Native Vegetation Clearance

North West Bend Project, Morgan SA

Data Report

Clearance under the *Native Vegetation Regulations 2017*

06 June 2023

Prepared by J. Skewes– EBS Ecology (NVC Accredited Consultant)

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Version 3

Prepared by EBS Ecology for North West Bend Project Pty Ltd

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Cover photograph: General landscape photo of Project Area showing chenopod shrubland with emergent mallee Eucalypts.

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Glossary and abbreviations

ALA	Atlas of Living Australia
BAM	Bushland Assessment Methodology
BESS	Battery Energy Storage System
BDBSA	Biological Database of South Australia (maintained by DEW)
BOM	Bureau of Meteorology
CEMP	Constructions Environmental Management Plan
CFS	Country Fire Service
Cm	Centimetres
CP	Conservation Park
CSO	Crown Solicitor's Office
DA	Development Application
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Commonwealth)
DEM	Department of Energy and Mining
DEMP	Decommissioning Environmental Management Plan
DEW	Department for Environment and Water (South Australia)
EA	Environmental Association
EBS	Environment and Biodiversity Services Pty Ltd (trading as EBS Ecology)
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
ha	Hectare(s)
IBRA	Interim Biogeographical Regionalisation of Australia
ILUA	Indigenous Land Use Agreement
km	Kilometre(s)
kV	kilovolt
LSA Act	*Landscape South Australia Act 2019*
MBC	*Mallee Bird Community*
M	metres
MLR	Mt Lofty Ranges
Mm	millimetres
MNES	Matters of National Environmental Significance
MW	Megawatt
MWh	Megawatt hour
NatureMaps	Initiative of DEW that provides a common access point to maps and geographic information about South Australia's natural resources in an interactive online mapping format
NPW	National Parks and Wildlife
NPW Act	*National Parks and Wildlife Act 1972*
NRM	Natural Resources Management
NVMU	Native Vegetation Management Unit
NV Act	*Native Vegetation Act 1991*
NVC	Native Vegetation Council
NWBP	North West Bend Project
O&M	Operations and maintenance
OMP	Operational Environmental Management Plan
OTR	Office of the Technical Regulator
PDI Act	*Planning, Development and Infrastructure Act 2016*

PMST	Protected Matters Search Tool (under the EPBC Act; maintained by DCCEEW)
PO	Performance Outcome
Project	The proposed development of a Hybrid battery energy storage and solar farm at Morgan
Project Area	The area where the proposed North West Bend Hybrid Farm is proposed to be constructed
Project footprint	The area of native vegetation clearance associated with construction of the Project
Proponent	North West Bend Solar Project Pty Ltd
PV	Photovoltaic
SA	South Australia(n)
SASCC	South Australian Seed Conservation Centre
Search Area	5 km buffer of the Project Area considered in the desktop assessment database searches
SEB	Significant Environmental Benefit
sp.	Species
spp.	Species (plural)
ssp.	Sub-species
SynCo	SynCo Global Pty Ltd, the owner of the Proponent
TEC	Threatened Ecological Community
the Regs	*Native Vegetation Regulations 2017*
var.	Variety (a taxonomic rank below that of species and subspecies, but above that of form)
VA	Vegetation Association
WAA	Water Affecting Activity

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Attachment 20 – Project Spatial data (zipped shapefile)'

1. Application information

- Applicant details and land ownership details relating to this native vegetation clearance application are summarised in Table 1. Table 2 summarises the proposed clearance, including details of the impacted vegetation and risk level. **VA A/B1 –** *Maireana sedifolia* Shrubland
    - **1a –** *Maireana sedifolia +/- Acacia nyssophylla* Low Open Shrubland with emergent *Eucalyptus socialis* (Table 5. Summary of VA A/B1a);
    - **1b –** *Maireana sedifolia* Low Open Shrubland over native grasses and forbs (Table 6. Summary of VA A/B1b);
    - **1c –** *Myoporum platycarpum +/- Alectryon oleifolius* Low Open Woodland over *Maireana sedifolia* (Table 7. Summary of VA B1c);
- **VA A/B2 -** *Lycium australe* Low Open Shrubland (Table 8. Summary of VA A2);
- **VA A/B3 –** *Casuarina pauper* Open woodland (Table 9. Summary of VA A3.).
- **VA A4 -** *Acacia nyssophylla* over *Lycium australe +/- Maireana sedifolia* Tall Shrubland with emergent *Eucalyptus socialis* in low lying moist depressions (Table 10. Summary of VA A4.).

Table 1. Application details.

Applicant:	SynCo Global Pty Ltd		
Key contact:	[redacted] SynCo Global Pty Ltd (the owner of the Proponent) M: +61 408 134 757 [redacted]		
Landowner:	North West Bend Solar Project Pty Ltd		
Site Address:	7795 Goyder Highway Morgan, SA		
Local Government Area:	Mid Murray	**Hundred:**	Eba
Title ID:	CT5549/747	**Parcel ID**	H120700SE141 H120700SE140

Table 2. Summary of the proposed clearance.

Purpose of clearance:	Clearance required for the construction of a Battery Energy Storage System (BESS) facility and associated infrastructure.
Native Vegetation Regulation:	Regulation 12(34) Infrastructure.
Description of the vegetation under application:	• **40.75 hectares (ha) of** *Maireana sedifolia +/- Acacia nyssophylla* Low Open Shrubland with emergent *Eucalyptus socialis*; • **127.18 ha of** *Maireana sedifolia* Low Open Shrubland; • **0.77 ha of** *Myoporum platycarpum +/- Alectryon oleifolius* Low Open Woodland over *Maireana sedifolia* • **3.58 ha of** *Lycium australe* Low Open Shrubland; • **0.07 ha of** *Casuarina pauper* Open woodland;

	• **0.43 ha of** *Acacia nyssophylla* over *Lycium australe* +/- *Maireana sedifolia* Tall Shrubland with emergent *Eucalyptus socialis* in low lying moist depressions.
Total proposed clearance – area (ha) and/or number of trees:	Total proposed area of clearance equals approximately 172.78 ha across the Project Area.
Level of clearance:	Level 4.
Overlay (Planning and Design Code):	Native Vegetation Overlay, Water Resources Overlay.
Map of proposed clearance area:	See Figure 2 on page 13.
Mitigation Hierarchy:	**Avoidance** Complete avoidance of native vegetation was not possible, given the nature of the block of land, which comprises 100% remnant native vegetation. Avoidance measures taken into consideration in the infrastructure planning include: • The infrastructure footprint has avoided impacting areas of structurally diverse woodland vegetation, including Buloke woodland (VA A3), which supports a variety of habitat components such as hollows and nesting trees for species such as microbats and Wedge-tailed Eagles; and VA B1c which comprises a higher cover of mallee eucalypts woodland vegetation. **Minimization** • Clearance areas have been proposed in areas of lower quality vegetation, or vegetation which contains fewer habitat resources such as upper storey vegetation, dense vegetation and water sources. • The proposed solar panel array has been micro-sited to avoid these ecological constraints. • A range of minimal impact construction methods will be utilised to prevent the need for cleared access tracks and photovoltaic (PV) driven piles. • Design components of the PV solar array have minimised the need for vegetation clearance through components such as their height from the ground (allowing shrubland vegetation to remain).

	• Each module of the PV solar array is separated by 8 metres (m) of unimpacted vegetation. • To ensure impact to vegetation, fauna and threatened species is minimised a Native Vegetation Management Framework (NVMF) is currently being prepared (*in draft*), which will ensure the implementation of the following management plans: o Construction Environmental Management Plan (CEMP): o Operational Environmental Management Plan (OEMP) and o Decommissioning Environmental Management Plan (DMEP). **<u>Rehabilitation or restoration</u>** • Natural regeneration of low grasses and shrubs will be permitted under the installed solar panels. • Topsoil and cleared vegetation material will be re-spread over the cleared area where possible. • Following decommissioning of the site, rehabilitation will be undertaken in impacted areas, using local seed to revegetate impacted or cleared areas.
SEB Offset proposal	Offset will be made by way of: On-ground SEB offset of 150.79 ha, totalling 786.84 SEB points of gain; and A Payment into the Native Vegetation Fund of **$2,412,134.75** (including the an administration fee) (to be finalised based on possible application of varied loss factors for certain infrastructure elements).

2. Purpose of clearance

2.1. Description

North West Bend Solar Project Pty Ltd (the proponent) is currently designing a solar farm (North West Bend Project) to be built on a property approximately 4 kilometres (km) north of the township of Morgan South Australia (SA).

Objectives

EBS Ecology was engaged to undertake a flora and fauna assessment for the proposed Project in accordance with the *Native Vegetation Act 1991* (NV Act) and *Native Vegetation Regulations 2017* (the Regs), with the primary objectives to:

- Undertake a desktop assessment of the likelihood of occurrence and status of threatened flora and fauna protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and State *National Parks and Wildlife Act 1972* (NPW Act);
- Assess native vegetation within the Project Area for clearance using the Native Vegetation Council (NVC) endorsed Bushland Assessment Method (BAM) in accordance with the NV Act;
- Calculate the Significant Environmental Benefit (SEB) offset cost requirements for the Project based on the client supplied impact footprint; and
- Calculate the SEB points provided by a proposed on-ground offset.

2.2. Background

The Project Area is the area where the proposed North West Bend Hybrid Farm is proposed to be constructed. The Project Area consists of remnant native vegetation on pastoral land in the District Council of Mid Murray within the Murraylands and Riverland Landscape Management Region, and Hundred of Eba. The Project Area is located approximately 4 km north of Morgan, bordered to the east by Go Kart Road, and Controversial Road in the north; the intersection of these two unsealed roads marks the north-east corner of the proposed Project Area. Further to the west is a major road, Goyder Highway. The location and landscape context of the Project Area is depicted in Figure 1.

2.3. General location map

Figure 1. Landscape context of Project Area including Interim Biogeographical Regionalisation of Australia (IBRA) environmental associations, conservation areas and watercourses.

2.4. Details of the proposal

The proposed development of a Hybrid battery energy storage and solar farm at Morgan is referred to as the North West Bend Project (NWBP - the Project), is proposed to be built north of Morgan, South Australia.
The Project is proposed to be undertaken in two stages:

- **Stage 1**: Construction of a 100 megawatt (MW)/200 megawatt hour (MWh) Battery Energy Storage System (BESS).
- **Stage 2**: Construction of a 200MW/400MWH BESS and 260 MW PV solar panel array.

The Project will have a final generation capacity 300 MW / 600 MWh BESS and 260 MW solar.

The layout of the proposed design plan illustrated in Figure 2, and a detailed site lay-out plan illustrated in Figure 5.

The Project includes:

- Stage 1 and Stage 2 BESS and Connection Substation within yard fences.
- Operations and maintenance (O&M) facilities located in the north-western extent of section 140 next to Stage 2 BESS and Connection Substation including:
    - Staff amenity buildings and first aid room.
    - Building for maintenance, vehicles and gators, re-fuelling facilities, spares and parts.
    - Staff and visitor carpark for minimum 8 cars.
    - 2x 90,000 Litres water storage tank for amenities and fire suppression.
- Site access tracks (selected to follow existing tracks and trafficked using highly inflated wide flat tread tyres of rubber tracks to distribute loads) including:
    - Main access track up to 5.5 metres (m) width with packed gravel surface.
    - Informal access and maintenance tracks of 2 x 400 millimetres (mm) wide tyre tracks in each alternate PV row.
- PV array field (Risen Energy module number RSM144-6-395BMDG-420BMDG) (Figure 3 and Figure 4), with piles driven into the ground at a dept of ~2 m using rubber tracked lightweight hydraulic piling machine.
- Underground cable trenching, up to 120 centimetres (cm) deep and 100 cm wide.

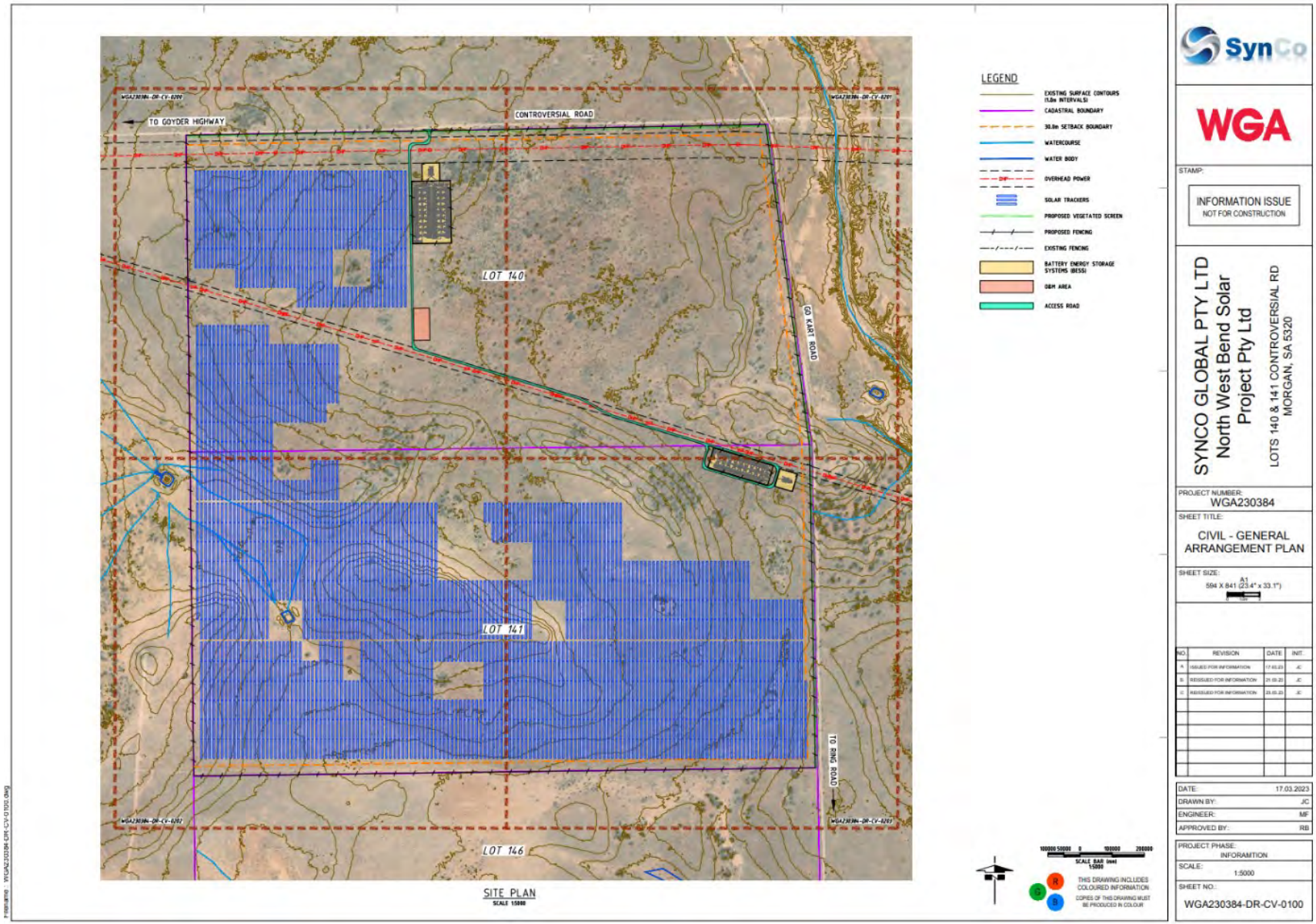

Figure 2. Proposed site plan (Supplied to EBS by SynCo Global Pty Ltd on 30/03/2023).

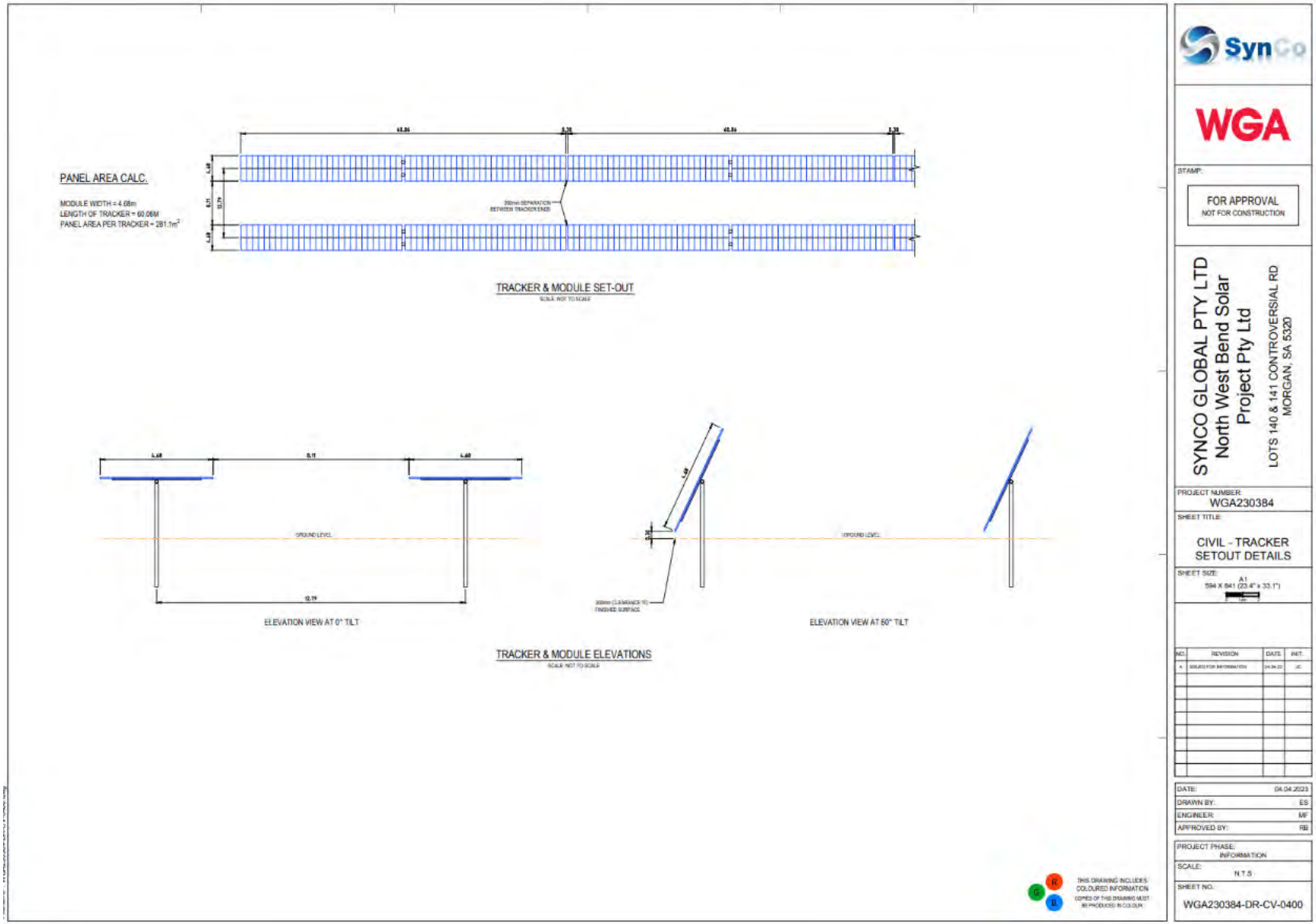

Figure 3. Tracker layout (Voyager) (provided to EBS by SynCo Global Pty Ltd on 05/04/2023).

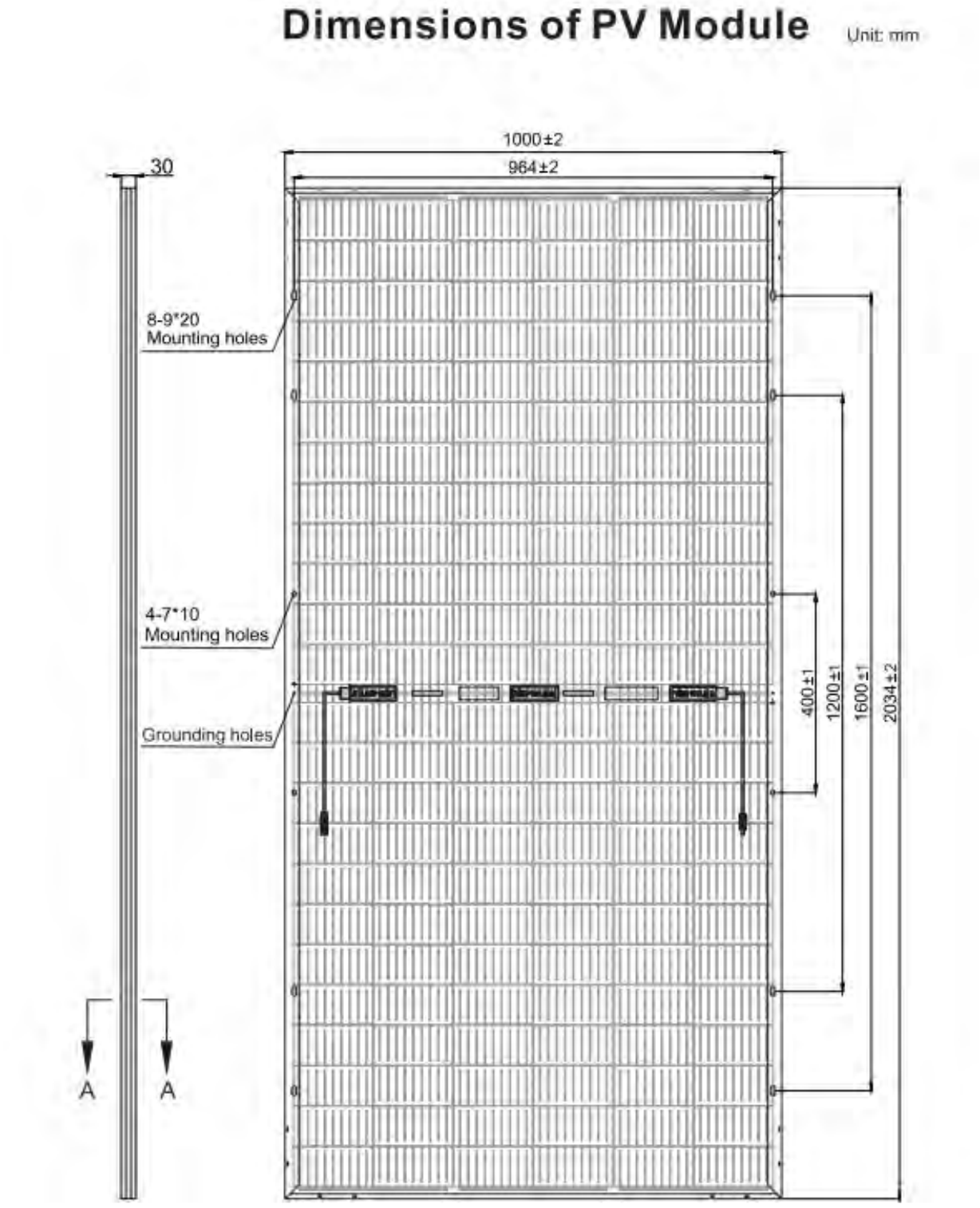

Figure 4. Solar panel specifications (Supplied to EBS by SynCo Global Pty Ltd on 30/03/2023).

