freehold agricultural land used predominantly for grain growing and sheep grazing. It will also be adjacent to an existing solar farm and BESS constructed in 2018 and to Western Power's Merredin Terminal, allowing ready access to the South West Interconnected System (SWIS).

The project includes the construction and operation of:

- up to 260,000 solar panels over 460 ha with a production capacity of up to 100MW
- associated infrastructure, including decentralised BESS and electrical sub-station, and associated operation and maintenance buildings.

The estimated total construction cost for the project is $335 million.

The key document from a regional development perspective is the Development Application report prepared by Land Insights in December 2025. These reports summarise the project scope and the opportunities and challenges being faced by the proponent and the community.

Attachment 2: Wheatbelt Development Commission feedback

- WDC supports the WA State Government's Sectoral Emissions Reduction Strategy (SERS), a core commitment of the WA Climate Policy. The strategy identifies the need to replace thermal electricity generation with zero-emissions electricity. This is driving significant investment in renewable energy and battery storage in the Wheatbelt region.
- In Table 4.4, the proponent states that "there will be no social impacts from the proposed development". It is unclear how this conclusion has been reached, as no formal social impact assessment has been provided. WDC notes that other renewable energy projects in the region are creating social impacts such as increased demand for infrastructure and reduced availability of housing.
- WDC notes that the cumulative impact on the community, resources (such as water) and infrastructure (including housing) of this collective pool of renewable projects has not yet been quantified.
- Section 2.10 Community Benefits does not reference the WA Government's Community Benefits Guideline for Large-scale Renewable Energy Projects in the South West Interconnected System, which was released in February 2026. It is not clear how the proponent intends to generate ongoing community benefits beyond potential employment opportunities, which are mostly in the construction phase. Furthermore, Section 2.10 seems to imply that the utilisation of accommodation and housing will be a net benefit but does not address how the current local housing stock (which is already close to capacity) will accommodate their estimated 200-person workforce. In the absence of additional housing stock, additional demand may constitute a disbenefit, which reinforces the need to consider social impacts in greater detail.
- WDC is supportive of initiatives that contribute to the State's low carbon ambitions and seeks to ensure efforts are made by proponents and communities to maximise positive economic and social outcomes. In this regard, WDC encourages the proponent to continue engaging with the Shire of Merredin, First Nations groups, the local business community and other relevant stakeholders (including the WDC Local Content Advisor) to identify local business supply opportunities and facilitate local training and employment opportunities.

Our Ref: 2026/0727
Your Ref: MDPA001(2026)

Xinyi Zhao
Shire of Merredin
dso@merredin.wa.gov.au

Dear Xinyi Zhao

LOTS 19448 AND 27381 ROBARTSON ROAD, NANGEENAN – PROPOSED RENEWABLE ENERGY FACILITY INCLUDING SOLAR FARM AND BATTERY ENERGY STORAGE SYSTEM – DEVELOPMENT APPLICATION

I refer to your email dated 24 February 2026 regarding the submission of a Bushfire Management Plan (BMP) (Version 1.0), prepared by Bushfire Prone Planning and dated 22 December 2025, for the above proposed development. The BMP is accompanied by a development application report titled 'Renewable Energy Facility – Ngaangk Boodja Battery and Solar Farm' from the proponent dated December 2025 in relation to the proposal.

This advice relates to the *State Planning Policy 3.7 Bushfire* (SPP 3.7) and supporting *Planning for Bushfire Guidelines* (Guidelines), as well as DFES' role and responsibilities as Hazard Management Agency (HMA) for Fire in Western Australia.

General Comment

- DFES acknowledges that the site is currently vacant and is adjacent to the existing Merredin Solar Farm and substation. The development will include the installation of a Solar Farm and Battery Energy Storage System (BESS) across 230 hectares.
- DFES has reviewed the BMP, however cannot guarantee that the BMP is consistent with all other plans and information submitted as part of the proposal. The decision maker should be satisfied that all submitted documents have consistent details.
- DFES notes that the current version of SPP 3.7 and the Guidelines no longer makes reference to 'high risk land use'. The decision maker has referred this proposal to DFES as a discretionary referral. DFES considers that SPP 3.7 and the Guidelines do not adequately address high risk land use such as renewable energy facilities from a HMA perspective. Given the temperature sensitive nature of the infrastructure, it is critical to ensure that the proposed design adequately responds to facility fire risks and bushfire risks in order to protect life, property and infrastructure.
- Accordingly, DFES has also assessed the proposal against the *CFA Design Guidelines and Model Requirements – Renewable Energy Facilities* as amended

(REF Guidelines) which is currently considered best practice for the development of renewable energy facilities.
- Specific requirements of SPP 3.7 and the supporting Guidelines and the REF Guidelines are to be further addressed in the BMP as outlined in the below assessment. The assessment comments relating to the REF Guidelines have been incorporated into the below overall assessment comments for the respective issue/element.