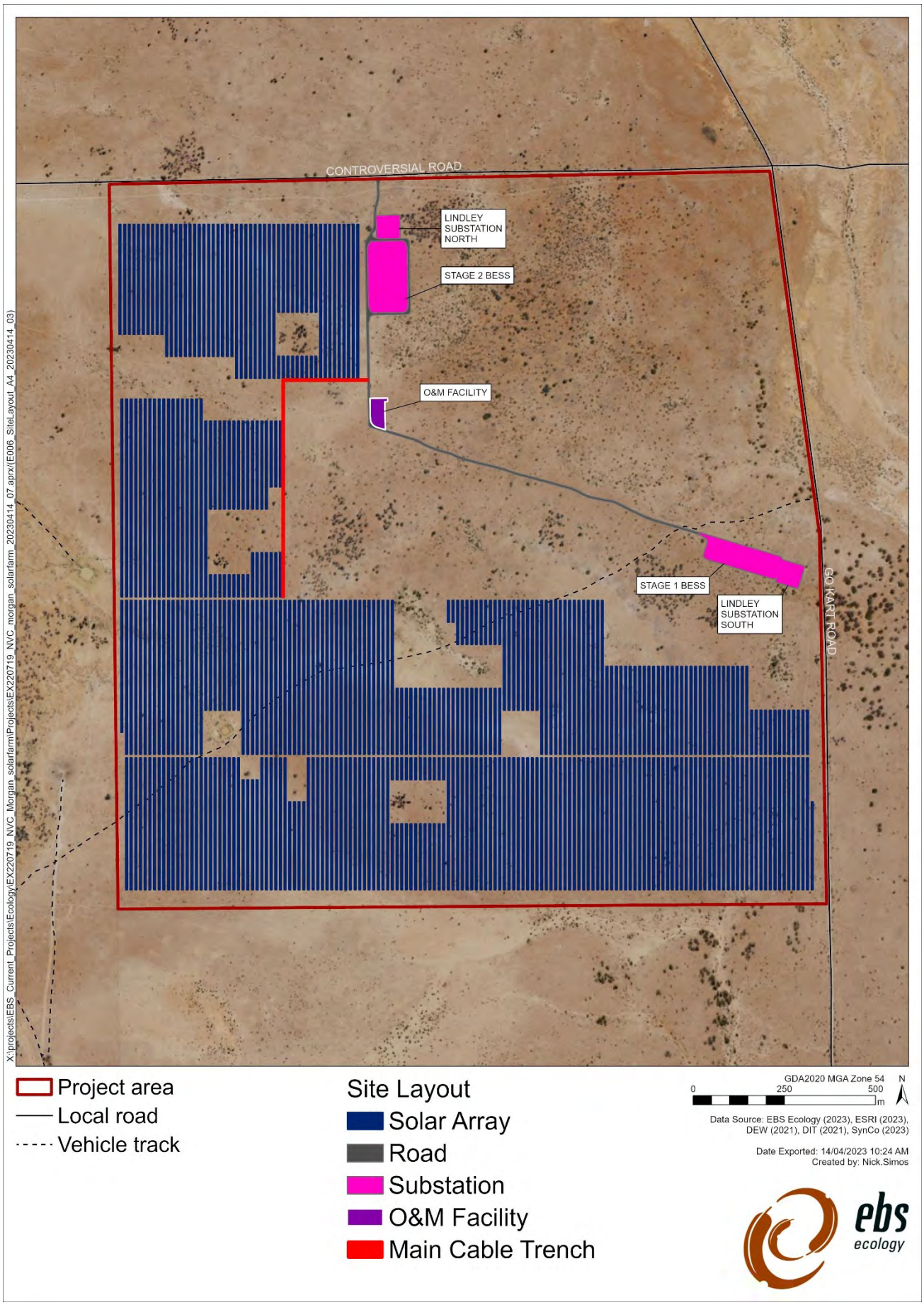

Figure 5. Map of the site layout with details of proposed infrastructure items.

Construction equipment is expected to include:

- Generators
- Excavators rubber tracked
- Crane Trucks and trailers
- Telehandlers and cranes
- Trenching machine
- Fuel trucks
- Water carts.

Temporary site facilities will include:

- Transportable site office
- Amenity facilities
- Waste storage area.

All vehicles entering the PV Array Field Tracks shall have a minimum axle height of 500 mm. Vehicles repeatedly entering the PV Array Field will be fitted with laser guided receptors to ensure they stay on wheel rut tracks. The wheel or track system shall be used to prevent/mitigate fracture of the Biological crust. Turning manoeuvres shall be tightly controlled.

2.5. Approvals <u>required</u> *or* <u>obtained</u>

- ***Native Vegetation Act 1991*** **(NV Act) –** this data report is supplied to fulfil requirements under the NV Act.
- ***Planning, Development and Infrastructure Act 2016*** **(PDI Act)** – Approval is required for this Project.
- ***Environment Protection and Biodiversity Conservation Act 1999*** **(EPBC Act)** – Matters of National Significance are likely to be impacted by this Project, including up to five nationally listed threatened fauna species. A significant impact self-assessment should be undertaken for all MNES which may be impacted by the Project, including those listed nationally as Critically Endangered, Endangered and Vulnerable. If impacts are considered significant to any MNES, an EPBC Referral to the Commonwealth Government under the EPBC Act will be required, which may impose additional conditions on Project approval.
- ***National Parks and Wildlife Act 1972*** **(NPW Act)** – EBS has the required flora collection permit (K25613-22).
- ***Landscapes SA Act 2019*** **(LSA Act)** – A water affecting activity (WAA) permit may be required for the proposed Project. Environmental management plans should consider the impact of erosion / runoff into the Burra and Bryant Creek catchments. No Declared weeds were detected on site during the field survey; however, coverage

was not exhaustive and Declared species may still occur. All land managers have a duty to manage environmental and declared weeds on their property. Should Declared weeds be detected on site during construction, a permit to transport declared weeds on a public road may be required for the proposed Project (i.e. for contaminated topsoil which may be removed from site).

- ***Aboriginal Heritage Act 1988 –*** Approval will be required if any sites, objects or remains are uncovered during construction works. Additionally, the Project Area is within The River Murray and Cron Lands Indigenous Land Use Agreement (ILUA). The First Peoples of the River Murray Mallee Region have an ILUA which is a voluntary agreement between the native title group and The Attorney-General for the State of South Australia regarding access, co-management and consultation protocol in the determination land and waters. When registered, ILUAs bind all parties and all native title holders to the terms of the agreement. As the ILUA is not available publicly, the landowner (SynCo Global Pty Ltd) will need to seek clarification from the Crown Solicitor's Office (CSO) on the requirements and exemptions listed in the ILUA regarding any consultation protocols. The CSO will advise if the agreement contains specific heritage requirements prior to any works being undertaken, including areas where native title has been extinguished.

2.6. Native Vegetation Regulation

The Project is under application for Crown Sponsorship from the Department of Energy and Mining (DEM). If endorsed by the Minister the Project will be permitted under the following regulation:

Regulation 12(34) – Infrastructure

Clearance of vegetation:

a. Incidental to the construction or expansion of a building or infrastructure where the Minister has, by instrument in writing, declared that the Minister is satisfied that the clearance is in the public interest; or
b. Required in connection with the provision of infrastructure or services to a building or proposed building, or to any place, provided that any development authorisation required by or under the *Planning, Development and Infrastructure Act 2016* (PDI Act) has been obtained.

The *Native Vegetation Regulations 2017* define infrastructure as:

a. The infrastructure, equipment, structures, works and other facilities used in or in connection with the supply of water or electricity, gas or other forms of energy, the provision of telecommunications, or the drainage, removal or treatment of wastewater or sewage; or
b. Roads and their supporting structures or works; or
c. Ports, wharfs, jetties, railways, trams and busways.

2.7. Development Application (DA) information (if applicable)

The Project Area occurs within the Rural Zone under which Renewable Energy Facilities must satisfy the following performance outcomes (POs):

- **PO 9.1** Renewable energy facilities and ancillary development minimises significant fragmentation or displacement of primary production; and
- **PO 9.2** – Small-scale, ground mounted solar power facilities support rural production or value adding industries.

The Project Area is within the Native Vegetation Overlay under which development is required to avoid or minimise the clearance of native vegetation.

The Office of the Technical Regulator (OTR) granted approval for the proposed Project on 24 October 2022, under section 122 of the PDI Act.

3. Method

3.1. Flora assessment

The field assessment was conducted by NVC Accredited Consultant J Skewes and EBS Ecologist J. Thorsteinsson from 25 to 26 October 2022, in accordance with the Bushland Assessment Method (BAM) (NVC 2020a).

3.1.1. Bushland Assessment Method

The BAM is derived from the Nature Conservation Society of South Australia's Bushland Condition Monitoring methodology (Croft *et al.* 2007, 2008a, 2008b, 2009; Milne and Croft 2012; Milne and McCallum 2012). The BAM used to assess areas of native vegetation requiring clearance and calculate the SEB requirements.

Details of site selection/stratification and assessment protocols, and the biodiversity value components assessed and the factors that influence these components are outlined in the *Bushland Assessment Manual* (NVC 2020a).

The Conservation Significance Scores were calculated from direct observations of flora and direct and historical observations of fauna species of conservation significance. All fauna identified as known to occur in the Protected Matters Search Tool (PMST), and fauna with Biological Databases of South Australia (BDBSA) records since 1995 and with a spatial reliability of less than 1 km, within 5 km of the Project Area, were included in the BAM scoresheets. Species determined as unlikely to occur within the Project Area will be removed by the Native Vegetation Branch if the finding is supported. Marine and/or wetland species were omitted from the scoresheets given the Project Area is terrestrial.

Loss Factor

As per the *Guide for calculating a Significant Environmental Benefit Under the Native Vegetation Act 1991 and Native Vegetation Regulations 2017* (July 2020) (NVC 2018), the following information regarding loss factors is in place for BAM assessments.

Scale of impact – Patch of vegetation (Bushland or Rangeland Assessment)	Loss Factor
Complete removal of vegetation under assessment	1
Clearance where at least one stratum of the vegetation in the application area will not be impacted Example – The understorey stratum of vegetation will be impacted, but the overstorey will remain intact	0.8
Removal of vegetation where the clearance is linear and narrow in nature (1m or less wide) and the path of the clearance has been carefully planned and varied, such as micrositing, in order to avoid vegetation as much as possible Example – The development of a recreational track which is specifically placed to avoid as much vegetation as possible	0.6

Table 1. Loss factor for clearance of patches of vegetation.

3.2. Fauna assessment

3.2.1. Protected Matters Search Tool (PMST) report

A PMST Report for the Project Area and a 5 km buffer (Search Area) was generated on 21 September 2022 (DCCEEW 2022a) to identify Nationally threatened flora and fauna, migratory fauna and Threatened Ecological Communities (TECs) under the EPBC Act relevant to the Project Area. The PMST search was updated on 4 April 2023 in response to the Department for Climate Change, Energy, the Environment and Water (DCCEEW) undertaking a review of species listing status across Australia.

Species and TECs identified in the PMST report that are known, likely or may occur within the Search Area were assessed for their likelihood of occurrence within the Project Area. All species considered exclusively marine (including whales, sharks, fish, dolphins, marine turtles and marine birds) were not assessed in this report as the Project Area is terrestrial. No species listed as marine by the PMST have been included as the Project Area contains no marine habitat.

3.2.2. Biological Databases of South Australia (BDBSA) data extract

A BDBSA search was obtained from the Department of Environment and Water (DEW) on 26 September 2022 (Recordset number: *DEWNRBDBSA220926-2)* to identify threatened flora and fauna species previously recorded within 5 km of the Project Area (DEW 2022a).

The BDBSA is comprised of an integrated collection of species records from the South Australian Museum, conservation organisations, private consultancies, Birds SA, Birdlife Australia, and the Australian Wader Study Group, which meet the Department of Environment and Water's (DEW) standards for data quality, integrity and maintenance. Only species with records since 1995 and a spatial reliability of less than 1 km were assessed for their likelihood of occurrence.

3.2.3. Field survey

Fauna surveys were conducted in conjunction with the flora assessments along the site. Weather conditions during the survey were favourable, with recent rain and mild daytime temperatures.

All native and exotic fauna species opportunistically encountered (directly observed, or tracks, scats, burrows, nests, and other signs of presence) during the native vegetation clearance assessment were recorded. Potential fauna refuge sites, such as hollows, were noted as an indication of availability of suitable habitat. Particular attention was paid to identifying habitat for threatened species identified in the desktop assessment. For each opportunistic fauna observation, the species, number of individuals, GPS location, detection methodology (sight, sound, or sign) and habitat were recorded.

In addition to opportunistic records, three dedicated 20-minute, ~2-hectare (ha) bird surveys (based on Lyon (1986)) were undertaken during the field survey within in each broad vegetation association. At each survey site, the observer

walked through similar vegetation recording all birds seen and heard during a timed 20-minute period. For each sighting the following were recorded (as a minimum):

- Detection method (e.g. seen, heard).
- Number of individuals.
- Activity (i.e., foraging, resting on tree, advertising).

3.2.4. Assessment of the likelihood of occurrence

Threatened species and TECs identified as potentially occurring in the Project Area by desktop research were assessed as to their likelihood of occurrence and have been rated as either 'Highly Likely', 'Likely', 'Possible', or 'Unlikely' to occur in the Project Area according to the criteria listed in Table 3.

Table 3. Criteria for the likelihood of occurrence of threatened species within the Project Area.

Likelihood	Criteria
Highly Likely / Known	• Recorded in the last 10 years, the species does not have highly specific niche requirements, the habitat is present and falls within the known range of the species distribution or; • The species was recorded as part of field surveys.
Likely	• Recorded within the previous 20 years, the area falls within the known distribution of the species and the area provides habitat or feeding resources for the species.
Possible	• Recorded within the previous 20 years, the area falls inside the known distribution of the species, but the area provides limited habitat or feeding resources for the species. • Recorded within 20 -40 years, survey effort is considered adequate, habitat and feeding resources present, and species of similar habitat needs have been recorded in the area.
Unlikely	• Recorded within the previous 20 years, but the area provides no habitat or feeding resources for the species, including perching, roosting or nesting opportunities, corridor for movement or shelter. • Recorded within 20 -40 years; however, suitable habitat does not occur, and species of similar habitat requirements have not been recorded in the area. • No records despite adequate survey effort.

4. Assessment outcomes

4.1. Vegetation assessment

4.1.1. General description of the vegetation, the site and matters of significance

Landform, geography, and soils

The Interim Biogeographical Regionalisation of Australia (IBRA) identifies geographically distinct bioregions based on common climate, geology, landform, native vegetation and species information, which is used to assess and plant for the protection of biodiversity (DCCEEW 2022b). Each Bioregion is further divided into smaller sub-regions based on differences in the above at a more local scale.

The Project Area falls within the Murray Darling Depression IBRA bioregion and Murray Mallee and Braemer IBRA sub-regions, with dominant characteristics summarised in Table 4. Environmental Associations (EA) Florieton and Mount Mary divide the Project Area east from west.

For the Mount Mary EA, 75 percent (%) of vegetation remains in the IBRA Association, with 21% remaining in the Murray Mallee subregion; whilst the Florieton EA has 99% native vegetation remaining in the Association and 100 % in the subregion.

Searches for water formations in relation to the Project Area have found a dam in the south-west of the Project Area, as well as an old Bore Hole drilled to a depth of 104 m in north -east corner of Project Area drilled on 06/06/1978 (WaterConnect 2022).

To the east of the Project Area are unnamed tributaries which feed into Burra Creek which ultimately drains into the Murray River. Low lying areas associated with this creek system were identified along the eastern boundaries of the Project Area and were inundated at the time of the field survey due to recent rains. No other standing water was found during the field survey within the Project Area. The adjoining land to the south of the Project Area is subject to inundation during high rainfall times, from the Bryant Creek water body.

Native vegetation within the Project Area forms part of a larger swathe of native vegetation within the broader landscape, which comprises predominantly chenopod shrubland with a variable density overstorey of mallee vegetation.

Table 4. IBRA bioregion and subregion environmental landscape summary.

Murray Darling Depression IBRA bioregion	
An extensive gently undulating sand and clay plain of Tertiary and Quaternary age frequently overlain by aeolian dunes. Vegetation consists of semi-arid woodlands of Black Oak / Belah (*Allocasuarina* sp.) Bullock Bush/ Rosewood (*Alectryon oleifolius*) and *Acacia* spp., mallee shrublands and heathlands and savanna woodlands.	
Murray Mallee IBRA subregion	
Extensive calcreted plains overlain by a series of sand dunes. The calcreted ridges which form the undulating plain have a distinct west-north-westerly trend. The soils are shallow reddish sands on the plains and deep yellowish sands on the dunes. Fans bordering the Mt Lofty Ranges (MLR) with low isolated hills rising above them have red duplex soils and calcareous earths subject to sheet erosion. Mallee is the dominant vegetation of the subregion. Its species composition reflects the diminishing coastal influence towards the north, especially in the understorey: Broombush (*Melaleuca uncinata*) gives way here to saltbush and bluebush (*Atriplex* and *Maireana* spp.) and hummock grass (*Triodia irritans*). Blue Gum (*E. leucoxylon*) and Peppermint Box (*E. odorata*) are characteristic species in the west of the region. Although tracts of mallee still occur, most of the original vegetation has been cleared for agriculture.	
Remnant vegetation	Approximately 21% (444,401 ha) of the subregion is mapped as remnant native vegetation, of which 17% (76,180 ha) is formally conserved.
Landform	Very gently undulating, to flat aeolian sand covered depositional plain of the central-southern Murray Basin.
Geology	East-west linear dunes, regularly spaced with cusp-like crests which are consistently steeper on the southern side. Up to four buried paleosols within the dune. Dunes composed of pale to dark reddish-brown calcareous sand with some clay fraction.
Soil	Brown calcareous earths and highly calcareous brown loamy earths, hard setting loamy soils with red clayey subsoils, Cracking clays.
Vegetation	Mallee heath and shrublands.
Conservation significance	101 species of threatened fauna, 136 species of threatened flora. 9 wetlands of national significance.

General overview of the vegetation under application

The Project Area is within a site of remnant bushland consisting of medium to low chenopod shrubland with emergent tall shrubs and remnant mallee Eucalypts, with an understorey of native forbs and grasses and minimal weed coverage.

As two IBRA environmental associations (EAs) (Mount Mary and Florieton) divide the Project Area, each with different remnancy figures, two 'Blocks' were designated, with those in Murray Mallee (Mount Mary) listed as 'Block A' and those in Braemer (Florieton) listed as 'Block B'.

Though Vegetation Associations (VAs) occurred across the arbitrary 'Block' boundary, separate BAM scoresheets were filled out for each impacted VA to account for differences in SEB outcomes across the two EAs. Due to the contiguous nature of the vegetation, separate BAM sites were not undertaken for each VA in each Block.

Six native vegetation associations were mapped during the field survey:

- **VA A/B1 –** *Maireana sedifolia* Shrubland
    - **1a –** *Maireana sedifolia +/- Acacia nyssophylla* Low Open Shrubland with emergent *Eucalyptus socialis* (refer to Table 5. Summary of VA A/B1a.);
    - **1b –** *Maireana sedifolia* Low Open Shrubland over native grasses and forbs (refer to Table 6. Summary of VA A/B1b);
    - **1c –** *Myoporum platycarpum +/- Alectryon oleifolius* Low Open Woodland over *Maireana sedifolia* (refer to Table 7. Summary of VA B1c);
- **VA A/B2 –** *Lycium australe* Low Open Shrubland (refer to Table 8. Summary of VA A2);
- **VA A/B3 –** *Casuarina pauper* Open woodland (refer to Table 9. Summary of VA A3.).
- **VA A4 –** *Acacia nyssophylla* over *Lycium australe +/- Maireana sedifolia* Tall Shrubland with emergent *Eucalyptus socialis* in low lying moist depressions (refer to Table 10. Summary of VA A4).

There were minor variations to the flora species contained within the first three VA's (which are present over the largest portion of the Project Area), which differed from each-other in amount of vegetation cover and species dominance. Vegetation association (VA) mapping is presented in Figure 6.

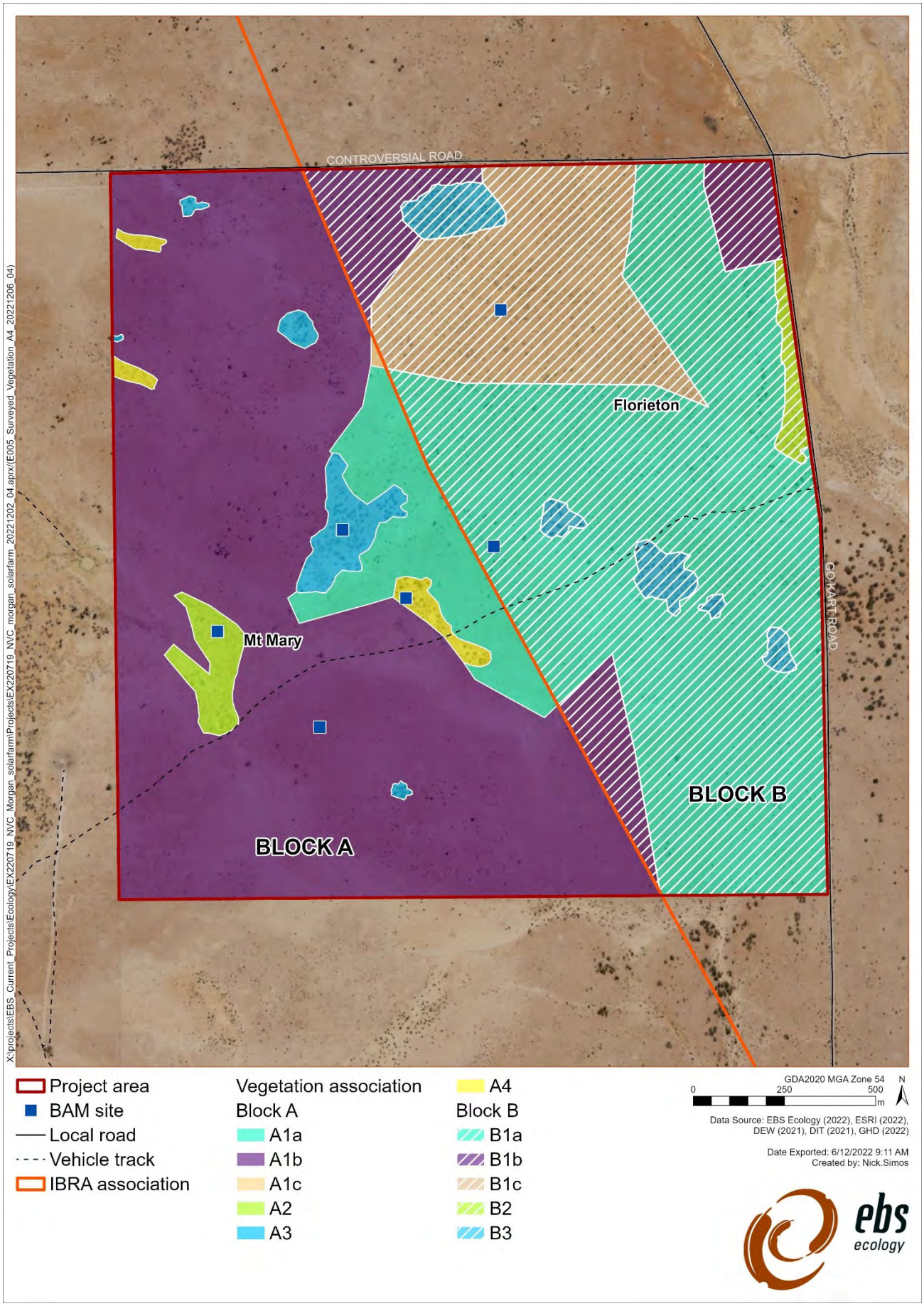

Figure 6. Vegetation associations mapped within the Project Area.

Table 5. Summary of VA A/B1a.

Vegetation Association	**Vegetation Association A/B1a**; *Maireana sedifolia* and *Lawrencia squamata* +/- *Acacia nyssophylla* Low Open Shrubland with emergent *Eucalyptus socialis.*

Figure 7. VA A1a facing southeast. Coordinates: Long: 139.6672389; Lat:-33.97998879.

General description Benchmark Community: MDBSA 2.1: Open Mallee / Low Open Woodland with Chenopod Shrub Understorey	Dominant species included *Maireana sedifolia* (Pearl Bluebush), *Lawrencia squamata* (Thorny Lawrencia) and *Austrostipa* spp. (Spear-grasses) with a covering of annual herbaceous forbs in the ground layer. Weed cover was generally low, with the most abundant species being *Carrichtera annua* (Wards Weed). Evidence of previous dieback was prominent across the site, likely linked to previous drought conditions. Old burnt-out mallee lignotubers were present throughout, suggesting a previously higher coverage of mallee vegetation. There was no regeneration of eucalyptus trees present across the site.
Threatened species or community	This VA does not comprise a listed TEC. No listed threatened flora or fauna species were observed within this VA, however the desktop assessment found several species may occur including: <u>Known</u> • *Aphelocephala leucopsis* (Southern Whiteface) (EPBC Act: VU) • *Melanodryas cucullata cucullata* (Hooded Robin) (EPBC Act: EN; NPW Act: R); <u>Likely</u> • *Corcorax melanorhamphos* (White-winged Chough) (NPW Act: R) • *Hieraaetus morphnoides* (Little *Eagle*) (NPW Act: VU) • *Neophema elegans elegans* (Elegant Parrot) (NPW Act: R)

	• *Pachycephala inornata* (Gilbert's Whistler) (NPW Act: R) • *Plectorhyncha lanceolata* (Striped Honeyeater) (NPW Act: R) • *Polytelis anthopeplus monarchoides* (Regent Parrot (eastern)) (EPBC / NPW: VU) • *Stagonopleura guttata* (Diamond Firetail) (EPBC Act: VU; NPW Act: VU) <u>Possible</u> • *Falco hypoleucos* (Grey Falcon) (EPBC Act: Vulnerable, NPW Act: R) • *Leipoa ocellata* (Malleefowl) (EPBC / NPW Act: VU) • *Lophochroa leadbeateri leadbeateri* (Eastern Major Mitchell's Cockatoo) (EPBC EN) • *Myiagra cyanoleuca* (Satin Flycatcher) (NPW Act: EN) • *Morelia spilota* (Carpet Python) (NPW Act: R) • *Neophema chrysostoma* (Blue-winged Parrot (EPBC Act: VU) • *Trichosurus vulpecula* (Common Brushtail Possum) (NPW Act: R)				
Block A – Murray Mallee (Mount Mary)					
Landscape context score	1.09	**Vegetation Condition Score**	55.08	**Conservation significance score**	1.10
Unit biodiversity Score	66.04	**Area (ha)**	5.7	**Total biodiversity score**	376.42
Block B – Braemer (Florieton)					
Landscape context score	1.06	**Vegetation Condition Score**	55.08	**Conservation significance score**	1.10
Unit biodiversity Score	64.22	**Area (ha)**	35.05	**Total biodiversity score**	2250.95

Table 6. Summary of VA A/B1b.

Vegetation Association	**Vegetation Association A/B1b**; *Maireana sedifolia* Low Open Shrubland with emergent *Eucalyptus socialis*.
 **Figure 8. VA A1b looking south. Long: 139.6620035, Lat: -33.98439637.**	
General description Benchmark Community: MDBSA 2.1: Open Mallee / Low Open Woodland with Chenopod Shrub Understorey	Dominant species included *Maireana sedifolia* (Pearl Bluebush) with *Austrostipa* spp. (Spear-grasses) and a covering of annual herbaceous forbs in the ground layer. Weed cover was generally low, with the most abundant species being *Carrichtera annua* (Wards Weed) and *Sisymbrium erysimoides* (Rocket). Evidence of previous dieback was prominent across the site, likely linked to previous drought conditions. Old burnt-out mallee lignotubers were present throughout, suggesting a previously higher coverage of mallee vegetation. There was no regeneration of eucalyptus trees present across the site. Shrubs were generally lower and sparser than in VA A1a, and likely corresponded to severity of the previous fire scar as well as proximity to artificial water sources, increasing grazing pressure.
Threatened species or community	This VA does not comprise a listed TEC. No listed threatened flora or fauna species were observed within this VA; however, the desktop assessment found several species may occur including: Known • *Aphelocephala leucopsis* (Southern Whiteface) (EPBC Act: VU) • *Melanodryas cucullata cucullata* (Hooded Robin) (EPBC Act: EN; NPW Act: R); Likely • *Corcorax melanorhamphos* (White-winged Chough) (NPW Act: R) • *Hieraaetus morphnoides* (Little *Eagle*) (NPW Act: VU)

	• *Neophema elegans elegans* (Elegant Parrot) (NPW Act: R) • *Pachycephala inornata* (Gilbert's Whistler) (NPW Act: R) • *Plectorhyncha lanceolata* (Striped Honeyeater) (NPW Act: R) • *Polytelis anthopeplus monarchoides* (Regent Parrot (eastern)) (EPBC / NPW: VU) • *Stagonopleura guttata* (Diamond Firetail) (EPBC Act: VU; NPW Act: VU) <u>Possible</u> • *Falco hypoleucos* (Grey Falcon) (EPBC Act: Vulnerable, NPW Act: R) • *Leipoa ocellata* (Malleefowl) (EPBC / NPW Act: VU) • *Lophochroa leadbeateri leadbeateri* (Eastern Major Mitchell's Cockatoo) (EPBC EN) • *Myiagra cyanoleuca* (Satin Flycatcher) (NPW Act: EN) • *Morelia spilota* (Carpet Python) (NPW Act: R) • *Neophema chrysostoma* (Blue-winged Parrot (EPBC Act: VU) • *Trichosurus vulpecula* (Common Brushtail Possum) (NPW Act: R)

Block A – Murray Mallee (Mount Mary)					
Landscape context score	1.09	**Vegetation Condition Score**	43.88	**Conservation significance score**	1.10
Unit biodiversity Score	52.61	**Area (ha)**	117.57	**Total biodiversity Score**	6184.90
Block B– Braemer (Florieton)					
Landscape context score	1.06	**Vegetation Condition Score**	43.88	**Conservation significance score**	1.10
Unit biodiversity Score	51.16	**Area (ha)**	9.61	**Total biodiversity Score**	491.63

Table 7. Summary of VA B1c.

Vegetation Association	**Vegetation Association B1c**; *Myoporum platycarpum +/- Alectryon oleifolius Low* Open Woodland.
 **Figure 9. B1c looking south. Long:139.6675 Lat:-33.9741.**	
General description Benchmark Community: MDBSA 2.1: Open Mallee / Low Open Woodland with Chenopod Shrub Understorey	Dominant species included *Myoporum platycarpum* (Sugarwood) and *Alectryon oleifolius* (Rosewood) in the overstorey with midstorey of *Maireana sedifolia* (Pearl Bluebush) and *Acacia nyssophylla* (Spine Bush) and mixed *Austrostipa* spp. (Spear-grasses) and a covering of annual herbaceous forbs in the ground layer. A number of emergent *E. oleosa* and *E. socialis* mallee trees were distributed throughout the site, however 'mallee' was not the dominant overstorey. The upperstorey varied from sparse to dense patches of trees and included a high diversity of species including abundant mistletoe in places. Bird activity was high, with a total of 22 bird species identified during a 20-min 2-ha bird survey. Interesting observations included nesting Red-capped Robins (*Petroica goodenovii*), two inactive Wedge-tailed Eagle (*Aquila audax*) nests and Southern Whiteface (*Aphelocephala leucopsis*). Weed cover was generally low, with the most abundant species being *Carrichtera annua* (Wards Weed) and *Sisymbrium erysimoides* (Rocket).
Threatened species or community	This VA does not comprise a listed TEC. No listed threatened flora or fauna species were observed within this VA; however, the desktop found several species may occur including: <u>Known</u> • *Aphelocephala leucopsis* (Southern Whiteface) (EPBC Act: VU) • *Melanodryas cucullata cucullata* (Hooded Robin) (EPBC Act: EN; NPW Act: R); <u>Likely</u>

	• *Corcorax melanorhamphos* (White-winged Chough) (NPW Act: R) • *Hieraaetus morphnoides* (Little *Eagle*) (NPW Act: VU) • *Neophema elegans elegans* (Elegant Parrot) (NPW Act: R) • *Pachycephala inornata* (Gilbert's Whistler) (NPW Act: R) • *Plectorhyncha lanceolata* (Striped Honeyeater) (NPW Act: R) • *Polytelis anthopeplus monarchoides* (Regent Parrot (eastern)) (EPBC / NPW: VU) • *Stagonopleura guttata* (Diamond Firetail) (EPBC Act: VU; NPW Act: VU) <u>Possible</u> • *Falco hypoleucos* (Grey Falcon) (EPBC Act: Vulnerable, NPW Act: R) • *Leipoa ocellata* (Malleefowl) (EPBC / NPW Act: VU) • *Lophochroa leadbeateri leadbeateri* (Eastern Major Mitchell's Cockatoo) (EPBC EN) • *Myiagra cyanoleuca* (Satin Flycatcher) (NPW Act: EN) • *Morelia spilota* (Carpet Python) (NPW Act: R) • *Neophema chrysostoma* (Blue-winged Parrot (EPBC Act: VU) • *Trichosurus vulpecula* (Common Brushtail Possum) (NPW Act: R)

Block B– Braemer (Florieton)					
Landscape context score	1.06	**Vegetation Condition Score**	61.63	**Conservation significance score**	1.10
Unit biodiversity Score	71.85	**Area (ha)**	0.77	**Total biodiversity Score**	55.33

Table 8. Summary of VA A2.

Vegetation Association	**Vegetation Association A2**; *Lycium australe* Low Open Shrubland in area subject to irregular inundation associated with watering point.
 **Figure 10. A2 looking south (left) (Long: 139.6592, Lat: -33.9828) and watering point (right) looking north (Long:139.6593, Lat: *33.6593).**	
General description Benchmark Community: MDBSA 11.6 Semi-saline Shrublands of River cliffs, floodplains, depressions and drainage lines.	Dominant species were *Lycium australe* (Australian Boxthorn) and *Nitraria billardiera* (Nitre Bush) which occurred around man-made watering point. Given the artificial nature of the watering point, this VA has not been described as having 'wetland or riparian habitat present' in the BAM scoresheet. Vegetation in this VA matched the description for benchmark community MDBSA 11.6; however, it was unclear if this was naturally occurring association, or had formed as a result of placement of an artificial watering point. The vegetation occupied a low-lying depression which had moist clayey soil and associated plant species. Given the amount of rain which had recently occurred in the area, there was very little standing water, with most confined to the dam.
Threatened species or community	This VA does not comprise a listed TEC. No listed threatened flora or fauna species were observed within this VA; however, the desktop found several species may occur including: Known • *Aphelocephala leucopsis* (Southern Whiteface) (EPBC Act: VU) • *Melanodryas cucullata cucullata* (Hooded Robin) (EPBC Act: EN; NPW Act: R); Likely • *Coturnix ypsilophora* (Brown Quail) (NPW Act: V) • *Corcorax melanorhamphos* (White-winged Chough) (NPW Act: R) • *Hieraaetus morphnoides* (Little *Eagle*) (NPW Act: VU) • *Neophema elegans elegans* (Elegant Parrot) (NPW Act: R) • *Pachycephala inornata* (Gilbert's Whistler) (NPW Act: R) • *Plectorhyncha lanceolata* (Striped Honeyeater) (NPW Act: R) • *Polytelis anthopeplus monarchoides* (Regent Parrot (eastern)) (EPBC / NPW: VU) • *Stagonopleura guttata* (Diamond Firetail) (EPBC Act: VU; NPW Act: VU) Possible • *Falco hypoleucos* (Grey Falcon) (EPBC Act: Vulnerable, NPW Act: R) • *Leipoa ocellata* (Malleefowl) (EPBC / NPW Act: VU) • *Lophochroa leadbeateri leadbeateri* (Eastern Major Mitchell's Cockatoo) (EPBC EN) • *Myiagra cyanoleuca* (Satin Flycatcher) (NPW Act: EN) • *Morelia spilota* (Carpet Python) (NPW Act: R) • *Neophema chrysostoma* (Blue-winged Parrot (EPBC Act: VU) • *Trichosurus vulpecula* (Common Brushtail Possum) (NPW Act: R)
Block A- Murray Mallee (Mount Mary)	

Landscape context score	1.09	**Vegetation Condition Score**	59.67	**Conservation significance score**	1.10
Unit biodiversity Score	65.74	**Area (ha)**	3.58	**Total biodiversity Score**	235.33
Block B- Braemer (Florieton) – No clearance proposed.					

Table 9. Summary of VA A3.

Vegetation Association	**Vegetation Association A3**; *Casuarina pauper* Open Woodland.
 **Figure 11. VA A3 facing east. Long: 139.6628, Lat: -33.9795.**	
General description Benchmark Community: MDBSA 10.10 Black Oak Open Forests of Inland Depressions and Drainage Lines.	Dominant species was *Casuarina pauper* (Black Oak) which occurred in isolated patches on lighter soils on low rises and also in depressions. The understorey was sparse and low, and comprised primarily of *Maireana sedifolia* and annual herbs. Species diversity was higher on the edges of this VA where it intergraded with other vegetation types. This VA contained important habitat features including nesting habitat for Wedge-tailed Eagles, including one nest which was active and had a fledgling on the nest at the time of the survey. Other habitat features included numerous hollows of varying size and condition which would provide favourable habitat for microbats and other fauna. Dead wood formed large amounts of debris on the ground providing important habitat for reptiles and other ground dwelling fauna.
Threatened species or community	This VA does not comprise a listed TEC. No listed threatened flora or fauna species were observed within this VA; however, the desktop found several species may occur including: Known • *Aphelocephala leucopsis* (Southern Whiteface) (EPBC Act: VU) • *Melanodryas cucullata cucullata* (Hooded Robin) (EPBC Act: EN; NPW Act: R); Likely • *Corcorax melanorhamphos* (White-winged Chough) (NPW Act: R) • *Hieraaetus morphnoides* (Little *Eagle*) (NPW Act: VU) • *Neophema elegans elegans* (Elegant Parrot) (NPW Act: R)

	• *Pachycephala inornata* (Gilbert's Whistler) (NPW Act: R) • *Plectorhyncha lanceolata* (Striped Honeyeater) (NPW Act: R) • *Polytelis anthopeplus monarchoides* (Regent Parrot (eastern)) (EPBC / NPW: VU) • *Stagonopleura guttata* (Diamond Firetail) (EPBC Act: VU; NPW Act: VU) <u>Possible</u> • *Falco hypoleucos* (Grey Falcon) (EPBC Act: Vulnerable, NPW Act: R) • *Leipoa ocellata* (Malleefowl) (EPBC / NPW Act: VU) • *Lophochroa leadbeateri leadbeateri* (Eastern Major Mitchell's Cockatoo) (EPBC EN) • *Myiagra cyanoleuca* (Satin Flycatcher) (NPW Act: EN) • *Morelia spilota* (Carpet Python) (NPW Act: R) • *Neophema chrysostoma* (Blue-winged Parrot (EPBC Act: VU) • *Trichosurus vulpecula* (Common Brushtail Possum) (NPW Act: R)

Block A- Murray Mallee (Mount Mary)					
Landscape context score	1.09	**Vegetation Condition Score**	66.98	**Conservation significance score**	1.10
Unit biodiversity Score	88.61	**Area (ha)**	0.07	**Total biodiversity Score**	6.20

Table 10. Summary of VA A4.

Vegetation Association	**Vegetation Association A4**; *Acacia nyssophylla* over *Lycium australe* +/- *Maireana sedifolia* Tall Shrubland with emergent *Eucalyptus socialis*.

Figure 12. VA A4 facing north-west. Long: 139.6646, Lat: -33.9812.

General description Benchmark Community: MDBSA 1.1 Open Woodland with Open Arid adapted Shrub Understorey on Limestone Plains	This VA occurred in isolated clay loam depressions and contained dense patches of tall shrubs dominated by *Acacia nyssophylla* and *Acacia oswaldii*, with emergent *Myoporum platycarpum* and *Alectryon oleifolius*. These areas contained a high amount of bird activity and included sightings of species such as Superb Fairywrens (*Malurus cyaneus*), Splendid Fairy Wrens (*Malurus splendens*), Chestnut-crowned Babblers (*Pomatostomus ruficeps*) and Striated Pardalotes (*Pardalotus striatus*).
Threatened species or community	This VA does not comprise a listed TEC. No listed threatened flora or fauna species were observed within this VA; however, the desktop found several species may occur including: <u>Known</u> • *Aphelocephala leucopsis* (Southern Whiteface) (EPBC Act: VU) • *Melanodryas cucullata cucullata* (Hooded Robin) (EPBC Act: EN; NPW Act: R); <u>Likely</u> • *Corcorax melanorhamphos* (White-winged Chough) (NPW Act: R) • *Hieraaetus morphnoides* (Little *Eagle*) (NPW Act: VU) • *Neophema elegans elegans* (Elegant Parrot) (NPW Act: R) • *Pachycephala inornata* (Gilbert's Whistler) (NPW Act: R) • *Plectorhyncha lanceolata* (Striped Honeyeater) (NPW Act: R)

	• *Polytelis anthopeplus monarchoides* (Regent Parrot (eastern)) (EPBC / NPW: VU) • *Stagonopleura guttata* (Diamond Firetail) (EPBC Act: VU; NPW Act: VU) <u>Possible</u> • *Falco hypoleucos* (Grey Falcon) (EPBC Act: Vulnerable, NPW Act: R) • *Leipoa ocellata* (Malleefowl) (EPBC / NPW Act: VU) • *Lophochroa leadbeateri leadbeateri* (Eastern Major Mitchell's Cockatoo) (EPBC EN) • *Myiagra cyanoleuca* (Satin Flycatcher) (NPW Act: EN) • *Morelia spilota* (Carpet Python) (NPW Act: R) • *Neophema chrysostoma* (Blue-winged Parrot (EPBC Act: VU) • *Trichosurus vulpecula* (Common Brushtail Possum) (NPW Act: R)				
Block A- Murray Mallee (Mount Mary)					
Landscape context score	1.09	**Vegetation Condition Score**	65.31	**Conservation significance score**	1.10
Unit biodiversity Score	57.06	**Area (ha)**	0.43	**Total biodiversity Score**	31.32

4.1.2. Vegetation condition

Land use within the Project Area and surrounds comprises native vegetation utilised for pastoral grazing. During the field assessment, low numbers of livestock (sheep) were observed utlising the Project Area for grazing and there was some evidence of modification of shrubs. Most shrubs in the understorey, especially *Maireana sedifolia*, showed evidence of significant previous dieback, which may be linked to drought conditions in previous years. Given the high rainfall in the 12 months prior to the field survey, including recent rainfall in the area, most shrubs were regenerating vigorously with regenerating juvenile plants present. Young perennial native grasses were prominent in the ground layer between shrubs, with a dense covering of annual forbs in many locations.

No fire history was available on NatureMaps for the region, however there was evidence across the site that a fire had historically burnt in the region, with burnt out stumps of old mallee trees present across the site.

Considering the utilisation for grazing and the previous drought conditions, the site is currently in good condition and is a fair representation of remnant vegetation in the area. One Vegetation Association (VA) A2 showed greater signs of weed cover, likely from increased soil disturbance alongside the man-made dam area.

The field survey identified 62 flora species across the Project Area, 17 of which are introduced weed species. A complete list of flora species observed in the Project Area is provided in Appendix 1. Flora species list.

A total of 32 native fauna were observed within the Project Area during the field survey (1 amphibian, 28 bird, 1 reptile, and 1 mammal species). Sheep were the only non-native species observed across the site. Bird activity across the site was most concentrated within VA's A1c and A3. A complete list of fauna observed across the Project Area is presented in Appendix 2. Fauna species list.

4.1.3. Site map showing areas of proposed impact

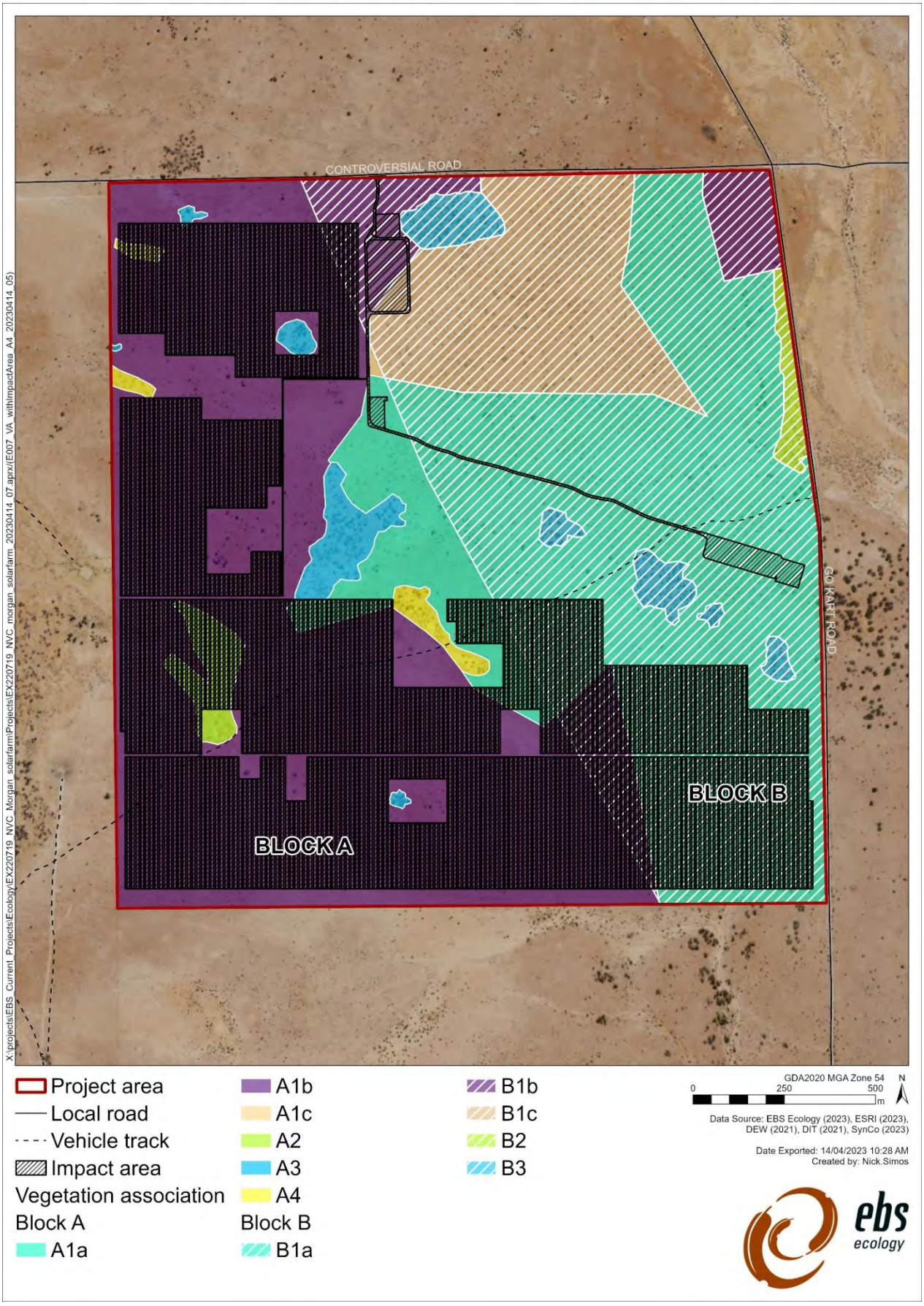

Figure 13. Proposed impact areas and vegetation associations mapped during field assessment.

4.1.4. Photo log

Photographic examples of vegetation conditions and fauna habitat found within proposed impact areas are presented in Figure 14 to Figure 19.

Figure 14. Photo looking South over proposed impact area of Stage 1.

Figure 15. South-east corner of Project Area, looking west over proposed impact area of stage 2.

Figure 16. Photo point for VA A1b looking south over proposed impact area of for stages 2 and 3.

Figure 17. Example of ground-cover vegetation present within VA A1.

Figure 18. Photo point for VA A2, example of vegetation within impact area for Stage 2.

Figure 19. Active Wedge-tailed Eagle (*Aquila audax*) nest detected within VA A3 during field assessment.

4.2. Threatened species assessment

The PMST report identified three TECs, as relevant to the Project Area, detailed and assessed in Table 11.

Table 11. TEC likelihood of occurrence in the Project Area.