Recommendation: Compliance with acceptable not demonstrated – modifications required

DFES advises that the BMP has not demonstrated that the proposed development complies with the following requirements of SPP 3.7 and the Guidelines:
1. Element 2: Siting and Design; and
2. Element 4: Water Supply.

DFES recommends the BMP be modified as per the Assessment advice provided in Tables 1-3 to ensure it is accurate and the bushfire risk management/mitigation measures are effective and can be implemented in perpetuity to manage/mitigate the bushfire risk to people, property and infrastructure to an acceptable level and appropriate to the land use and location. The required modifications are listed in the table(s) below. Should the modified BMP affect the design of the proposal, the proposal should be amended to reflect these modifications.

Further information should also be submitted to demonstrate compliance with the Victorian Country Fire Authority REF Guidelines.

DFES recommends that due consideration be given to the below assessment of the extreme bushfire hazard level and unacceptable risk (see Tables 1 – 3).

Could you please forward notification of the application determination to DFES for our records.

If you require any clarification or further information regarding the below assessment, please do not hesitate to contact Senior Land Use Planning Officer – Sasha De Brito on telephone number 9395 9703.

Yours sincerely



DESMOND ABEL
DIRECTOR LAND USE PLANNING

27 March 2026

Table 1: Assessment – Policy Measure 7.1 ii. c. Compliant Preparation of a Bushfire Attack Level (BAL) Contour Map

Vegetation Classification or Exclusions	BMP Modification Required
Classified Area 2 – not demonstrated Vegetation Area 2 cannot be substantiated as Class D Scrub with the limited information and photographic evidence provided. Photographic ID s 13 and 14 do not represent Class D Scrub. No height markers have been used in the photographic evidence. The BMP should detail specifically how the Class D Scrub classification was derived as opposed to Class B Woodland. If unsubstantiated, the vegetation classification should be revised to consider the vegetation as per AS 3959, or the resultant BAL ratings may be inaccurate.	**BAL Rating cannot be validated.** Further evidence to support the vegetation classification of Area 2 is required.
Exclusion Area 5 – not demonstrated Evidence to support the exclusion of parts of Area 5 along Robartson Road, within the road reserve, as managed to low threat in accordance with AS 3959 is required. The photographic evidence provided for Area 5 states that the vegetation is excluded as a windbreak, however the vegetation has not been planted as a single row of trees and appears to align more closely with Class B Woodland in photographs 36 - 38. No height markers have been used in the photographic evidence. If unsubstantiated, the vegetation should be classified as per AS 3959, or the resultant BAL ratings may be inaccurate.	**BAL Rating cannot be validated.** Further evidence to support the current vegetation exclusion of Area 5 is required.
SPP 3.7 Appendix A - Bushfire Assessment Methodologies	**BMP Modification Required**
Method 2 The Method 2 calculation cannot be validated until the vegetation inputs relating to Areas 2 and parts of Area 5 can be confirmed. Accordingly, DFES considers that the Method 2 outputs cannot be validated.	**BAL Rating cannot be validated.** Method 2 outputs cannot be validated.

Table 2: Policy Measure 7.1 ii. e. Compliance with the Bushfire Protection Criteria 7: Development – Commercial and Industrial

Element	Assessment	Action
Siting and Design	**A2.1a – not demonstrated** The BAL ratings cannot be validated for the reason(s) outlined in Table 1.	**BAL Rating cannot be validated.** Modification to the BMP is required to address the Assessment advice in Table 1.
Water Supply	**A4.1 – not demonstrated** It is noted that 300 kilolitres of firefighting water is supplied at the site entrance close to the Operations and Maintenance building, however no water tanks are shown at any other location on the subject site. The compliance statement in the BMP states that a water tank will be within 120 metres of the BESS infrastructure, however this is not shown on any of the figures in the BMP. **REF Guidelines** There are specific requirements within the REF Guidelines for numbers of tanks required based on the size of the solar farm. At least one 45,000 litre tank should be located at the site entrance and an additional tank is required for every additional 100 hectare area. The proposed lot for development is 230 hectares. It is accepted that 300 kilolitres of water for firefighting have been provided, however the location of the tanks should be decided in conjunction with emergency services. Furthermore, given, this solar array is an extension to the existing Merredin solar farm, the decision maker should be satisfied that adequate water is available for the existing site and not reliant on the water supply proposed for this development.	**Compliance with Water Supply for firefighting not demonstrated.** Modification to the BMP is required to address the Assessment advice.