Threatened Ecological Community	EPBC Status	Description	Likelihood of Occurrence
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	EN	Woodland communities where Buloke (*Allocasuarina luehmannii*) is the dominant or co-dominant tree species. Co-dominant species include *Callitris gracilis, Callitris glaucophylla, Eucalyptus largiflorens, Eucalyptus leucoxylon* ssp. *pruinosa* and *Eucalyptus microcarpa*. In SA, the community is only known from the Bordertown district (Cheal, Lucas, & Macaulay 2011).	**Unlikely** The Project Area is outside the known distribution of the community. There is no woodland community in the Project Area. Buloke (*A. luehmannii*) and associated co-dominant tree species do not occur.
Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions	CE	Medium to tall open mallee eucalypt woodland with a canopy typically dominated by *E. porosa* and an understorey in which tussock grasses may be prominent in relatively wet years, low chenopod shrubs occur in variable densities, and taller shrubs are typically sparse. Associated with areas with an average annual rainfall in the range of 260mm – 450 mm (DAWE 2021a).	**Unlikely** Although mapped within 5 km, no 'mallee-box' communities occur in the Project area, with no domination of tussock grasses in the understorey. *E. porosa* was not recorded within the Project Area. Annual rainfall is below annual average rainfall for the typical range of community.
Mallee Bird Community of the Murray Darling Depression Bioregion	EN	The ecological community described in this conservation advice is a type of fauna community found in the Murray Darling Depression bioregion comprising an assemblage of bird species that specialise or are dependent on mallee vegetation that characterises this bioregion (DAWE 2021b).	**Unlikely** Mallee vegetation did not dominate an area of at least 5-hectares as the dominant canopy tree, and therefore is not considered to meet the key diagnostic criterion for the TEC. The Project Area is likely to contain Mallee Bird Community (MBC) supportive habitat, but in itself, does not comprise the MBC TEC. Six MBC species either observed in field survey, or with observation records within the last ten years within 20 km of the Project Area.

PBC Status Conservation Codes: CE Critically Endangered. EN Endangered.

The PMST report (generated 4 April 2023) found 26 EPBC listed threatened species to possibly occur including four plant species (may occur) and 22 fauna species comprising, 16 birds (6 known, 5 likely, 5 may), one mammal (may), one frog (known) and four fish (2 known, 2 may) (Appendix 3).

Six of these EPBC listed species were found to have records within the Search Area, with two observed within the Project Area during the field assessment:

- Southern Whiteface (*Aphelocephala leucopsis*) (observed onsite)
- Southern Bell Frog (*Litoria raniformis*)
- Hooded Robin (*Melanodryas cucullata var. cucullata*) (observed onsite)

- Blue-winged parrot (*Neophema chrysostoma*)
- Regent Parrot (eastern) (*Polytelis anthopeplus monarchoides*)
- Diamond Firetail (*Stagonopleura guttata*).

Three other EPBC listed species did not have nearby records, but were considered to possibly occur within the Project Area based on known distribution and suitability of habitat. However, the habitat within the Project Area is unlikely to be considered critical to their survival:

- Major Mitchell's Cockatoo (*Lophochroa leadbeateri leadbeateri*)
- Grey Falcon (*Falco hypoleucos*)
- Malleefowl (*Leipoa ocellata*).

The PMST found 12 migratory species as potentially occurring within 5 km of the Project Area (Appendix 3).

Additionally, a BDBSA search found one State listed (NPW Act) plant species and twelve State listed fauna species with historical records within 5 km of the Project Area since 1995 (spatial reliability of < 1 km including 'unentered' reliability). Three of these were considered unlikely to occur due to lack of suitable habitat in the Project Area, four were considered possible with marginal habitat available and / or old records of nomadic or uncommon species, five were considered likely to occur.

Species listed in the PMST as known to occur, or otherwise with records occurring since 1995 within 5 km of the Project Area, or listed in PMST with suitable habitat present, are listed in Table 12.

A full list of all species assessed as part of the likelihood assessment is presented in Appendix 3.

Additionally, 36 fauna species were detected during the field survey, including one reptile, two native mammals, one introduced mammal, one amphibian and 31 bird species. A full list of species and number of individuals recorded is presented in Appendix 2. Recorded species included State Rare Hooded Robin (*Melanodryas cucullata* ssp. *cucullata*), as well as Southern Whiteface (*Aphelocephala leucopsis*) which is currently under review for possible EPBC listing status.

Threatened fauna and flora database records within 5 km of the Project Area are mapped in Figure 20 and Figure 21.

Table 12. Likelihood of occurrence of threatened species identified in the desktop assessment as 'known to occur' (PMST) or with records within 5 km of the Project Area since 1995. The data source and threat levels are described in the table footer.

Species (common name)	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Flora						
Callistemon brachyandrus (Prickly Bottlebrush)		R	2	2006	Grows mostly in sandy soils of alluvial flats in subarid regions of the Darling and lower Murray River (eFloraSA 2022).	**Unlikely** – no suitable sandy alluvial flat habitat in Project Area.
Fauna						

Species (common name)	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Anhinga novaehollandiae novaehollandiae (Australasian Darter)		R	2,3	2012; 2020	Found in wetlands and sheltered coastal waters, mainly in the Tropics and Subtropics. It prefers smooth, open waters, for feeding, with tree trunks, branches, stumps or posts fringing the water, for resting and drying its wings. Most often seen inland, around permanent and temporary water bodies at least half a metre deep, but may be seen in calm seas near shore, fishing. (Birdlife 2022).	**Unlikely** – Records within last 20 years, however no suitable trees located around dam area for suitable habitat.
Aphelocephala leucopsis leucopsis (Southern Whiteface)	VU		2,3,4	2020, 2022	Listed in 2023 due to documented population decline. Occurs across most of mainland Australia south of the tropics, living in a wide range of open woodland and shrublands where there is an understorey of grasses and/ or shrubs. The species feeds almost exclusively on the ground, favouring areas with lower tree densities. Nesting is usually in a hollow, crevice or low bush (DAWE, 2021).	**Known –** This species was detected during the field survey and multiple historical records occur within the Project Area vicinity.
Biziura lobata menziesi (Musk Duck)		R	2,3	2021; 2010	Lakes and deep swamps with reeds and open water. Nesting in dense old reed clumps in standing water at least 1 metre deep (Morcombe 2011).	**Unlikely** – no suitable aquatic habitat in Project Area.
Botaurus poiciloptilus (Australasian Bittern)	EN	E	1, 2	Known	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spike rushes (*Eleocharis* spp. (Morcombe 2011).	**Unlikely –** Specialised wetland habitat of rushes not present in Project Area.
Corcorax melanorhamphos (White-winged Chough)		R	2,3	2020; 2013	White-winged Choughs are found in open forests and woodlands. They tend to prefer the wetter areas, with lots of leaf-litter, for feeding, and available mud for nest building (BirdLife Australia 2022).	**Likely** – previous records in the area and suitable habitat present.
Coturnix ypsilophora australis (Brown Quail)		V	2,3	2012; 2011	Typically occurs in grass, crops, heaths, rainforest edges, grassy and spinifex woodland where it prefers damp rank vegetation (Morcombe 2011).	**Possible** – damp/rank vegetation limited to VA A/B2 (*Lycium australe* low shrubland) habitat in Project Area. On edge of known distribution.
Falco hypoleucos (Grey Falcon)	VU	R	1	Likely	The species occurs in arid and semi-arid Australia, including the MDB, EB, central Australia and WA. The species is mainly found where annual rainfall is less than 500 mm,	**Possible** – no nearby records, however suitable habitat occurs and the Project Area is within is known /

Species (common name)	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
					except when wet years are followed by drought, when the species might become marginally more widespread, although it is essentially confined to the arid and semi-arid zones at all times (Schoenjahn 2018).	preferred distribution and habitat characteristics.
Hieraaetus morphnoides (Little *Eagle*)		V	2,3	2012; 2019	Widespread across Australia in diverse habitats including coastal forest, woodland, open scrub, tree lined interior watercourse. Prefers areas where open country mixes with open forested hills, such as farmland areas (Morcombe 2011).	**Likely** – recent nearby records and a variety of suitable habitat including for foraging and nesting.
Leipoa ocellata (Malleefowl)	VU	V	1	Known	Inhabits semi-arid regions of southern Australia. Typically occupies shrublands and low woodlands that are dominated by mallee vegetation, with sandy soil, an abundance of leaf litter, and long-unburnt fire history. It also occurs in other habitat types including eucalypt or native pine *Callitris* woodlands, *Acacia* shrublands, Broombush *Melaleuca uncinata* vegetation or coastal heathlands (Benshemesh 2007).	**Possible** – No preferred Mallee dominated habitat in Project Area and no suitable sandy areas with abundant leaf litter for nesting. May occur in Project Area for foraging or dispersal only. No nearby recent records.
Litoria raniformis (Southern Bell Frog)	VU	V	1, 2	Known; 2010	Three distinct groups of records in SA. One group is located in the far south-east of the state (to near Keith) and adjoining Vic. Populations, one group along the Murray River from Victoria to the coast, and a small group in the Mt Lofty Ranges (MLR). The group in the MLR is likely to represent an unintentionally introduced population originating from captive stock and is likely to have now died out. Populations in the Murray lower lakes (Lake Alexandrina, Lake Albert and the Eastern Mount Lofty Ranges tributaries) are known to have declined significantly due to drought and have not recovered since water flows have returned in 2007. This species is found mostly amongst emergent vegetation, including *Typha* sp. (bullrush), *Phragmites* sp. (reeds) and *Eleocharis* sp. (sedges), in or at the edges of still or slow-flowing water	**Unlikely** – the distribution of this species is within the bounds of the Murray River and associated aquatic habitat. Aquatic habitat in the Project Area is minimal, ephemeral and / or man-made and does not contain emergent vegetation that supports this species. ***Removed from BAM scoresheet due to lack of suitable wetland / aquatic habitat.**

Species (common name)	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
					bodies such as lagoons, swamps, lakes, ponds and farm dams (Clemann and Gillespie 2012).	
Lophochroa leadbeateri leadbeateri (Eastern Major Mitchell's Cockatoo)	EN		1	Likely	Occurs in the Murray Darling, Eyre and Bulloo River basins, including in eastern SA. In SA the subspecies had disappeared from Adelaide and Mt Mary Plains by the 1950s. Occurs in arid and semi-arid woodlands dominated by mulga (*Acacia aneura*), mallee and box *Eucalypts*, slender cypress pine (*Callitris gracilis*) or belah (*Casuarina cristata*). Within these vegetation types, the subspecies main requirements are fresh surface water and trees with suitable nesting hollows (med to large entrance and >50cm deep). Eastern (DCCEEW 2023).	**Possible** -suitable foraging habitat occurs including presence of ephemeral water. Some hollows occur in the large Belah (*Casuarina pauper*) trees; however it is uncertain if these are large enough to host this species. No nearby records occur.
Melanodryas cucullata cucullata (Hooded Robin (YP, MN, AP, MLR, MM, SE))	EN	R	2, 3, 4	2010, 2020, 2022	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey (Morcombe 2011).	**Known** – recent nearby records, suitable habitat and was detected on field survey in VA A2.
Morelia spilota (Carpet Python)		R	2	2010	Occurs across northern, eastern and southwestern Australia. Found from rainforest to a variety of semi-arid coastal and inland habitat. In SA it occurs in dry sclerophyll forest with ground cover and logs, and in the SAMBD lives in hollows of large River Red Gums and north-facing cliffs along the Murray River (DEH 2008).	**Possible** – no preferred riparian habitat in Project Area, however may occur in wet periods, though there is minimal suitable log-cover on the ground to support their extended presence.
Myiagra cyanoleuca (Satin Flycatcher)		E	2	1998	Inhabits forest and woodland, mangroves and coastal heath, but typically avoids rainforest. Uncommon migrant to SA, but typically has a summer breeding range in SE QLD to Tasmania, and in winter migrates to NE QLD and New Guinea (Morcombe 2011).	**Possible** – no preferred habitat in Project Area. Uncommon migrant, likely to utilise the Murray River corridor, but may not extend into less suitable habitat in arid shrublands.

Species (common name)	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Neophema chrysostoma (Blue-winged Parrot)	VU			1999	Partial migrant. During non-breeding period from autumn to early spring, birds are recorded from northern Vic, eastern SA, southwestern QLD and western NSW. Inhabit a range of habitats from coastal, sub-coastal and inland areas through to semi-arid zones, favouring grasslands, grassy woodlands and wetlands. Forage typically on the ground. Breed in Tasmania, south eastern SA and southern Victoria in nest hollows (DCCEEW, 2022)	**Possible** -suitable foraging habitat occurs. Only one record nearby from over 20 years ago.
Neophema elegans elegans (Elegant Parrot)		R	2,3	2004; 1999	In South Australia it occurs in the east, north to the Flinders Ranges and west to the Eyre Peninsula. Inhabiting open habitats, the Elegant Parrot can be found in a wide variety of habitats, including grasslands, shrublands, mallee, woodlands and thickets, bluebush plains, heathlands, saltmarsh and farmland (BirdLife Australia 2022).	**Likely** – suitable foraging habitat in Project Area and recent nearby records.
Pachycephala inornata (Gilbert's Whistler)		R	2,3	2012; 2019	Dry woodland, mallee, mulga with shrubby understorey and abundant litter, where it feeds in shrubs on the ground (Morcombe 2011).	**Likely** – suitable foraging habitat in Project Area and recent nearby records.
Pedionomus torquatus (Plains-wanderer)	CE	E	1	Likely	The Plains-wanderer occurs at scattered sites in Queensland, NSW, Victoria and SA. Inhabits sparse, treeless, lowland native grasslands with approximately 50% bare ground, most vegetation less than 5 cm in height, with some widely-spaced plants up to 30 cm high. Typically, this occurs on hard red-brown clay soils (Commonwealth of Australia 2012).	**Unlikely** - no nearby records and no preferred grassland habitat. Some potentially suitable fringe habitat of chenopod shrubland occurs and the Project Area is within likely area of distribution.
Philemon citreogularis citreogularis (Little Friarbird)		R	2,3	2005; 2018	Open forests, woodlands, river edges, swampy woodlands, mangroves. Nomadic in the north and a summer migrant to the SE of Australia (Morcombe 2011).	**Unlikely** – the Project Area is on the very western edge of this species range, and it is likely to be an uncommon migrant along the Murray River corridor in unusual seasonal conditions. No suitable riparian woodland habitat in the Project Area.

Species (common name)	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Plectorhyncha lanceolata (Striped Honeyeater)		R	2,3	2010; 2017	Utilises drier open forest, woodland, mallee, mulga, heath and mangroves. Is a generalist feeder whose diet includes insects, seeds, fruits and nectar (Morcombe 2011).	**Likely** – suitable foraging habitat occurs in the Project Area and there are recent nearby records.
Polytelis anthopeplus monarchoides (Regent Parrot (eastern))	VU	V	1, 2, 3	Likely; 2013; 2019	The Regent Parrot (eastern) occurs in the lower MDB region of SA, NSW and Vic, with three separate breeding areas including the lower Murray River area upstream from Swan Reach in SA. The species primarily inhabits riparian River Red Gum *(Eucalyptus camaldulensis)* forests or woodlands and adjacent Black Box *(E. largiflorens)* woodlands. Critical habitat includes all known nesting sites, foraging, shelter and essential travel / dispersal routes and buffer areas of up to 20 km from known breeding areas. (DCCEEW 2020b; Baker-Gabb and Hurley 2011).	**Likely** – the Project Area contains suitable foraging habitat within the 20 km critical habitat buffer from known breeding populations of Regent Parrots.
Rostratula australis (Australian Painted Snipe)	EN	E	1	Likely	Inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of Duma, Canegrass or sometimes tea-tree species (DOE 2014).	**Unlikely** - preferred vegetation type and supporting habitat is not found within the Project Area despite recent nearby records.
Stagonopleura guttata (Diamond Firetail)	VU	V	3	2012	Inhabits grassy ground cover underneath open forest, woodland, mallee, acacia scrub and timber belts along watercourses and roadsides. Feeds exclusively on the ground and often moves and nests in loose flocks. Can be sedentary or locally migratory (Morcombe 2011).	**Likely** – suitable foraging habitat occurs in the Project Area and there are recent nearby records.
Trichosurus vulpecula (Common Brushtail Possum)		R	2	2004	Dry eucalypt forest, woodlands and suburban areas, foraging on leaves, and fruits. Sleep in tree hollows or other dark confined spaces such as hollow logs, dense vegetation and	**Possible** – some potentially suitable foraging habitat, though few hollows large enough to

Species (common name)	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
					even ceilings and walls of buildings (AoLA 2022).	support nesting animals.

Conservation status

EPBC Act (National); NPW Act (State / SA). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. Ssp.: the conservation status applies at the sub-species level.

Source of Information

1. EPBC Act Protected Matters Report (Accessed on 21/09/2022; updated 04/04/2023) – 5 km buffer applied to Project Area.
2. Biological Database of South Australia data extract (21/09/2022) – 5 km buffer applied to Project Area.
3. Birdlife records included as part of BDBSA data extract (21/09/2022) – 5 km buffer applied to Project Area.
4. Observed / recorded on site during field survey.

Abbreviations within Distribution and preferred habitat: EP: Eyre Peninsula; FP: Fleurieu Peninsula; FR: Flinders Ranges; KI: Kangaroo Island; MLR: Mount Lofty Ranges; MU: Murraylands; NL: Northern Lofty; NP: National Park; NSW: New South Wales QLD: Queensland; SL: Southern Lofty; SE: South East / South-Eastern; SW: South-Western; Tas: Tasmania; Vic: Victoria; WA: Western Australia; YP: Yorke Peninsula.

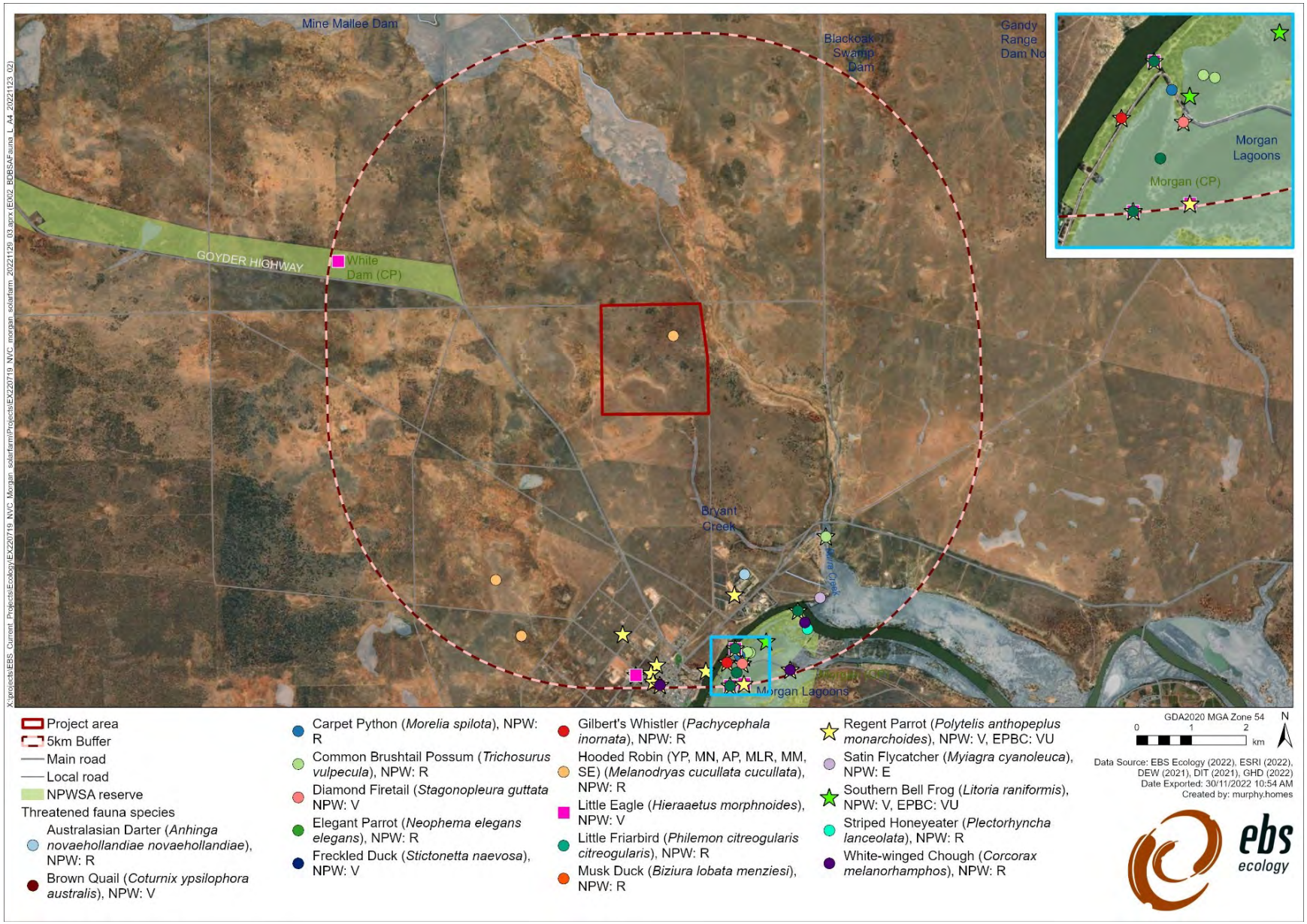

Figure 20. BDBSA recorded threatened fauna species within 5 km of Project Area.

Figure 21. BDBSA recorded threatened flora species identified within 5 km of the Project Area.

4.2.1. Threatened species discussion

Impact significance is a moderating factor that may be considered by the NVC when assessing the clearance application. The NVC will consider an impact significant if it will:

1. Lead to a long-term decrease in the size of a population, or
2. Reduce the area of occupancy of the species, or
3. Fragment an existing population into two or more populations, or
4. Adversely affect habitat critical to the survival of a species, or
5. Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
6. Result in invasive species that are harmful to a threatened species becoming established in the threatened species habitat, or
7. Interfere with the recovery of the species.

Hooded Robin

Hooded Robins occur in south-eastern Australia where there are estimated to be 100 subpopulations. They utilise dry eucalypt and acacia woodland and shrublands with an open understorey of grasses and herbs. The species has recently been listed as nationally Endangered under the EPBC Act (effective 31st March 2023) due to a significant (>50%) population decline over the last 10 years. Critical habitat for the species includes areas which contain their known preferred habitat. There are multiple records of Hooded Robin within 5 km of the Project Area, and the species was detected on site during the field assessment (1 individual). An EPBC self-assessment is likely to be required to determine the significance of impact for this species.

Southern Whiteface

Southern Whiteface are widespread across the southern half of mainland Australia, where they occupy open woodlands and shrublands with grassy understorey. The species forages in the understorey of low tree density habitats, and use low bushes, small hollows or crevices to nest. Southern Whiteface have recently been listed as nationally Vulnerable under the EPBC Act due to a substantial decline in their population (30-50%) over the last 10 years. Multiple records of Southern Whiteface occur within 5 km of the Project Area, and the species was detected on site during the field survey (6 individuals). An EPBC self-assessment is likely to be required to determine the significance of impact for this species.

Regent Parrot

Regent Parrots are confined to the semi-arid interior of south-eastern mainland Australia, and in SA is restricted to the Murray-Mallee districts. Regent Parrots utilise River Red Gum (*Eucalyptus camaldulensis*) forests or woodlands for colonial nesting and surrounding (~20 km radius) Mallee woodland vegetation with shrub and herb layer for foraging. The National Recovery Plan for the Regent Parrot lists all known sites for nesting, food resources, water, shelter, essential travel routes, dispersal and buffer areas within its current normal range as 'critical habitat'.

The Project Area occurs within 5 km of known nesting habitat along the Murray River at Morgan and there are multiple records of the species within 5 km. The Project Area is more open than their typical 'mallee woodland' foraging habitat, however it contains known foraging species including *E. socialis*, *E. oleosa*, *Maireana spp.*, *Casuarina pauper*,

Zygophyllum eremaeum and others. An EPBC self-assessment is likely to be required to determine the significance of impact for this species.

Diamond Firetail

Diamond Firetail occur in the south-east mainland of Australia and within SA have been separated into three isolated subpopulations. They occur in eucalypt, acacia or casuarina woodlands, open forests and another lightly timbered habitats including farmland and grassland with scattered trees. They prefer low tree density areas with abundant grass cover, where they feed on the ground. They build nests into the base of prey birds such as Wedge-tailed Eagles and/or among prickly foliage of shrubs. Diamond Firetail have recently been listed as nationally Vulnerable under the EPBC Act due to a substantial decline in their population (30-50%) over the last 10 years. Sparsely scattered records occur, with a recent (2012) record in Morgan, however most records in SA are in the eastern Mount Lofty Ranges. Habitat within the Project Area is suitable, however is on the fringe of known sub-populations and is therefore unlikely to constitute critical habitat. An EPBC self-assessment may be required to determine the significance of impact for this species.

Grey Falcon

Several historical and more recent records of Grey Falcon occur within 100 km of the site, with the most recent from 2019 (records on NatureMaps are denatured to within one decimal degree and therefore proximity has not been stated). Suitable nesting habitat occurs along the Murray River and favoured foraging habitat is available in the surrounding landscape, including within the Project Area.

Given the broad ranging and generalised diet, foraging and nesting habitat preferences of the species, and that there are no known nesting populations within the Project Area, it is considered unlikely that the Project would have a significant impact on this species.

4.3. Cumulative impacts

When exercising a power or making a decision under Division 5 of the Native Vegetation Regulations 2017, the NVC must consider the potential cumulative impact, both direct and indirect, that is reasonably likely to result from a proposed clearance activity.

Direct clearance of native vegetation associated with the application includes:

- 61.8 ha for solar panel array (wont require 100% clearance, but vegetation likely to be disturbed).
- 104.9 ha between the solar arrays used for maintenance periodically, requires minimal direct clearance, vegetation may be indirectly impacted by adjacent solar panel arrays.
- 0.17 ha for the main cable trenching.
- 4.27 ha for the substation.
- 1.2 ha for new roads for access to and around site.
- 0.33 ha for the Operation and Maintenance facility.

Direct clearance of vegetation associated with each infrastructure component are listed for each VA in Table 14.

Table 13. Summary of impact for each project component and proposed loss factor.

Infrastructure component	Area (ha)	Comments / Detail	Proposed loss factor
Solar panel array	61.8	4.7m width in provided plans includes: • 1.8 m slashed corridor for pile driver access; • Indirect impacts from shading / changes in hydrology, • Footings (driven piles) ~205mm diameter (200UC) x 7 posts per tracker x 2190 trackers (totalling 0.051 ha (505.99m^2))	0.8
Substation and BESS (Stage 1)	3.64		1.0
BESS and Substation (Stage 2)	0.75		1.0
Underground trench	0.17	Includes: • Trench 1 m wide x 1.2m deep • Will be rehabilitated after construction Does not include: • Construction buffer / access track. Construction impacts will be mitigated by: • Placing soil in micro-sited heaps within existing construction areas. • Use of high-clearance underbody construction vehicle. • Topsoil spread back over trench area	0.6
Operation and Maintenance facility	0.33		1.0
Main access road	1.2	Width of 5.5 m (gravel	1.0
Area between solar panel array (maintenance corridors)	104.9	Includes: • Alternative string tracks (informal) for construction and annual maintenance. • 2 x 400 mm rolled tracks in alternate stings (calculated as 20cm buffers to each solar PV array); • 10m corridors provided for maintenance vehicles (medium rigid) to traverse the site.	0.6

Table 14. Direct clearance associated with each proposed infrastructure component.

Vegetation Association	Infrastructure	Area (Ha)
A1a	Solar panel array	14.06
	Area between solar panel array	23.94
	Operations and Maintenance	0.33
	Road	0.6
	Substation / BESS Stage 1	1.83
	A1a/B1a Total	**40.76**
A1b	Solar panel array	46.23
	Area between solar panel array	78.38
	Main cable trench	0.17
	Road	0.46

Vegetation Association	Infrastructure	Area (Ha)
	Substation / BESS Stage 1	1.81
	Substation / BESS Stage 2	0.12
	A1b/B1b Total	**127.17**
A1c	Substation / BESS Stage 2	0.63
	Road	0.14
	A1c/B1c Total	**0.77**
A2	Solar panel array	1.32
	Area between solar panel array	2.26
	A2 Total	**3.58**
A3	Solar panel array	0.02
	Area between solar panel array	0.05
	A3/B3 Total	**0.07**
A4	Solar panel array	0.16
	Area between solar panel array	0.27
	A4 Total	**0.43**
	Grand Total	**172.78**

The impact footprint does not account for clearance of unformed tracks which may be made within the Project Area during construction for access to installation sites, nor does it account for infrequent vehicular access along solar PV array gaps for irregular maintenance activities or annual cleaning.

Indirect impacts to native vegetation and fauna may include:

- Potential generation of dust during construction.
- Potential increase in dust deposition from clearance associated with solar panel installation (at least until understory vegetation regenerates).
- Impacts to retained vegetation from effects of altered hydrology, sunlight and heat radiation from infrastructure.
- Disturbance to nesting fauna species, particularly during construction. This includes Wedge-tailed Eagles which were found to have multiple nests on site, including one active nest at the time of field survey.
- Reduction in or deterrent to access to ephemeral water resources for local birds following rainfall events (including dam which is not within footprint, and VA A2 which contains low-lying depressions which hold water and moisture in the soil).

4.4. Addressing the Mitigation Hierarchy

When exercising a power or making a decision under Division 5 of the Native Vegetation Regulations 2017, the NVC must have regard to the mitigation hierarchy. The NVC will also consider, with the aim to minimize, impacts on biological diversity, soil, water and other natural resources, threatened species or ecological communities under the EPBC Act or listed species under the NPW Act.

A Native Vegetation Management Framework (NVMF) (*in draft*) has been developed for the proposed Project, which addresses components of the mitigation hierarchy to minimise the Projects impact and is referred to in the following section.

a) Avoidance – outline measures taken to avoid clearance of native vegetation

Avoidance measures taken into consideration in the infrastructure planning include:

- Initial Footprint - The initial footprint of the Project was based on laser imaging, detection and ranging (LiDAR) of the site, and had a high-level focus on impact avoidance including minimisation of impacts to native vegetation (i.e. dense mid-upper storey vegetation), soil, water (i.e. dams), ecological communities and other natural resources.
- Concept Footprint – During the Initial Footprint period Ecologists were engaged to determine the vegetations associations across the Project Area. On the basis of the survey outcome, native vegetation areas of poorer condition and lower value were identified (along with the converse) and the initial footprint was further adjusted targeting such areas. Micro siting of key infrastructure elements; [roads, BESS and O&M facilities] occurred to reduce earthworks etc. This step in the design process included the avoidance of the removal of isolated upper storey trees such a Black Oak in the PV Array Field, which where consequently sited into the vegetation corridors between tracker strings which will not be impacted.
- As a result, the initial infrastructure footprint has avoided impacting areas of structurally diverse woodland vegetation, including Buloke woodland (A3) which supports a variety of habitat components such as hollows and nesting trees for species such as microbats and Wedge-tailed Eagles; and VA B1c which comprises a higher cover of mallee eucalypts woodland vegetation.
- The proposed main access track was sited to follow an existing track.
- Construction Footprint- Prior to construction, ground truthing laser surveys will be undertaken in the field and minor alterations of tracker strings will occur to avoid unnecessary impact to mid and upper storey vegetation where present.

b) Minimization – if clearance cannot be avoided, outline measures taken to minimize the extent, duration and intensity of impacts of the clearance on biodiversity to the fullest possible extent (whether the impact is direct, indirect or cumulative).

For the most part, clearance areas have been proposed in areas of more disturbed vegetation, or vegetation which contains fewer habitat resources such as upper storey vegetation, dense vegetation and water sources. The proposed solar panel array has been micro-sited to avoid these ecological constraints. The VA most impacted is VA A1b, which contains more open chenopod shrubland which has been subjected to higher grazing pressures, and is within proximity to a man-made dam, thereby representing a higher grazing gradient than other parts of the Project Area.

A range of overarching management and mitigation measures are proposed during construction, operational and decommission phases of the Project, to minimise impacts to vegetation, outlined in the NVMF (*in draft*). Table 15 is extracted from the draft NVMF and states that the following management and mitigation measures will be implemented.

Table 15. Management and mitigation measures outlined in the draft NVMF (supplied to EBS by SynCo Global Pty Ltd on 30/03/2023 and adapted by EBS).

Management / Mitigation Measure	Construction Phase	Operational Phase	Decommissioning Phase
Minimise vegetation clearance as far as practicable through design, layout and controls during construction.	✓	✓	✓
Retain all small shrubs and groundcover across the site where possible. Minimise fracturing the biological crust by eliminating/restricting tracked vehicle turning/rotating. Also: • Plant equipment must use highly inflated wide flat treat tyres or rubber tracks to distribute loads. • Number of routes will be minimised and vehicles will be required to remain on formed tracks at all times. • 'Low impact' clearing methods for tracks will be utilised, including mulching or hand clearing to reduce the amount of vegetation that is removed or damaged, and to reduce impacts to soil crust.	✓	✓	
Locate areas of temporary disturbance [temporary laydown areas within the final/permanent disturbance footprint (i.e. BESS Stage 2)], where possible.	✓		
Restrict vegetation clearance to the area approved for clearance.	✓		
Avoid works beyond the boundaries of the approved area including vehicle entry, personnel entry, storage of goods and materials and stockpiling of topsoil or cleared vegetation.	✓	✓	✓
Clean earthmoving/construction equipment of soil and vegetation prior to entering the site and before moving to another site.	✓	✓	✓
Avoid importing weed affected soil, mulch, fill or other material to the site.	✓	✓	
Rehabilitate areas of temporary disturbance (e.g., trenches) where appropriate to encourage native vegetation regeneration.	✓		✓
Minimise vegetation clearance during maintenance (if required) as far as practicable.		✓	✓
Avoid vegetation clearing in new areas once construction is completed unless necessary approvals are in place.		✓	✓
Undertake ongoing weed management as per LSA Act requirements, where required, in consultation with the respective agency where relevant.		✓	
Provide an appropriate SEB to offset vegetation clearance in accordance with the requirements of the *Native Vegetation Act 1991*, by implementation of an approved SEB Management Plan.	✓		

To ensure that the environment is protected and preserved following management plans will be developed and implemented:

- Construction Environmental Management Plan (CEMP):
- Operational Environmental Management Plan (OEMP) and
- Decommissioning Environmental Management Plan (DMEP).

Specific minimisation measures related to construction components are detailed below.

Solar PV array design

- Footings inserted (~205 mm diameter (200UC) x 7 posts per tracker x 2190 trackers) with a height of approximately 2.13 m from ground to centre of PV allowing chenopod shrubland vegetation to be retained under panels.
- Vegetation along the post row to be slashed at a height of 300 mm with pile driver to traverse the alignment using Unimog Hiab to install preassembled trackers (assembled at Stage 2 BESS).
- Solar panels will be micro-sited during construction based on on-ground truthing to avoid impacts to substantial vegetation (such as taller shrubs and trees etc).
- Gap of 8.1 m between each solar PV array module allowing vegetation to be retained. Impacts in this area will be limited to initial one-off access by required pile driver machine (300mm rolled tracks) and may be accessed once per year for maintenance by a high-clearance gator.
- Maintenance and cleaning to be done by grape vine tractors with front mounted brushes. General maintenance will be undertaken using drone technology, followed by high axle (>500 mm clearance) gator (Figure 22).

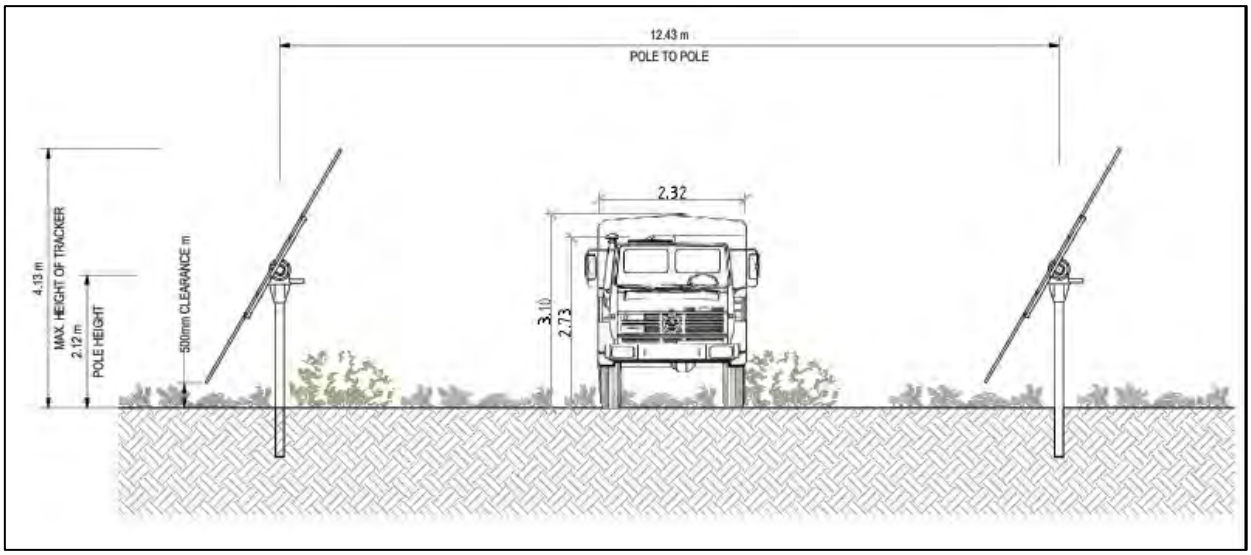

Figure 22. Indicative image of PV array and high clearance (min 500mm axle height) designed to reduce need for clearance of vegetation for tracks (Source: NWBP *in draft*).

Electrical cable trench

- High clearance vehicle to be utilised during construction to reduce need for vegetation clearance for access.
- Spoil piles to be microsite to avoid mid-storey vegetation (i.e., shrubs), proposed at 5m intervals along the length of the trench at 19.63m2 (approx. piles of 5 m diameter).
- Length of electrical cable trench to follow main access track, which will be utilised for spoil piles and access.

Main access track

- Follows the footprint of an existing un-made (gravel) east-west access track where possible.

Maintenance corridors

- Maintenance corridors designated running east-west (perpendicular to solar PV array) up to 10 m width.
- Impacts limited to access by machinery during construction and up to once per year thereafter by light vehicle for cleaning / maintenance (i.e., not a formed track).

Ongoing maintenance

Impacts for ongoing maintenance such as cleaning and / or repairing any damages are minimised through the utilisation of drone technology to located and inform of required maintenance actions. Access will then be allowed only as necessary by high-clearance gator vehicles directly to the issue. Access for cleaning of panels will occur once per year using unformed tracks along parallel (8.1m) alternate corridors. Acknowledging the impact that vehicle tread will have on the vegetation, the Client has proposed a disturbance area of 2 x 400mm tracks for vehicle tread in each alternate string.

c) Rehabilitation or restoration – outline measures taken to rehabilitate ecosystems that have been degraded, and to restore ecosystems that have been degraded, or destroyed by the impact of clearance that cannot be avoided or further minimized, such as allowing for the re-establishment of the vegetation.

Clearance will be required initially for construction related to the installation of the solar panel array for footings / driven piles to support the solar PV array (~205mm diameter (200UC) x 7 posts per tracker x 2190 trackers). Additional impacts to vegetation under the solar array comprise:

- 1.8 m slashed corridor required for pile-driver machine;
- One-off access by Medium Rigid (MR) vehicle on unformed tracks;
- Irregular (i.e. annual) access using high-clearance gator vehicle; and
- Alterations to vegetation as a result of changes in hydrology, sunlight and heat radiation impact.

Rehabilitation and restoration or vegetation will be permitted in the solar array following the initial construction impact, including regeneration of low grasses and shrubs under the installed solar panels and in alternate 'gap' corridors initially used for access. Rehabilitation of native vegetation is preferable for solar farm projects to reduce dust accumulation on panels and associated maintenance.

The NVMF (*in draft*) states that once the facility reaches the end of its useful life, it will be decommissioned, which involves the removal of equipment, demolition of structures and restoration of the site to its original condition. Cleared areas will be rehabilitated and revegetated.

d) Offset – any adverse impact on native vegetation that cannot be avoided or further minimized should be offset by the achievement of a significant environmental benefit that outweighs that impact.

Offset will be achieved through a combination of an on-ground SEB offset and payment into the Native Vegetation Fund to meet the balance.

5. Principles of Clearance (Schedule 1, *Native Vegetation Act 1991*)

The Native Vegetation Council will consider Principles 1(b), 1(c) and 1(d) when assigning a level of Risk under Regulation 16 of the Native Vegetation Regulations. The Native Vegetation Council will consider all the Principles of clearance of the Act as relevant, when considering an application referred under the *Planning, Development and Infrastructure Act 2016*.

Table 16 provides an assessment of the clearance against the Principles.

Table 16. Assessment against the Principles of Clearance.

<table>
<tr><th>Principle of clearance</th><th>Considerations</th></tr>
<tr><td rowspan="3">Principle 1(a) – it comprises a high level of diversity of plant species</td><td>Relevant information
A high diversity of plant species was present at all sites across the Project Area. A combination of good seasonal conditions in the lead up to the survey, and the timing of the survey in spring, contributed to this outcome, with many annual herbaceous species present in the understorey. Considering the property has been utilised for grazing, there was minimal weed invasion, and minimal grazing impacts. Dieback in plants was most likely due to prolonged drought conditions in years prior. Table 17 lists the native and introduced plant species found within each impacted VA, and the resulting plant diversity score. Native plant species diversity scores over ‘20’ represents a high level of diversity and is considered seriously at variance.

Table 17. Number of plant species recorded (native and introduced) and plant diversity score for each VA impacted by the proposed development.
<table>
<tr><th>VA</th><th>Native</th><th>Introduced</th><th>Plant Diversity Score</th></tr>
<tr><td>A/B1a</td><td>37</td><td>4</td><td>30</td></tr>
<tr><td>A/B1b</td><td>35</td><td>8</td><td>30</td></tr>
<tr><td>A/B1c</td><td>25</td><td>10</td><td>30</td></tr>
<tr><td>A/B2</td><td>30</td><td>9</td><td>30</td></tr>
<tr><td>A/B3</td><td>23</td><td>6</td><td>24</td></tr>
<tr><td>A/B4</td><td>24</td><td>4</td><td>28</td></tr>
</table></td></tr>
<tr><td>Assessment against the principles
Seriously at Variance
A1a, B1a, A1b, B1b, A2, A3, B3, A4 (Plant Diversity Score >20)</td></tr>
<tr><td>Moderating factors that may be considered by the NVC

Amount of clearance related to area of remnant</td></tr>
</table>

Principle of clearance	Considerations
	Where only a very small area of vegetation will be impacted relative to the amount of vegetation within the local vicinity (less than 0.25 %) of the native vegetation within 5 km radius to be impacted), may reduce impact from 'seriously at variance', to 'at variance'. The Project Area is surrounded by native vegetation, with the NatureMaps SA Native Vegetation layer showing 100% native vegetation coverage within 5 km of the site. 178.27 hectares of clearance represents 1.5% of an approximate 12,046.59 ha of vegetation within a 5 km radius and therefore this moderating factor is **unlikely to apply.**
Principle 1(b) – significance as a habitat for wildlife	Relevant information Two nationally listed threatened species was detected during the field survey: • *Aphelocephala leucopsis* (Southern Whiteface (EPBC VU) • *Melanodryas cucullata cucullata* (Hooded Robin (EPBC EN; NPW R) Based on proximity of and time since the most recent record and the type of habitats available within the Project Area, other threatened species which may utilise the Project Area include: **Likely** • *Corcorax melanorhamphos* (White-winged Chough) (NPW R) • *Hieraaetus morphnoides* (Little *Eagle*) (NPW V) • *Neophema elegans elegans* (Elegant Parrot) (NPW R) • *Pachycephala inornata* (Gilbert's Whistler) (NPW R) • *Plectorhyncha lanceolata* (Striped Honeyeater) (NPW R) • *Polytelis anthopeplus monarchoides* (Regent Parrot (eastern)) (EPBC VU; NPW V) • *Stagonopleura guttata* (Diamond Firetail) (EPBC VU; NPW V) **Possible** • *Coturnix ypsilophora australis* (Brown Quail) (NPW V) • *Falco hypoleucos* (Grey Falcon) (EPBC VU; NPW R) • *Leipoa ocellata* (Malleefowl) (EPBC VU; NPW V) • *Lophochroa leadbeateri leadbeateri* (Eastern Major Mitchell's Cockatoo) (EPBC EN) • *Morelia spilota* (Carpet Python) (NPW R) • *Myiagra cyanoleuca* (Satin Flycatcher) (NPW R) • *Neophema chrysostoma* (Blue-winged Parrot) (EPBC VU) • *Trichosurus vulpecula* (Common Brushtail Possum) (NPW R) Of these, two nationally listed species have records within 5 km of the Project Area, and are considered likely to occur, Regent Parrot and Diamond Firetail. Four other species are considered to possibly occur. All nationally listed species known or considered likely to occur are discussed in Section 4.2.1, however, briefly: **Hooded Robin** Critical habitat for the species includes areas which contain their known preferred habitat. There are multiple records of Hooded Robin within 5km of the Project Area, and the species was detected on site during the field assessment. A significant impact self-assessment is likely to be required to determine the significance of impact for this species. **Southern Whiteface** The Project Area contains suitable foraging and breeding habitat for the Southern Whiteface. Multiple records of Southern Whiteface occur within 5 km of the Project Area, and the species was detected on site during the field survey (6 individuals). A significant impact self-assessment is likely to be required to determine the significance of impact for this species. **Regent Parrot** The Project Area occurs within 5 km of known nesting habitat along the Murray River at Morgan. The National Recovery Plan for the Regent Parrot lists all known sites for nesting, food resources,

<table>
<tr><th>Principle of clearance</th><th>Considerations</th></tr>
<tr><td></td><td>
water, shelter, essential travel routes, dispersal and buffer areas within its current normal range as 'critical habitat'. A significant impact self-assessment is likely to be required to determine the significance of impact for this species.
<u>Diamond Firetail</u>
Sparsely scattered records occur, with a recent (2012) record in Morgan, however most records in SA are in the eastern Mount Lofty Ranges. Habitat within the Project Area is suitable, however is on the fringe of known sub-populations and is therefore unlikely to constitute critical habitat. A significant impact self-assessment may be required to determine the significance of impact for this species.

More generally, vegetation within the site contains suitable habitat for a wide range of species and contains habitat features which support sheltering (trees, shrubs, sandy soil, woody debris), nesting (structurally diverse vegetation), and foraging (seeds, fruits, seasonal nectar). It is likely to support a range of common and less common species.
A total of 30 native fauna species were recorded within the Project Area during the field survey which occurred over an afternoon and a morning on separate days. Evidence of breeding birds (including nesting Wedge-tailed Eagles, Red-capped Robins and White-winged Trillers) were observed, at it is likely that other species also utilise the site.
The vegetation occurs in a landscape which has not been largely cleared and formed a contiguous block of vegetation with the surrounding landscape for many kilometres, except for road or housing infrastructure, and therefore is unlikely to be critical for movement of fauna through the landscape. Damp drainage depressions, a man-made dam and drainage lines are unlikely to hold water during times of drought, and therefore do not contribute significantly as a refuge for fauna.
The threatened fauna score and unit biodiversity score for each VA is listed in Table 18.
Table 18. Threatened fauna score and unit biodiversity score (UBS) for each impacted VA.
<table>
<tr><th rowspan="2">VA</th><th rowspan="2">Threatened Fauna Score</th><th colspan="2">UBS</th></tr>
<tr><th>Block A</th><th>Block B</th></tr>
<tr><td>1a</td><td>0.1</td><td>66.04</td><td>64.22</td></tr>
<tr><td>1b</td><td>0.1</td><td>52.61</td><td>51.16</td></tr>
<tr><td>2</td><td>0.1</td><td>71.65</td><td>NA</td></tr>
<tr><td>3</td><td>0.1</td><td>80.30</td><td>78.09</td></tr>
<tr><td>4</td><td>0.1</td><td>78.30</td><td>NA</td></tr>
</table>
</td></tr>
<tr><td></td><td>
<u>Assessment against the principles</u>
<u>Seriously at Variance</u>
A/B1a, A/B1b, A2, A/B3, A4
</td></tr>
<tr><td></td><td>
<u>Moderating factors that may be considered by the NVC</u>
Impact Significance
Given the abundance of uncleared landscapes surrounding the Project Area, clearance may be considered to be not significant, given that it is unlikely to:

lead to a long-term decrease in the size of a population;
reduce the area of occupancy of a species;
fragment an existing population into two or more populations;
decrease availability of habitat such that the extent of a species is likely to decline;
result in invasive species becoming established in the threatened species habitat;
interfere with the recovery of a species.