Table 3: Policy Measure 7.1 iv. and Section 9.4.2 of the Guidelines: DFES Role as Hazard Management Agency (HMA)

DFES wishes to provide the below additional advice in its role and responsibilities of HMA for Fire in Western Australia.

Emergency Management Plan (EMP)		**Action**
Emergency Management Plan (EMP)	Given the high-risk land use at this location, it is considered appropriate that an 'Emergency Management Plan' be prepared. Consideration should be given to the Bushfire Emergency Plan (BEP) Manual (as published by the Western Australian Planning Commission) and Section 7 of the REF Guidelines. These contain details of information that should be included in a EMP and will ensure the appropriate content is detailed when finalising the EMP to the satisfaction of the Shire.	**Comment only.**
Renewable Energy Facilities		**Action**
Risk Management Plan	As per the REF Guidelines, a Risk Management Plan (RMP) describes the risk management process and its outcomes, including the specific site hazards/risks and their analysis, control measures, and the monitoring and review process. A RMP is considered to be a critical requirement of planning and informing fire risk management in the design and operation of renewable energy facilities. A RMP for the proposal has not been provided. It is noted that at the end of the BMP is a page which states 'Addendum 1: Bushfire Risk Report', however this report was not included as part of the referral documentation. A Risk Management Report is not bushfire specific and should cover a broader range of risks as bushfire risk should be covered within the BMP. A detailed RMP should be provided that demonstrates compliance with the REF Guidelines, including addressing the following model requirements of the REF Guidelines: • Detailed site plans showing the location of site vehicle access points, internal roads, battery containers, substations, buildings and fire water supplies. • The exact specifications of the elements within the renewable energy facility, such as the battery chemistry, relevant specifications and technical data sheets on the BESS facility. • Details of the fire, smoke, heat, and toxic off-gassing detection system for the BESS facility. The system should specify what triggers an internal operator response and what triggers a 000 call. • Details of the explosion prevention and venting system for the BESS facility.	**A Risk Management Plan is required to be prepared.**

	• Details of the battery management and monitoring system. The system should enable the operator to intervene for the prevention of thermal runaway. • Details of the system to prevent water ingress to battery containers and appropriate ingress protection rating for containers. • Details of the warning and alarm system within battery containers and/or the facility. The system should specify what each alarm signal means.	
Consultation	In the event that an approval is granted, the DFES District Officer responsible for this region and the local fire and emergency services should be consulted during the development, construction, and leading up to the commissioning of the facility. It is considered critical for the local fire and emergency services to understand the hazards present in the facility and the measures required to ensure the safety of firefighting personnel when working in or around different parts of the facility. This may impact on how crews respond to a fire within the facility, which may in turn have ramification regarding the optimal number and location of water supplies.	**Comment only.**
DFES Other Technical Advice		**Action**
DFES Bushfire Technical Services	• Class D Scrub vegetation classification not accepted. The photographs for the proposed Class D Scrub vegetation classifications show evidence of disturbance and lack height indicators. All areas classified as Class D Scrub should be changed to Class B Woodland based on their potential for revegetation. • The vegetation classification for Area 5 is not accepted, it is not a single row of trees and is sited within classifiable vegetation, it should be classified as Class B Woodland.	**Modification to the BMP is required to address the Assessment advice.**
DFES Special Operations	• The BMP should provide information on how the grass will be managed across the site under the solar panels. The exclusion of Area 3 Class G Grassland in the post-development scenario within the solar panel area suggests ongoing management to low threat, however the mechanism of maintenance is not detailed. Without ongoing management any fire may be difficult to suppress as it is difficult to fight fires in between solar panels. • The water tanks for firefighting are proposed to be clustered at the Operations and Maintenance building near main entrance, the water tanks should be spread out around the periphery of the proposed development to prevent appliances having to continually returning to the same location to refill the appliance.	**Modification to the BMP is required to address the Assessment advice.**

DFES Land Use Planning	It is the responsibility of the proponent to ensure the proposal complies with relevant planning and building requirements. This advice does not exempt the applicant/proponent from obtaining approvals that apply to the proposal including planning, building, environmental health or any other approvals required by a relevant authority under written laws.	**Comment only.**

PART C – OTHER BUSINESS

1. State Administrative Tribunal Applications and Supreme Court Appeals

2. Meeting Closure