</td></tr>
</table>

<table>
<tr><th>Principle of clearance</th><th>Considerations</th></tr>
<tr><td></td><td>A significant impact self-assessment is required to determine the level of impact this Project may have on several MNES, as it may be considered habitat critical to the survival of some species under the Significant Impact Criteria.

Common species

For more common species occurring within the Project Area, higher quality areas of vegetation, including those areas where structural diversity is higher, are being avoided for clearance. The habitat under application is unlikely to be essential habitat for local populations of common species.</td></tr>
<tr><td rowspan="3">Principle 1(c) – plants of a rare, vulnerable or endangered species</td><td>Relevant information
No listed threatened plant species were recorded at the site and a desktop assessment combined with habitat assessment during the field survey, found that there were unlikely to be any listed threatened species occurring within the Project Area.

Threatened Flora Score(s) – 0 (all sites)</td></tr>
<tr><td>Assessment against the principles
Seriously at Variance - N/A
At Variance – N/A</td></tr>
<tr><td>Moderating factors that may be considered by the NVC -N/A</td></tr>
<tr><td rowspan="3">Principle 1(d) – the vegetation comprises the whole or part of a plant community that is Rare, Vulnerable or endangered</td><td>Relevant information
No listed threatened ecological communities (EPBC Act) or State provisionally listed threatened ecological communities were identified within the Project Area. The Project Area was assessed against the criteria for three TECs, detailed in Table 19.

Table 19. Assessment against the criteria for listing as a TEC.
<table>
<tr><th>Threatened Ecological Community</th><th>EPBC Status</th><th>Likelihood of Occurrence</th></tr>
<tr><td>Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions</td><td>EN</td><td>Unlikely
There is no woodland community in the Project Area. Buloke and associated co-dominant tree species do not occur and the Project Area is outside the known distribution of the community.</td></tr>
<tr><td>Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions</td><td>CE</td><td>Unlikely
Although mapped within 5 km, no ‘mallee-box’ communities occur in the Project Area. Annual rainfall is below annual average rainfall for the typical range of community.</td></tr>
<tr><td>Mallee Bird Community of the Murray Darling Depression Bioregion</td><td>EN</td><td>Unlikely
Mallee vegetation did not dominate an area of at least 5-hectares as the dominant canopy tree, and therefore is not considered to meet the key diagnostic criterion for the TEC. The Project Area is likely to contain MBC supportive habitat, but in itself, does not comprise the MBC TEC.</td></tr>
</table>
Threatened Community Score – 0 (all sites)</td></tr>
<tr><td>Assessment against the principles
Seriously at Variance -N/A</td></tr>
</table>

<table>
<tr><th>Principle of clearance</th><th>Considerations</th></tr>
<tr><td></td><td>Moderating factors that may be considered by the NVC' -N/A</td></tr>
<tr><td rowspan="3">Principle 1(e) – it is significant as a remnant of vegetation in an area which has been extensively cleared</td><td>Relevant information
The Project Area is divided by two IBRA Subregions (and Associations): Murray Mallee (Mount Mary) and Braemer (Florieton). The Braemer subregion (Florieton land system name) is largely uncleared and utilised for pastoral grazing, comprising bluebush low shrubland plans with isolated patches of Black Oak, Sugarwood, and depressions of Australian boxthorn, Nitre bush and Blackbush. The Murray Mallee subregion includes riverine towns and associated agricultural land uses. The condition of the landscape is area is largely influenced by climatic conditions and is unlikely to decline significantly as a result of human disturbance on its current trajectory.

Table 20. IBRA remnancy figures for the Project Area.
<table>
<tr><th>Subregion</th><th>Remnancy</th><th>Association</th><th>Remnancy</th></tr>
<tr><td>Murray Mallee</td><td>21%</td><td>Mount Mary</td><td>75%</td></tr>
<tr><td>Braemer</td><td>100%</td><td>Florieton</td><td>99%</td></tr>
</table>
Total Biodiversity Score – 9988.31</td></tr>
<tr><td>Assessment against the principles
Seriously at Variance - N/A
At Variance - All</td></tr>
<tr><td>Moderating factors that may be considered by the NVC
Impact significance
The impact is unlikely to impact on a vegetation community that has been selectively removed within either association of subregion, and the vegetation communities are generally well represented in the surrounding landscape. The vegetation, though clearly impacted by drought in previous years, and with some grazing impacts, was in good condition at the time of survey.</td></tr>
<tr><td rowspan="3">Principle 1(f) – it is growing in, or in association with, a wetland environment</td><td>Relevant information
Several areas were identified as drainage / moist depressions and were associated with low-lying areas and / or artificial watering points. It was unclear if these watering points were once natural accumulation areas which had been modified to retain water. Given the large amount of recent rainfall prior to the survey and lack of standing water in these depressions, the site was not considered to be in association with a wetland environment.</td></tr>
<tr><td>Assessment against the principles
Seriously at Variance -N/A
At Variance – N/A</td></tr>
<tr><td>Moderating factors that may be considered by the NVC -N/A</td></tr>
<tr><td rowspan="3">Principle 1(g) – it contributes significantly to the amenity of the area in which it is growing or is situated</td><td>Relevant information
The block under application is situated away from the main highway on minor agricultural / access roads and is unlikely to contribute significantly to the local amenity.

The site is within The River Murray and Crown Lands ILUA (SI2011/025) and may therefore have cultural values, and require further investigation.</td></tr>
<tr><td>N/A</td></tr>
<tr><td>Moderating factors that may be considered by the NVC
N/A</td></tr>
</table>

Principles of Clearance (h-m) will be considered by comments provided by the local NRM Board or relevant Minister. The Data Report should contain information on these principles where relevant and where sufficient information or expertise is available.

5.1. Risk assessment

The level of risk associated with the application is presented in Table 21 and is based on the Risk Assessment matrix for clearance of native vegetation in

Table 22.

Table 21. Summary of the level of risk associated with the application.

Total clearance	No. of trees	0
	Area (ha)	172.78
	Total biodiversity Score	9632.08
Seriously at variance with principle 1(b), 1(c) or 1 (d)		1(b)
Risk assessment outcome		Level 4

Table 22. Risk Assessment matrix for clearance of native vegetation.

	Agricultural (EP, GA, H&F, KI, LC, M&R and N&Y Landscape Management Regions plus Port Augusta city Council and the Flinders Ranges Council).		**Pastoral** (SAAL and AW Landscape Management Regions excluding Port Augusta city Council and the Flinders Ranges Council).		**Escalating matters** Clearance assessment will be raised to the next level if;
	Patches - clearance	**Trees - clearance**	**Patches - clearance**	**Trees - clearance**	
Level 1	**0.05ha** or less	**5 trees** or less	**3ha** or less	**5 trees** or less	The site contains a listed species or contains a threatened community under either the NP&W Act or EPBC Act Or Clearance of any trees of the specified circumference.
	And clearance does not involve **any** trees with a trunk circumference measured at 1m above the ground of (for multi stemmed trees, measure the largest trunk/stem): - 50cm or more for Agricultural zone, or - 30cm of more for the Pastoral zone,				
Level 2	**>0.05 ha to 0.5ha**	**6 - 20 trees**	**>3ha to 10 ha**	**6 - 20 trees**	Clearance is seriously at variance with Principle of Clearance 1(b), 1(c) or 1(d).
Level 3	Total Biodiversity Score of less than or equal to **250**		Total Biodiversity Score of less than or equal to **2500**.		Clearance is seriously at variance with Principle of Clearance 1(b), 1(c) or 1(d).
Level 4	Total Biodiversity Score of greater than **250**		Total Biodiversity Score of greater than **2500**		

6. Clearance summary

Clearance Area(s) Summary table

Block	Site	Species diversity score	TEC Score	Threatened plant score	Threatened fauna score	UBS	Area (ha)	Total Biodiversity score		Loss factor	Loadings	Reductions	SEB Points required	SEB payment	Admin Fee
A	1a	30	1	0	0.1	66.04	5.70	376.42		1			395.24	$96,976.99	$5,333.73
A	1b	30	1	0	0.1	52.61	117.57	6184.90		1			6494.15	$1,593,412.89	$87,637.71
A	2	30	1	0	0.1	65.74	3.58	235.33		1			247.10	$60,628.43	$3,334.56
A	3	24	1	0	0.1	88.61	0.07	6.20		1			6.51	$1,598.01	$87.89
A	4	28	1	0	0.1	57.06	0.43	31.32		1			25.76	$6,320.86	$347.65
B	1a	30	1	0	0.1	64.22	35.05	2250.95		1			2363.50	$579,910.83	$31,895.10
B	1b	30	1	0	0.1	51.16	9.61	491.63		1			516.21	$126,658.57	$6,966.22
B	1c	30	1	0	0.1	71.85	0.77	55.33		1			58.09	$13,705.90	$753.82
						Total	**172.78**	**9632.08**					**10106.56**	**$2,479,212.68**	**$136,356.68**

Table 23 below details the SEB requirement if the following loss factors are applied the different elements of the Project:

- Solar Panel Array – Loss Factor 0.8
- Cable trench – Loss Factor 0.6
- Area between Solar Array – Loss Factor 0.6
- All other infrastructure – Loss Factor 1.0

Table 23. SEB requirement under application of varied loss factors.

Block	Site	Species diversity score	TEC Score	Threatened plant score	Threatened fauna score	UBS	Area (ha)	Total Biodiversity score	Loss factor	Loadings	Reductions	SEB Points required	SEB payment	Admin Fee
A	1a	30	1	0	0.1	66.04	3.28	216.61	.6			136.46	$33,482.58	$1,841.54
A	1a	30	1	0	0.1	66.04	1.96	129.44	.8			108.73	$26,677.18	$1,467.24
A	1a	30	1	0	0.1	66.04	0.47	31.04	1			32.59	$7,996.35	$439.80
A	1b	30	1	0	0.1	52.61	73.98	3891.80	.6			2451.83	$601,585.54	$33,087.20
A	1b	30	1	0	0.1	52.61	43.53	2289.94	.8			1923.55	$471,965.73	$25,958.11
A	1b	30	1	0	0.1	52.61	0.06	3.16	1			3.31	$813.17	$44.72
A	2	30	1	0	0.1	65.74	2.26	148.56	.6			93.59	$22,964.29	$1,263.04
A	2	30	1	0	0.1	65.74	1.32	86.77	.8			72.89	$17,883.69	$983.60
A	3	24	1	0	0.1	88.61	0.05	4.43	.6			2.79	$684.86	$37.67
A	3	24	1	0	0.1	88.61	0.02	1.77	.8			1.49	$365.26	$20.09
A	4	28	1	0	0.1	57.06	0.27	15.41	.6			9.71	$2,381.35	$130.97
A	4	28	1	0	0.1	57.06	0.16	9.13	.8			7.67	$1,881.56	$103.49
B	1a	30	1	0	0.1	64.22	20.66	1326.81	.6			835.89	$205,094.85	$11,280.22
B	1a	30	1	0	0.1	64.22	12.10	777.08	.8			652.74	$160,157.97	$8,808.69
B	1a	30	1	0	0.1	64.22	2.29	147.07	1			154.42	$37,888.61	$2,083.87
B	1b	30	1	0	0.1	51.16	4.57	233.79	.6			147.29	$36,139.21	$1,987.66
B	1b	30	1	0	0.1	51.16	2.7	138.13	.8			116.03	$28,468.52	$1,565.77
B	1b	30	1	0	0.1	51.16	2.33	119.20	1			125.16	$30,709.10	$1,689.00
B	1c	30	1	0	0.1	71.85	0.77	55.33	1			58.09	$13,705.90	$753.82
						Total	**172.78**	**9625.47**				**6934.23**	**$1,700,845.72**	**$93546.50**

Totals summary table

	Total Biodiversity score	Total SEB points required	SEB Payment	Admin Fee	Total Payment
Application	9632.08	10106.56	$2,479,212.68	$136,356.68	$2,615,784.68

Economies of Scale Factor	0.35
Rainfall (mm)	252

7. Significant Environmental Benefit

A Significant Environmental Benefit (SEB) is required for approval to clear under Division 5 of the *Native Vegetation Regulations 2017*. The NVC must be satisfied that as a result of the loss of vegetation from the clearance that an SEB will result in a positive impact on the environment that is over and above the negative impact of the clearance.

ACHIEVING AN SEB

Indicate how the SEB will be achieved by ticking the appropriate box and providing the associated information:

☒ Establish a new SEB Area on land owned by the proponent.

☐ Use SEB Credit that the proponent has established. Provide the SEB Credit Ref. No. _____

☐ Apply to have SEB Credit assigned from another person or body. The application form needs to be submitted with this Data Report.

☐ Apply to have an SEB to be delivered by a Third Party. The application form needs to be submitted with this Data Report.

☒ Pay into the Native Vegetation Fund.

PAYMENT SEB

If a proponent proposes to achieve the SEB by paying into the Native Vegetation Fund, summary information must be provided on the amount required to be paid and the manner of payment:

A total of 10,106.56 SEB points or a payment of $2,615,784.68 (includes the Administration fee) is required to provide an SEB for the project. The proponent will provide a combination of an on-ground SEB Offset and a balance payment into the Native Vegetation Fund. The on-ground SEB offset area will generate a total of 786.84 SEB points. Based on the total required SEB points and the corresponding SEB payment, each SEB point is worth $258.82. Therefore, the on-ground SEB Offset reduces the payment into the fund by $203,649.90 to $2,412,134.75.

7.1. On-ground SEB details

Landowner:	SynCo Global Pty Ltd		
Site Address:	7795 Goyder Highway Morgan, SA		
Local Government Area:	Mid Murray	**Hundred:**	Eba
Title ID:	CT5549/747	**Parcel ID**	H120700SE141 H120700SE140

7.1.1. General description of the vegetation, the site and matters of significance

The land proposed for the on-ground SEB offset (SEB Area) directly adjoins the proposed Project Area within the same land parcel, comprising 150.80 ha.

Landform, geography, and soils

The proposed SEB Area falls within the Murray Darling Depression IBRA bioregion and Murray Mallee and Braemer IBRA sub-regions, with dominant characteristics summarised in Table 4 (page 26). Environmental Associations (EA) Florieton and Mount Mary divide the Project Area east from west.

To the east of the Project Area are unnamed tributaries which feed into Burra Creek which ultimately drains into the Murray River. Low lying areas associated with this creek system were identified along the eastern boundaries of the Project Area and were inundated at the time of the field survey due to recent rains. No other standing water was found during the field survey within the Project Area. The adjoining land to the south of the Project Area is subject to inundation during high rainfall times, from the Bryant Creek water body.

Vegetation condition

Land use within the Project Area and surrounds comprises native vegetation utilised for pastoral grazing. During the field assessment, low numbers of livestock (sheep) were observed utlising the size for grazing and there was some evidence of modification of shrubs. Most shrubs in the understorey, especially *Maireana sedifolia*, showed evidence of significant previous dieback, which may be linked to drought conditions in previous years. Given the high rainfall in the 12 months prior to the survey, including recent rainfall in the area, most shrubs were regenerating vigorously with regenerating juvenile plants present. Young perennial native grasses were prominent in the ground layer between shrubs, with a dense covering of annual forbs in many locations.

No fire history was available on NatureMaps for the region, however there was evidence across the site that a fire had historically burnt in the region, with burnt out stumps of old mallee trees present across the site.

Considering the utilisation for grazing and the previous drought conditions, the site is currently in good condition and is a fair representation of remnant vegetation in the area. One Vegetation Association (VA) A2 showed greater signs of weed cover, likely from increased soil disturbance alongside the man-made dam area.

The field survey identified 62 flora species across the Project Area, 17 of which are introduced weed species. A complete list of flora species observed in the Project Area is provided in Appendix 1. Flora species list.

A total of 32 native fauna were observed within the Project Area during the field survey (1 amphibian, 28 bird, 1 reptile, and 1 mammal species). Sheep were the only non-native species observed across the site. Bird activity across the site was most concentrated within VA's A1c and A3. A complete list of fauna observed across the Project Area is presented in Appendix 2. Fauna species list.

Information relating to the relevant land

The land has historically been utilised for pastoral grazing of sheep, however, has recently seen a significant reduction in grazing due to the retirement of the previous landowner. There are two existing encumbrances which will be excluded from the proposed SEB Area as per the *SEB Credit Guide for Landholders* (NVC 2020b):

- A 25 m easement declared on the land parcel, traversing east-west diagonally across the parcel of land for a 132 kilovolt (kV) transmission line; and
- An 80 m wide easement, offset 30 m to the south of the northern parcel boundary, for an Energy Connect 330 kV transmission line (not yet constructed).

Both easements are currently vegetated and so does not represent fragmentation of the proposed SEB Area into two isolated components. There are no other known or declared encumbrances on the land at the time of writing.

7.1.2. General location map

The location and landscape context of the SEB Project Area is depicted in Figure 23.

Figure 23. General location map of block under application and proposed SEB boundary.

7.1.3. Description of the vegetation

The proposed SEB Area is within a site of remnant bushland consisting of medium to low chenopod shrubland with emergent tall shrubs and remnant mallee Eucalypts, with an understorey of native forbs and grasses and minimal weed coverage.

Native vegetation within the SEB Area forms part of a larger swathe of native vegetation within the broader landscape, which comprises predominantly chenopod shrubland with a variable density overstorey of mallee and woodland vegetation.

As two IBRA environmental associations (EAs) (Mount Mary and Florieton) divide the Project Area, each with different remnancy figures, two 'Blocks' were designated, with those in Murray Mallee (Mount Mary) listed as 'Block A' and those in Braemer (Florieton) listed as 'Block B'. Though Vegetation Associations (VAs) occurred across the arbitrary 'Block' boundary, separate scoresheets were filled out for each impacted VA to account for differences in SEB outcomes across the two EAs. Due to the contiguous nature of the vegetation, separate BAM sites were not undertaken for each VA in each Block.

Six native vegetation associations were mapped during the field survey.

- **VA A/B1 –** *Maireana sedifolia* Shrubland
    - **1a –** *Maireana sedifolia +/- Acacia nyssophylla* Low Open Shrubland with emergent *Eucalyptus socialis* (Table 5. Summary of VA A/B1a);
    - **1b –** *Maireana sedifolia* Low Open Shrubland over native grasses and forbs (Table 6. Summary of VA A/B1b);
    - **1c –** *Myoporum platycarpum +/- Alectryon oleifolius* Low Open Woodland over *Maireana sedifolia* (Table 7. Summary of VA B1c);
- **VA A/B2 -** *Lycium australe* Low Open Shrubland (Table 8. Summary of VA A2);
- **VA A/B3 –** *Casuarina pauper* Open woodland (Table 9. Summary of VA A3.).
- **VA A4 -** *Acacia nyssophylla* over *Lycium australe +/- Maireana sedifolia* Tall Shrubland with emergent *Eucalyptus socialis* in low lying moist depressions (Table 10. Summary of VA A4.).

There were minor variations to the species contained within the first three VA's (which are present over the largest portion of the SEB Area) which differed from each-other in amount of vegetation cover and species dominance. Vegetation association (VA) mapping is presented in Figure 30.

Table 24. Summary of VA A/B1a.

Vegetation Association	**Vegetation Association A/B1a**; *Maireana sedifolia* and *Lawrencia squamata +/- Acacia nyssophylla* Low Open Shrubland with emergent *Eucalyptus socialis*.

Figure 24. VA A1a facing southeast. Coordinates: Long: 139.6672389; Lat:-33.97998879.

General description Benchmark Community: MDBSA 2.1: Open Mallee / Low Open Woodland with Chenopod Shrub Understorey	Dominant species included *Maireana sedifolia* (Pearl Bluebush), *Lawrencia squamata* (Thorny Lawrencia) and *Austrostipa* spp. (Spear-grasses) with a covering of annual herbaceous forbs in the ground layer. Weed cover was generally low, with the most abundant species being *Carrichtera annua* (Wards Weed). Evidence of previous dieback was prominent across the site, likely linked to previous drought conditions. Old burnt-out mallee lignotubers were present throughout, suggesting a previously higher coverage of mallee vegetation. There was no regeneration of eucalyptus trees present across the site and mallee was emergent only.
Threatened species or community	This VA does not comprise a listed TEC. No listed threatened flora or fauna species were observed within this VA, however the desktop assessment found several species may occur including: <u>Known</u> • *Aphelocephala leucopsis* (Southern Whiteface) (EPBC Act: VU) • *Melanodryas cucullata cucullata* (Hooded Robin) (EPBC Act: EN; NPW Act: R); <u>Likely</u> • *Corcorax melanorhamphos* (White-winged Chough) (NPW Act: R) • *Hieraaetus morphnoides* (Little *Eagle*) (NPW Act: VU) • *Neophema elegans elegans* (Elegant Parrot) (NPW Act: R)

	• *Pachycephala inornata* (Gilbert's Whistler) (NPW Act: R) • *Plectorhyncha lanceolata* (Striped Honeyeater) (NPW Act: R) • *Polytelis anthopeplus monarchoides* (Regent Parrot (eastern)) (EPBC / NPW: VU) • *Stagonopleura guttata* (Diamond Firetail) (EPBC Act: VU; NPW Act: VU) <u>Possible</u> • *Falco hypoleucos* (Grey Falcon) (EPBC Act: Vulnerable, NPW Act: R) • *Leipoa ocellata* (Malleefowl) (EPBC / NPW Act: VU) • *Lophochroa leadbeateri leadbeateri* (Eastern Major Mitchell's Cockatoo) (EPBC EN) • *Myiagra cyanoleuca* (Satin Flycatcher) (NPW Act: EN) • *Morelia spilota* (Carpet Python) (NPW Act: R) • *Neophema chrysostoma* (Blue-winged Parrot (EPBC Act: VU) • *Trichosurus vulpecula* (Common Brushtail Possum) (NPW Act: R)

Block A – Murray Mallee (Mount Mary)					
Landscape context score	1.09	**Vegetation Condition Score**	55.08	**Conservation significance score**	1.10
Gain score	5.66	**Area (ha)**	12.78	**SEB points of gain**	72.33
Block B – Braemer (Florieton)					
Landscape context score	1.06	**Vegetation Condition Score**	55.08	**Conservation significance score**	1.10
Gain score	5.50	**Area (ha)**	75.54	**SEB points of gain**	415.75

Table 25. Summary of VA A/B1b.

Vegetation Association	**Vegetation Association A/B1b**; *Maireana sedifolia* Low Open Shrubland with emergent *Eucalyptus socialis*.
 **Figure 25. VA A1b looking south. Long: 139.6620035, Lat: -33.98439637.**	
General description Benchmark Community: MDBSA 2.1: Open Mallee / Low Open Woodland with Chenopod Shrub Understorey	Dominant species included *Maireana sedifolia* (Pearl Bluebush) with *Austrostipa* spp. (Spear-grasses) and a covering of annual herbaceous forbs in the ground layer. Weed cover was generally low, with the most abundant species being *Carrichtera annua* (Wards Weed) and *Sisymbrium erysimoides* (Rocket). Evidence of previous dieback was prominent across the site, likely linked to previous drought conditions. Old burnt-out mallee lignotubers were present throughout, suggesting a previously higher coverage of mallee vegetation. There was no regeneration of eucalyptus trees present across the site. Shrubs were generally lower and sparser than in VA A1a, and likely corresponded to severity of the previous fire scar as well as proximity to artificial water sources, increasing grazing pressure.
Threatened species or community	This VA does not comprise a listed TEC. No listed threatened flora or fauna species were observed within this VA; however, the desktop assessment found several species may occur including: <u>Known</u> • *Aphelocephala leucopsis* (Southern Whiteface) (EPBC Act: VU) • *Melanodryas cucullata cucullata* (Hooded Robin) (EPBC Act: EN; NPW Act: R); <u>Likely</u> • *Coturnix ypsilophora* (Brown Quail) (NPW Act: V) • *Corcorax melanorhamphos* (White-winged Chough) (NPW Act: R)

	• *Hieraaetus morphnoides* (Little *Eagle*) (NPW Act: VU) • *Neophema elegans elegans* (Elegant Parrot) (NPW Act: R) • *Pachycephala inornata* (Gilbert's Whistler) (NPW Act: R) • *Plectorhyncha lanceolata* (Striped Honeyeater) (NPW Act: R) • *Polytelis anthopeplus monarchoides* (Regent Parrot (eastern)) (EPBC / NPW: VU) • *Stagonopleura guttata* (Diamond Firetail) (EPBC Act: VU; NPW Act: VU) <u>Possible</u> • *Falco hypoleucos* (Grey Falcon) (EPBC Act: Vulnerable, NPW Act: R) • *Leipoa ocellata* (Malleefowl) (EPBC / NPW Act: VU) • *Lophochroa leadbeateri leadbeateri* (Eastern Major Mitchell's Cockatoo) (EPBC EN) • *Myiagra cyanoleuca* (Satin Flycatcher) (NPW Act: EN) • *Morelia spilota* (Carpet Python) (NPW Act: R) • *Neophema chrysostoma* (Blue-winged Parrot (EPBC Act: VU) • *Trichosurus vulpecula* (Common Brushtail Possum) (NPW Act: R)				
Block A – Murray Mallee (Mount Mary)					
Landscape context score	1.09	**Vegetation Condition Score**	43.88	**Conservation significance score**	1.10
Gain score	6.59	**Area (ha)**	13.59	**SEB points of gain**	89.60
Block B– Braemer (Florieton)					
Landscape context score	1.06	**Vegetation Condition Score**	43.88	**Conservation significance score**	1.10
Gain score	6.41	**Area (ha)**	2.89	**SEB points of gain**	18.53

Table 26. Summary of VA A/B1c.

Vegetation Association	**Vegetation Association A/B1c**; *Myoporum platycarpum +/- Alectryon oleifolius Low* Open Woodland.
 **Figure 26. B1c looking south. Long:139.6675 Lat:-33.9741.**	
General description Benchmark Community: MDBSA 2.1: Open Mallee / Low Open Woodland with Chenopod Shrub Understorey	Dominant species included *Myoporum platycarpum* (Sugarwood) and *Alectryon oleifolius* (Rosewood) in the overstorey with midstorey of *Maireana sedifolia* (Pearl Bluebush) and *Acacia nyssophylla* (Spine Bush) and mixed *Austrostipa* spp. (Spear-grasses) and a covering of annual herbaceous forbs in the ground layer. A number of emergent *E. oleosa* and *E. socialis* mallee trees were distributed throughout the site, however 'mallee' was not the dominant overstorey. The upperstorey varied from sparse to dense patches of trees and included a high diversity of species including abundant mistletoe in places. Bird activity was high, with a total of 22 bird species identified during a 20-min 2-ha bird survey. Interesting observations included nesting Red-capped Robins (*Petroica goodenovii*), two inactive Wedge-tailed Eagle (*Aquila audax*) nests and Southern Whiteface (*Aphelocephala leucopsis*). Weed cover was generally low, with the most abundant species being *Carrichtera annua* (Wards Weed) and *Sisymbrium erysimoides* (Rocket).
Threatened species or community	This VA does not comprise a listed TEC. No listed threatened flora or fauna species were observed within this VA; however, the desktop found several species may occur including: <u>Known</u> • *Aphelocephala leucopsis* (Southern Whiteface) (EPBC Act: VU)

	• *Melanodryas cucullata cucullata* (Hooded Robin) (EPBC Act: EN; NPW Act: R); Likely • *Corcorax melanorhamphos* (White-winged Chough) (NPW Act: R) • *Hieraaetus morphnoides* (Little *Eagle*) (NPW Act: VU) • *Neophema elegans elegans* (Elegant Parrot) (NPW Act: R) • *Pachycephala inornata* (Gilbert's Whistler) (NPW Act: R) • *Plectorhyncha lanceolata* (Striped Honeyeater) (NPW Act: R) • *Polytelis anthopeplus monarchoides* (Regent Parrot (eastern)) (EPBC / NPW: VU) • *Stagonopleura guttata* (Diamond Firetail) (EPBC Act: VU; NPW Act: VU) Possible • *Falco hypoleucos* (Grey Falcon) (EPBC Act: Vulnerable, NPW Act: R) • *Leipoa ocellata* (Malleefowl) (EPBC / NPW Act: VU) • *Lophochroa leadbeateri leadbeateri* (Eastern Major Mitchell's Cockatoo) (EPBC EN) • *Myiagra cyanoleuca* (Satin Flycatcher) (NPW Act: EN) • *Morelia spilota* (Carpet Python) (NPW Act: R) • *Neophema chrysostoma* (Blue-winged Parrot (EPBC Act: VU) • *Trichosurus vulpecula* (Common Brushtail Possum) (NPW Act: R)				
Block A – Murray Mallee (Mount Mary)					
Landscape context score	1.09	**Vegetation Condition Score**	61.63	**Conservation significance score**	1.10
Gain score	4.71	**Area (ha)**	0.19	**SEB points of gain**	0.90
Block B– Braemer (Florieton)					
Landscape context score	1.06	**Vegetation Condition Score**	61.63	**Conservation significance score**	1.10
Gain score	4.58	**Area (ha)**	30.88	**SEB points of gain**	141.55

Table 27. Summary of VA B2.

Vegetation Association	**Vegetation Association B2**; *Lycium australe* Low Open Shrubland in area subject to irregular inundation.
 **Figure 27. A2 looking south (left) (Long: 139.6592, Lat: -33.9828). *Note this representative image is from within the Project Area not the SEB Area.**	
General description Benchmark Community: MDBSA 11.6 Semi-saline Shrublands of River cliffs, floodplains, depressions and drainage lines.	Dominant species were *Lycium australe* (Australian Boxthorn) and *Nitraria billardiera* (Nitre Bush). The vegetation occupied a low-lying depression which had moist clayey soil and associated plant species. Given the amount of rain which had recently occurred in the area, there was very little standing water. The BAM for this site was done in a matching vegetation association which was nearby an artificial dam (or modified natural watering point), as demonstrated in the above figure. Within Block B, this VA was associated with the terminal point of a drainage line.
Threatened species or community	This VA does not comprise a listed TEC. No listed threatened flora or fauna species were observed within this VA; however, the desktop found several species may occur including: <u>Known</u> • *Aphelocephala leucopsis* (Southern Whiteface) (EPBC Act: VU) • *Melanodryas cucullata cucullata* (Hooded Robin) (EPBC Act: EN; NPW Act: R); <u>Likely</u> • *Coturnix ypsilophora* (Brown Quail) (NPW Act: V) • *Corcorax melanorhamphos* (White-winged Chough) (NPW Act: R) • *Hieraaetus morphnoides* (Little *Eagle*) (NPW Act: VU)

	• *Neophema elegans elegans* (Elegant Parrot) (NPW Act: R) • *Pachycephala inornata* (Gilbert's Whistler) (NPW Act: R) • *Plectorhyncha lanceolata* (Striped Honeyeater) (NPW Act: R) • *Polytelis anthopeplus monarchoides* (Regent Parrot (eastern)) (EPBC / NPW: VU) • *Stagonopleura guttata* (Diamond Firetail) (EPBC Act: VU; NPW Act: VU) <u>Possible</u> • *Falco hypoleucos* (Grey Falcon) (EPBC Act: Vulnerable, NPW Act: R) • *Leipoa ocellata* (Malleefowl) (EPBC / NPW Act: VU) • *Lophochroa leadbeateri leadbeateri* (Eastern Major Mitchell's Cockatoo) (EPBC EN) • *Myiagra cyanoleuca* (Satin Flycatcher) (NPW Act: EN) • *Morelia spilota* (Carpet Python) (NPW Act: R) • *Neophema chrysostoma* (Blue-winged Parrot (EPBC Act: VU) • *Trichosurus vulpecula* (Common Brushtail Possum) (NPW Act: R)

Block B- Braemer (Florieton)					
Landscape context score	1.09	**Vegetation Condition Score**	59.67	**Conservation significance score**	1.10
Gain score	5.53	**Area (ha)**	2.61	**SEB points of gain**	14.44

Table 28. Summary of VA A3.

Vegetation Association	**Vegetation Association A3**; *Casuarina pauper* Open Woodland.
 **Figure 28. VA A3 facing east. Long: 139.6628, Lat: -33.9795.**	
General description Benchmark Community: MDBSA 10.10 Black Oak Open Forests of Inland Depressions and Drainage Lines.	Dominant species was *Casuarina pauper* (Black Oak) which occurred in isolated patches on lighter soils on low rises and also in depressions. The understorey was sparse and low, and comprised primarily of *Maireana sedifolia* and annual herbs. Species diversity was higher on the edges of this VA where it intergraded with other vegetation types. This VA contained important habitat features including nesting habitat for Wedge-tailed Eagles, including one nest which was active and had a fledgling on the nest at the time of the survey. Other habitat features included numerous hollows of varying size and condition which would provide favourable habitat for microbats and other fauna. Dead wood formed large amounts of debris on the ground providing important habitat for reptiles and other ground dwelling fauna.
Threatened species or community	This VA does not comprise a listed TEC. No listed threatened flora or fauna species were observed within this VA; however, the desktop found several species may occur including: Known • *Aphelocephala leucopsis* (Southern Whiteface) (EPBC Act: VU) • *Melanodryas cucullata cucullata* (Hooded Robin) (EPBC Act: EN; NPW Act: R); Likely • *Corcorax melanorhamphos* (White-winged Chough) (NPW Act: R) • *Hieraaetus morphnoides* (Little *Eagle*) (NPW Act: VU) • *Neophema elegans elegans* (Elegant Parrot) (NPW Act: R)

	• *Pachycephala inornata* (Gilbert's Whistler) (NPW Act: R) • *Plectorhyncha lanceolata* (Striped Honeyeater) (NPW Act: R) • *Polytelis anthopeplus monarchoides* (Regent Parrot (eastern)) (EPBC / NPW: VU) • *Stagonopleura guttata* (Diamond Firetail) (EPBC Act: VU; NPW Act: VU) <u>Possible</u> • *Falco hypoleucos* (Grey Falcon) (EPBC Act: Vulnerable, NPW Act: R) • *Leipoa ocellata* (Malleefowl) (EPBC / NPW Act: VU) • *Lophochroa leadbeateri leadbeateri* (Eastern Major Mitchell's Cockatoo) (EPBC EN) • *Myiagra cyanoleuca* (Satin Flycatcher) (NPW Act: EN) • *Morelia spilota* (Carpet Python) (NPW Act: R) • *Neophema chrysostoma* (Blue-winged Parrot (EPBC Act: VU) • *Trichosurus vulpecula* (Common Brushtail Possum) (NPW Act: R)

Block A- Murray Mallee (Mount Mary)					
Landscape context score	1.09	**Vegetation Condition Score**	66.98	**Conservation significance score**	1.10
Gain score	2.14	**Area (ha)**	4.74	**SEB Points of gain**	10.15
Block B -Braemer (Florieton)					
Landscape context score	1.06	**Vegetation Condition Score**	73.90	**Conservation significance score**	1.10
Gain score	2.08	**Area (ha)**	5.75	**SEB points of gain**	11.98

Table 29. Summary of VA A4.

Vegetation Association	**Vegetation Association A4**; *Acacia nyssophylla* over *Lycium australe* +/- *Maireana sedifolia* Tall Shrubland with emergent *Eucalyptus socialis*.
 **Figure 29. VA A4 facing north-west. Long: 139.6646, Lat: 33.9812.**	
General description Benchmark Community: MDBSA 1.1 Open Woodland with Open Arid adapted Shrub Understorey on Limestone Plains	This VA occurred in isolated clay loam depressions and contained dense patches of tall shrubs dominated by *Acacia nyssophylla* and *Acacia oswaldii*, with emergent *Myoporum platycarpum* and *Alectryon oleifolius*. These areas contained a high amount of bird activity and included sightings of species such as Superb Fairywrens (*Malurus cyaneus*), Splendid Fairy Wrens (*Malurus splendens*), Chestnut-crowned Babblers (*Pomatostomus ruficeps*) and Striated Pardalotes (*Pardalotus striatus*). Despite being connected to other vegetation, this VA uniquely contained *Templetonia egena* (Broombush Templetonia).
Threatened species or community	This VA does not comprise a listed TEC. No listed threatened flora or fauna species were observed within this VA; however, the desktop found several species may occur including: <u>Known</u> • *Aphelocephala leucopsis* (Southern Whiteface) (EPBC Act: VU) • *Melanodryas cucullata cucullata* (Hooded Robin) (EPBC Act: EN; NPW Act: R); <u>Likely</u> • *Corcorax melanorhamphos* (White-winged Chough) (NPW Act: R) • *Hieraaetus morphnoides* (Little *Eagle*) (NPW Act: VU) • *Neophema elegans elegans* (Elegant Parrot) (NPW Act: R) • *Pachycephala inornata* (Gilbert's Whistler) (NPW Act: R) • *Plectorhyncha lanceolata* (Striped Honeyeater) (NPW Act: R)

	• *Polytelis anthopeplus monarchoides* (Regent Parrot (eastern)) (EPBC / NPW: VU) • *Stagonopleura guttata* (Diamond Firetail) (EPBC Act: VU; NPW Act: VU) <u>Possible</u> • *Falco hypoleucos* (Grey Falcon) (EPBC Act: Vulnerable, NPW Act: R) • *Leipoa ocellata* (Malleefowl) (EPBC / NPW Act: VU) • *Lophochroa leadbeateri leadbeateri* (Eastern Major Mitchell's Cockatoo) (EPBC EN) • *Myiagra cyanoleuca* (Satin Flycatcher) (NPW Act: EN) • *Morelia spilota* (Carpet Python) (NPW Act: R) • *Neophema chrysostoma* (Blue-winged Parrot (EPBC Act: VU) • *Trichosurus vulpecula* (Common Brushtail Possum) (NPW Act: R)				
Block A- Murray Mallee (Mount Mary)					
Landscape context score	1.09	**Vegetation Condition Score**	47.59	**Conservation significance score**	1.10
Gain Score	6.38	**Area (ha)**	1.82	**SEB Points of Gain**	11.61

7.1.4. Site map showing areas of the proposed SEB

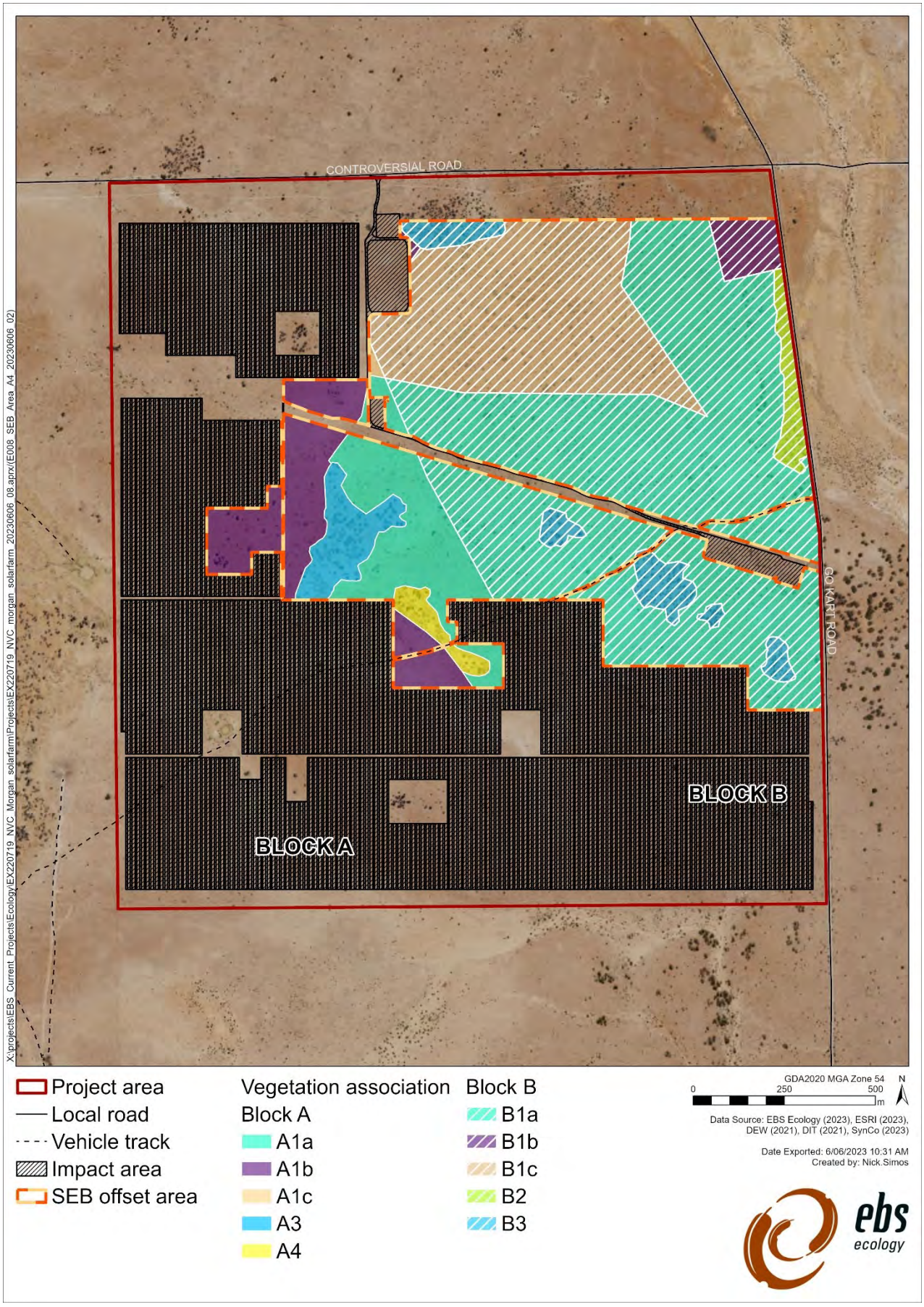

Figure 30. Vegetation Associations within the proposed SEB Area.

7.1.5. Photo log

See photo log in section 4.1.4, showing photographic examples of vegetation conditions and fauna habitat. Note that most of the photographs are taken from within the Project Area (i.e. impact area) not to the proposed SEB Area.

7.1.6. Fauna and Flora assessment

The PMST report identified three *Threatened Ecological Communities* (TEC), as relevant to the Project Area, detailed and assessed in Table 30.

Table 30. TEC likelihood of occurrence in the Project Area.

Threatened Ecological Community	EPBC Status	Description	Likelihood of Occurrence
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	EN	Woodland communities where Buloke (*Allocasuarina luehmannii*) is the dominant or co-dominant tree species. Co-dominant species include *Callitris gracilis, Callitris glaucophylla, Eucalyptus largiflorens, Eucalyptus leucoxylon* ssp. *pruinosa* and *Eucalyptus microcarpa*. In SA, the community is only known from the Bordertown district (Cheal, Lucas, & Macaulay 2011).	**Unlikely** The Project Area is outside the known distribution of the community. There is no woodland community in the Project Area. Buloke (*A. luehmannii*) and associated co-dominant tree species do not occur.
Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions	CE	Medium to tall open mallee eucalypt woodland with a canopy typically dominated by *E. porosa* and an understorey in which tussock grasses may be prominent in relatively wet years, low chenopod shrubs occur in variable densities, and taller shrubs are typically sparse. Associated with areas with an average annual rainfall in the range of 260mm – 450 mm (DAWE 2021a).	**Unlikely** Although mapped within 5 km, no 'mallee-box' communities occur in the Project area, with no domination of tussock grasses in the understorey. *E. porosa* was not recorded within the Project Area. Annual rainfall is below annual average rainfall for the typical range of community.
Mallee Bird Community of the Murray Darling Depression Bioregion	EN	The ecological community described in this conservation advice is a type of fauna community found in the Murray Darling Depression bioregion comprising an assemblage of bird species that specialise or are dependent on mallee vegetation that characterises this bioregion (DAWE 2021b).	**Unlikely** Mallee vegetation did not dominate an area of at least 5-hectares as the dominant canopy tree, and therefore is not considered to meet the key diagnostic criterion for the TEC. The Project Area is likely to contain MBC supportive habitat, but in itself, does not comprise the MBC TEC. **Six** MBC species either observed in field survey, or with observation records within the last ten years within 20 km of the Project Area.

The PMST report (generated 04/04/2023) found 26 EPBC listed threatened species to possibly occur including four plant species (may occur) and 22 fauna species comprising, 16 birds (6 known, 5 likely, 5 may), one mammal (may), one frog (known) and four fish (2 known, 2 may). Six of these EPBC listed species were found to have records within the Search Area, with two observed within the Project Area during the field assessment:

- Southern Whiteface (*Aphelocephala leucopsis*) (observed onsite);
- Southern Bell Frog (*Litoria raniformis*);
- Hooded Robin (*Melanodryas cucullata var. cucullata*) (observed onsite);
- Blue-winged parrot (*Neophema chrysostoma*);
- Regent Parrot (eastern) (*Polytelis anthopeplus monarchoides*); and
- Diamond Firetail (*Stagonopleura guttata*);

Three other EPBC listed species did not have nearby records but were considered to possibly occur within the Project Area based on known distribution and suitability of habitat, however, the habitat is unlikely to be considered critical to their survival:

- Major Mitchell's Cockatoo (*Lophochroa leadbeateri leadbeateri*);
- Grey Falcon (*Falco hypoleucos*); and
- Malleefowl (*Leipoa ocellata*).

The PMST found 12 migratory species as potentially occurring within 5 km of the Project Area (APPENDIX).

Additionally, a BDBSA search found one State listed (NPW Act) plant species and twelve State listed fauna species with historical records within 5 km of the Project Area since 1995 (spatial reliability of < 1 km including 'unentered' reliability). Three of these were considered unlikely to occur due to lack of suitable habitat in the Project Area, four were considered possible with marginal habitat available and / or old records of nomadic or uncommon species, five were considered likely to occur.

Species listed in the PMST as known to occur, or otherwise with records occurring since 1995 within 5 km of the Project Area, or listed in PMST with suitable habitat present, are listed in Table 12. A full list of all species assessed as part of the likelihood assessment is presented in Appendix 3. Desktop assessment and likelihood assessment of all species identified in PMST and BDBSA search.

Additionally, 36 fauna species were detected during the field survey, including one reptile, two native mammals, one introduced mammal, one amphibian and 31 bird species. A full list of species and number of individuals recorded is presented in Appendix 2. Fauna species list. Recorded species included State Rare Hooded Robin (*Melanodryas cucullata* ssp. *cucullata*), as well as Southern Whiteface (*Aphelocephala leucopsis*) which is currently under review for possible EPBC listing status.

Table 31. Likelihood of occurrence of threatened species identified in the desktop assessment as 'known to occur' (PMST) or with records within 5 km of the Project Area since 1995. The data source and threat levels are described in the table footer.

Species (common name)	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Flora						
Callistemon brachyandrus (Prickly Bottlebrush)		R	2	2006	Grows mostly in sandy soils of alluvial flats in subarid regions of the Darling and lower Murray River (eFloraSA 2022).	**Unlikely** – no suitable sandy alluvial flat habitat in Project Area.
Fauna						
Anhinga novaehollandiae novaehollandiae (Australasian Darter)		R	2,3	2012; 2020	Found in wetlands and sheltered coastal waters, mainly in the Tropics and Subtropics. It prefers smooth, open waters, for feeding, with tree trunks, branches, stumps or posts fringing the water, for resting and drying its wings. Most often seen inland, around permanent and temporary water bodies at least half a metre deep, but may be seen in calm seas near shore, fishing. (Birdlife 2022).	**Unlikely** – Records within last 20 years, however no suitable trees located around dam area for suitable habitat.
Aphelocephala leucopsis (Southern Whiteface)	VU		2,3,4	2020, 2022	Listed in 2023 due to documented population decline. Occurs across most of mainland Australia south of the tropics, living in a wide range of open woodland and shrublands where there is an understorey of grasses and/ or shrubs. The species feeds almost exclusively on the ground, favouring areas with lower tree densities. Nesting is usually in a hollow, crevice or low bush (DAWE, 2021).	**Known –** This species was detected during the field survey and multiple historical records occur within the Project Area vicinity.
Biziura lobata menziesi (Musk Duck)		R	2,3	2021; 2010	Lakes and deep swamps with reeds and open water. Nesting in dense old reed clumps in standing water at least 1 metre deep (Morcombe 2011).	**Unlikely** – no suitable aquatic habitat in Project Area.
Botaurus poiciloptilus (Australasian Bittern)	EN	E	1, 2	Known	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spike rushes (*Eleocharis* spp. (Morcombe 2011).	**Unlikely –** Specialised wetland habitat of rushes not present in Project Area.
Corcorax melanorhamphos (White-winged Chough)		R	2,3	2020; 2013	White-winged Choughs are found in open forests and woodlands. They tend to prefer the wetter areas, with lots of leaf-litter, for feeding, and available mud for nest building (BirdLife Australia 2022).	**Likely** – previous records in the area and suitable habitat present.

Species (common name)	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Coturnix ypsilophora australis (Brown Quail)		V	2,3	2012; 2011	Typically occurs in grass, crops, heaths, rainforest edges, grassy and spinifex woodland where it prefers damp rank vegetation (Morcombe 2011).	**Possible** – damp/rank vegetation limited to VA A/B2 (*Lycium australe* low shrubland) habitat in Project Area. On edge of known distribution.
Falco hypoleucos (Grey Falcon)	VU	R	1	Likely	The species occurs in arid and semi-arid Australia, including the MDB, EB, central Australia and WA. The species is mainly found where annual rainfall is less than 500 mm, except when wet years are followed by drought, when the species might become marginally more widespread, although it is essentially confined to the arid and semi-arid zones at all times (Schoenjahn 2018).	**Possible** – no nearby records, however suitable habitat occurs and the Project Area is within is known / preferred distribution and habitat characteristics.
Hieraaetus morphnoides (Little *Eagle*)		V	2,3	2012; 2019	Widespread across Australia in diverse habitats including coastal forest, woodland, open scrub, tree lined interior watercourse. Prefers areas where open country mixes with open forested hills, such as farmland areas (Morcombe 2011).	**Likely** – recent nearby records and a variety of suitable habitat including for foraging and nesting.
Leipoa ocellata (Malleefowl)	VU	V	1	Known	Inhabits semi-arid regions of southern Australia. Typically occupies shrublands and low woodlands that are dominated by mallee vegetation, with sandy soil, an abundance of leaf litter, and long-unburnt fire history. It also occurs in other habitat types including eucalypt or native pine *Callitris* woodlands, *Acacia* shrublands, Broombush *Melaleuca uncinata* vegetation or coastal heathlands (Benshemesh 2007).	**Possible** – No preferred Mallee dominated habitat in Project Area and no suitable sandy areas with abundant leaf litter for nesting. May occur in Project Area for foraging or dispersal only. No nearby recent records.
Litoria raniformis (Southern Bell Frog)	VU	V	1, 2	Known; 2010	Three distinct groups of records in SA. One group is located in the far south-east of the state (to near Keith) and adjoining Vic. Populations, one group along the Murray River from Victoria to the coast, and a small group in the Mt Lofty Ranges (MLR). The group in the MLR is likely to represent an unintentionally introduced population originating from captive stock and is likely to have now died out. Populations in the Murray lower lakes (Lake Alexandrina, Lake Albert and the	**Unlikely** – the distribution of this species is within the bounds of the Murray River and associated aquatic habitat. Aquatic habitat in the Project Area is minimal, ephemeral and / or man-made and does not contain emergent vegetation that supports this species. ***Removed from BAM scoresheet due to lack**

Species (common name)	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
					Eastern Mount Lofty Ranges tributaries) are known to have declined significantly due to drought and have not recovered since water flows have returned in 2007. This species is found mostly amongst emergent vegetation, including *Typha* sp. (bullrush), *Phragmites* sp. (reeds) and *Eleocharis* sp. (sedges), in or at the edges of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds and farm dams (Clemann and Gillespie 2012).	**of suitable wetland / aquatic habitat.**
Lophochroa leadbeateri leadbeateri (Eastern Major Mitchell's Cockatoo)	EN		1	Likely	Occurs in the Murray Darling, Eyre and Bulloo River basins, including in eastern SA. In SA the subspecies had disappeared from Adelaide and Mt Mary Plains by the 1950s. Occurs in arid and semi-arid woodlands dominated by mulga (*Acacia aneura*), mallee and box *Eucalypts*, slender cypress pine (*Callitris gracilis*) or belah (*Casuarina cristata*). Within these vegetation types, the subspecies main requirements are fresh surface water and trees with suitable nesting hollows (med to large entrance and >50cm deep). Eastern (DCCEEW 2023).	**Possible** -suitable foraging habitat occurs including presence of ephemeral water. Some hollows occur in the large Belah (*Casuarina pauper*) trees, however it is uncertain if these are large enough to host this species. No nearby records occur.
Melanodryas cucullata cucullata (Hooded Robin (YP, MN, AP, MLR, MM, SE))	EN	R	2, 3, 4	2010, 2020, 2022	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey (Morcombe 2011).	**Known** – recent nearby records, suitable habitat and was detected on field survey in VA A2.
Morelia spilota (Carpet Python)		R	2	2010	Occurs across northern, eastern and southwestern Australia. Found from rainforest to a variety of semi-arid coastal and inland habitat. In SA it occurs in dry sclerophyll forest with ground cover and logs, and in the SAMBD lives in hollows of large River Red Gums and north-facing	**Possible** – no preferred riparian habitat in Project Area, however may occur in wet periods, though there is minimal suitable log-cover on the ground to

Species (common name)	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
					cliffs along the Murray River (DEH 2008).	support their extended presence.
Myiagra cyanoleuca (Satin Flycatcher)		E	2	1998	Inhabits forest and woodland, mangroves and coastal heath, but typically avoids rainforest. Uncommon migrant to SA, but typically has a summer breeding range in SE QLD to Tasmania, and in winter migrates to NE QLD and New Guinea (Morcombe 2011).	**Possible** – no preferred habitat in Project Area. Uncommon migrant, likely to utilise the Murray River corridor, but may not extend into less suitable habitat in arid shrublands.
Neophema chrysostoma (Blue-winged Parrot)	VU			1999	Partial migrant. During non-breeding period from autumn to early spring, birds are recorded from northern Vic, eastern SA, southwestern QLD and western NSW. Inhabit a range of habitats from coastal, sub-coastal and inland areas through to semi-arid zones, favouring grasslands, grassy woodlands and wetlands. Forage typically on the ground. Breed in Tasmania, south eastern SA and southern Victoria in nest hollows (DCCEEW, 2022)	**Possible** -suitable foraging habitat occurs. Only one record nearby from over 20 years ago.
Neophema elegans elegans (Elegant Parrot)		R	2,3	2004; 1999	In South Australia it occurs in the east, north to the Flinders Ranges and west to the Eyre Peninsula. Inhabiting open habitats, the Elegant Parrot can be found in a wide variety of habitats, including grasslands, shrublands, mallee, woodlands and thickets, bluebush plains, heathlands, saltmarsh and farmland (BirdLife Australia 2022).	**Likely** – suitable foraging habitat in Project Area and recent nearby records.
Pachycephala inornata (Gilbert's Whistler)		R	2,3	2012; 2019	Dry woodland, mallee, mulga with shrubby understorey and abundant litter, where it feeds in shrubs on the ground (Morcombe 2011).	**Likely** – suitable foraging habitat in Project Area and recent nearby records.
Pedionomus torquatus (Plains-wanderer)	CE	E	1		The Plains-wanderer occurs at scattered sites in Queensland, NSW, Victoria and SA. Inhabits sparse, treeless, lowland native grasslands with approximately 50% bare ground, most vegetation less than 5 cm in height, with some widely-spaced plants up to 30 cm high. Typically, this occurs on hard red-brown clay soils (Commonwealth of Australia 2012).	**Unlikely** - no nearby records and no preferred grassland habitat. Some potentially suitable fringe habitat of chenopod shrubland occurs and the Project Area is within likely area of distribution.

Species (common name)	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Philemon citreogularis citreogularis (Little Friarbird)		R	2,3	2005; 2018	Open forests, woodlands, river edges, swampy woodlands, mangroves. Nomadic in the north and a summer migrant to the SE of Australia (Morcombe 2011).	**Unlikely** – the Project Area is on the very western edge of this species range, and it is likely to be an uncommon migrant along the Murray River corridor in unusual seasonal conditions. No suitable riparian woodland habitat in the Project Area.
Plectorhyncha lanceolata (Striped Honeyeater)		R	2,3	2010; 2017	Utilises drier open forest, woodland, mallee, mulga, heath and mangroves. Is a generalist feeder whose diet includes insects, seeds, fruits and nectar (Morcombe 2011).	**Likely** – suitable foraging habitat occurs in the Project Area and there are recent nearby records.
Polytelis anthopeplus monarchoides (Regent Parrot (eastern))	VU	V	1, 2, 3	Likely; 2013; 2019	The Regent Parrot (eastern) occurs in the lower MDB region of SA, NSW and Vic, with three separate breeding areas including the lower Murray River area upstream from Swan Reach in SA. The species primarily inhabits riparian River Red Gum *(Eucalyptus camaldulensis)* forests or woodlands and adjacent Black Box *(E. largiflorens)* woodlands. Critical habitat includes all known nesting sites, foraging, shelter and essential travel / dispersal routes and buffer areas of up to 20 km from known breeding areas. (DCCEEW 2020b; Baker-Gabb and Hurley 2011).	**Likely** – the Project Area contains suitable foraging habitat within the 20 km critical habitat buffer from known breeding populations of Regent Parrots.
Rostratula australis (Australian Painted Snipe)	EN	E	1	Likely	Inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of Duma, Canegrass or sometimes tea-tree species (DOE 2014).	**Unlikely** - preferred vegetation type and supporting habitat is not found within the Project Area despite recent nearby records.
Stagonopleura guttata (Diamond Firetail)	VU	V	3	2012	Inhabits grassy ground cover underneath open forest, woodland, mallee, acacia scrub and timber	**Likely** – suitable foraging habitat occurs in the Project Area and

Species (common name)	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
					belts along watercourses and roadsides. Feeds exclusively on the ground and often moves and nests in loose flocks. Can be sedentary or locally migratory (Morcombe 2011).	there are recent nearby records.
Trichosurus vulpecula (Common Brushtail Possum)		R	2	2004	Dry eucalypt forest, woodlands and suburban areas, foraging on leaves, and fruits. Sleep in tree hollows or other dark confined spaces such as hollow logs, dense vegetation and even ceilings and walls of buildings (AoLA 2022).	**Possible** – some potentially suitable foraging habitat, though few hollows large enough to support nesting animals.

Conservation status

EPBC Act (National); NPW Act (State / SA). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. Ssp.: the conservation status applies at the sub-species level.

Source of Information

1. EPBC Act Protected Matters Report (Accessed on 21/09/2022; updated 04/04/2023) – 5 km buffer applied to Project Area.
2. Biological Database of South Australia data extract (21/09/2022) – 5 km buffer applied to Project Area.
3. Birdlife records included as part of BDBSA data extract (21/09/2022) – 5 km buffer applied to Project Area.
4. Observed / recorded on site during field survey.

Abbreviations within Distribution and preferred habitat: EP: Eyre Peninsula; FP: Fleurieu Peninsula; FR: Flinders Ranges; KI: Kangaroo Island; MLR: Mount Lofty Ranges; MU: Murraylands; NL: Northern Lofty; NP: National Park; NSW: New South Wales QLD: Queensland; SL: Southern Lofty; SE: South East / South-Eastern; SW: South-Western; Tas: Tasmania; Vic: Victoria; WA: Western Australia; YP: Yorke Peninsula.

Table 32. Criteria for the likelihood of occurrence of species within the Project Area.

Likelihood	Criteria
Highly Likely/Known	Recorded in the last 10 years, the species does not have highly specific niche requirements, the habitat is present and falls within the known range of the species distribution or; The species was recorded as part of field surveys.
Likely	Recorded within the previous 20 years, the area falls within the known distribution of the species and the area provides habitat or feeding resources for the species.
Possible	Recorded within the previous 20 years, the area falls inside the known distribution of the species, but the area provide limited habitat or feeding resources for the species. Recorded within 20 -40 years, survey effort is considered adequate, habitat and feeding resources present, and species of similar habitat needs have been recorded in the area.
Unlikely	Recorded within the previous 20 years, but the area provide no habitat or feeding resources for the species, including perching, roosting or nesting opportunities, corridor for movement or shelter. Recorded within 20 -40 years; however, suitable habitat does not occur, and species of similar habitat requirements have not been recorded in the area. No records despite adequate survey effort.

7.1.7. Environmental Benefits

Key outcomes from the project include the continued improvement of grassland and shrubland condition due to the implementation of key management actions, listed below.

- Removal of stock grazing: stock are to be permanently excluded from the SEB Area at all times. Stock grazing may be permitted, on occasions in grassy ecosystems, but only if it is shown to be ecologically beneficial and undertaken in accordance with an approved Management Plan.
- Fencing: must be maintained in a stock proof condition. Where fencing is only to standard to delineate the location of the SEB Area (e.g. one plain wire fence) or there is an unfenced boundary (e.g. a site borders a conservation reserve), the boundary needs to be monitored for stock access. If stock are able to access the area at any time, a fence will need to be constructed or upgraded.
- Weed management: a total of 16 weed species were identified across the Project Area during the field survey (Appendix 1. Flora species list). An SEB Management Plan will detail management actions required to reduce weed spread and abundance across the site.

Additional recommended actions include:

- Ongoing monitoring to assess the condition of protected vegetation within the SEB Area which can be used to inform the success (or otherwise) of the SEB management plan. Results of this monitoring can be used as part of an adaptive management plan regarding grazing and / or necessity to implement control actions for native herbivores if required.

Other essential commitments which will be complied with at all times include:

- No unnecessary vehicle access (beyond that which is required to manage the biodiversity value of the SEB Area), using formed tracks where possible.
- No soil disturbance (beyond that which is necessary for agreed management actions);
- No dumping of rubbish, unwanted machinery or plant material;
- No new dams or drainage alterations;
- No rock or dead-wood removal.

Environmental benefits associated with improvement of grassland, shrubland and woodland improvement includes:

- Protection and enhancement of habitat for several national and State threatened fauna species considered known or likely to occur in the proposed SEB Area including:
    - *Aphelocephala leucopsis* (Southern Whiteface (EPBC VU);
    - *Corcorax melanorhamphos* (White-winged Chough) (NPW R);
    - *Melanodryas cucullata cucullata* (Hooded Robin (EPBC EN; NPW R);
    - *Hieraaetus morphnoides* (Little *Eagle*) (NPW V);

- *Neophema elegans elegans* (Elegant Parrot) (NPW R);
- *Pachycephala inornata* (Gilbert's Whistler) (NPW R);
- *Plectorhyncha lanceolata* (Striped Honeyeater) (NPW R);
- *Polytelis anthopeplus monarchoides* (Regent Parrot (eastern)) (EPBC VU; NPW V); and
- *Stagonopleura guttata* (Diamond Firetail) (EPBC VU; NPW V).

- Anticipated improvements to habitat include:
  - Regeneration of native species which had previously been grazed;
  - Seedling recruitment of emergent Mallee Eucalypts;
  - Increased cover and abundance of shrub and grass understorey species;
  - Increased diversity of herbaceous understorey species; and
  - Reduction in cover of weed species across the site.

7.1.8. Summary table

Based on the quality and condition of each vegetation association and the area available to be utilised as an SEB Area, a total of 786.84 SEB points are provided by the proposed SEB Area (Table 33). The balance of points should be made up in way of total payment into the Native Vegetation Fund of $2,412,134.75 (includes Administration fee).

Table 33. SEB VA summary table.

Block	Site	Vegetation Association	UBS	Gain Score	Area (ha)	SEB Point of Gain
A	1a	*Maireana sedifolia* and *Lawrencia squamata* +/- *Acacia nyssophylla* Low Open Shrubland with emergent *Eucalyptus socialis*.	66.04	5.66	12.78	72.33
A	1b	*Maireana sedifolia* Low Open Shrubland with emergent *E. socialis* and *E. oleosa*.	52.61	6.59	13.59	89.60
A	1c	*Myoporum platycarpum* +/- *Alectryon oleifolius Low Open Woodland with Chenopod Shrub Understorey*	73.89	4.71	0.19	0.90
A	3	*Casuarina pauper* Open Woodland	88.61	2.14	4.74	10.15
A	4	*Acacia nyssophylla* over *Lycium australe* +/- *Maireana sedifolia* Tall Shrubland with emergent *Eucalyptus socialis*	57.06	6.38	1.82	11.61
B	1a	*Maireana sedifolia* and *Lawrencia squamata* +/- *Acacia nyssophylla* Low Open Shrubland with emergent *Eucalyptus socialis*.	64.22	5.50	75.54	415.75
B	1b	*Maireana sedifolia* Low Open Shrubland with emergent *E. socialis* and *E. oleosa*.	51.16	6.41	2.89	18.53
B	1c	*Myoporum platycarpum* +/- *Alectryon oleifolius Low Open Woodland with Chenopod Shrub Understorey*	71.85	4.58	30.88	141.55
B	2	*Lycium australe* Low Open Shrubland in drainage depression.	63.93	5.53	2.61	14.44

B	3	*Casuarina pauper* Open Woodland	86.17	2.08	5.75	11.98
				Total	**150.79**	**786.84**

7.1.9. SEB Management Plan

A Native Vegetation Management Plan is required as part of the Conditions of Consent for clearance.
The Management Plan should be provided at the time of submitting the application to clear vegetation, however it can be lodged during the assessment process if required, but must be received before a decision can be made by the Native Vegetation Council in relation to the associated clearance. The Management Plan template is found under Tools for Accredited Consultants.

The Management Plan for the proposed SEB Area will be submitted as a condition of consent following assessment of the Project and clearance impacts by the Native Vegetation Council.

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9. Appendices

9.1. Appendix 1. Flora species list recorded during field survey

Scientific name	Common name
Acacia nyssophylla	Spine bush, Pin bush, wait-a-while
Acacia oswaldii	Umbrella Wattle
Alectryon oleifolius ssp. canescens	Bullock-bush, Rosewood, Bonaree
Austrostipa acrociliata	Graceful Spear-grass
Austrostipa eremophila	Desert Spear-grass
Austrostipa nitida	Balcarra Grass
Austrostipa platychaeta	Flat-awned Spear-grass
Brachyscome ciliaris var.	Variable Daisy
Brachyscome lineariloba	Hard-headed Daisy
Calotis hispidula	Hairy Burr-Daisy
Casuarina pauper	Black Oak, Belah
Convolvulus remotus	Australian Bindweed
Daucus glochidiatus	Native Carrot
Dodonaea viscosa ssp. angustissima	Narrow-leaf Hopbush
Dysphania cristata	Crested Goosefoot, Crested Crumbweed
Enchylaena tomentosa var. tomentosa	Ruby Saltbush
Eucalyptus oleosa ssp. oleosa	Red Mallee
Eucalyptus socialis	Summer Red Mallee, Pointed Mallee
Euphorbia drummondii	Caustic Weed
Exocarpos aphyllus	Leafless Ballart, Stiff Cherry
Goodenia fascicularis	Silky Goodenia
Goodenia pusilliflora	Small Flowered Goodenia
Grevillea huegelii	Comb Grevillea
Hyalosperma semisterile	Orange Sunray
Isoetopsis graminifolia	Grass Cushions, Grass Buttons
Lawrencia squamata	Thorny Lawrencia, Thorny Fan-leaf
Lycium australe	Australian Boxthorn
Lysiana exocarpi ssp. exocarpi	Harlequin Mistletoe
Maireana eriantha	Woolly Bluebush
Maireana georgei	Satiny Bluebush
Maireana sedifolia	Pearl Bluebush
Malva preissiana	Australian Hollyhock
Minuria cunninghamii	Bush Minuria
Myoporum platycarpum ssp. platycarpum	False Sandalwood, Sugarwood
Nicotiana goodspeedii	Small-flowered Tobacco

Scientific name	Common name
Nitraria billardierei	Nitrebush, Dillon Bush
Oxalis perennans	Native Oxalis
Pittosporum angustifolium	Native Apricot
Rhagodia parabolica	Fragrant Saltbush, Mealy Saltbush
Rhagodia ulicina	Spiny Goosefoot
Rhodanthe pygmaea	Pigmy Sunray
Roepera angustifolia	Scrambling Twinleaf
Roepera aurantiaca ssp. aurantiaca	Undivided Twinleaf
Roepera billardierei	Coast Twinleaf
Roepera ovata	Dwarf Twinleaf
Rytidosperma caespitosum	Common Wallaby-grass
Santalum acuminatum	Quandong
Scaevola spinescens	Currant Bush
Sclerolaena diacantha	Grey Copperburr, Bassia
Sclerolaena obliquicuspis	Limestone Copperburr, Oblique-spined Bassia
Sonchus sp.	Sow Thistle
Templetonia egena	Desert Broombush, Round Broombush, Round Templetonia
Tetragonia implexicoma	Bower Spinach
Trichanthodium skirrophorum	Woolly Yellow-Heads
Vittadinia cuneata var. cuneata	Fuzzweed, Woolly New Holland Daisy
Introduced flora (weed species)	
Alyssum linifolium	Flax-leaved Alyssum
Carrichtera annua	Ward's Weed
Carthamus lanatus	Saffron Thistle
Erodium botrys	Long Heron's-bill
Erodium cicutarium	Cut-leaf Heron's-bill
Herniaria hirsuta	Hairy Rupturewort
Lactuca saligna	Willowleaf Lettuce, Wild Lettuce
Medicago polymorpha	Burr-Medic
Moenchia erecta	Erect Chickweed
Neatostema apulum	Hairy Sheepweed
Onopordum acanthium	Scotch Thistle
Reichardia tingitana	False Sow Thistle
Salvia verbenaca var.	Wild Sage
Schismus barbatus	Arabian Grass
Sisymbrium erysimoides	Smooth Mustard
Spergularia diandra	Lesser Sand-spurrey

9.2. Appendix 2. Fauna species list recorded during field survey

Scientific name	Common name	Conservation Rating (if applicable)	No.	Comments
Amphibians				
Limnodynastes tasmaniensis	Spotted Marsh Frog		NA	Heard calling in VA2
Birds				
Acanthagenys rufogularis	Spiny-cheeked Honeyeater		2	
Acanthiza uropygialis	Chestnut-rumped Thornbill		2	
Accipiter cirrocephalus	Collared Sparrowhawk		1	
Aphelocephala leucopsis	Southern Whiteface	Currently under assessment for EPBC listing	6	
Aquila audax	Wedge-tailed Eagle		4	Three nests were observed including one active with fledgling present in a *Casuarina pauper* tree, one intact but inactive nest, and one low dilapidated nest in an *Alectryon oleifolius* tree.
Barnardius zonarius	Australian Ringneck		3	
Chalcites osculans	Black-eared Cuckoo		2	
Cincloramphus cruralis	Brown Songlark		2	
Corvus coronoides	Australian Raven		1	
Cracticus torquatus	Grey Butcherbird		1	
Eolophus roseicapilla	Galah		6	
Epthianura albifrons	White-fronted Chat		1	
Gymnorhina tibicen	Australian Magpie		1	
Lalage tricolor	White-winged Triller		5	
Lichenostomus virescens	Singing Honeyeater		4	
Malurus cyaneus	Superb Fairy-wren		2	
Malurus leucopterus	White-winged Fairywren		2	
Malurus splendens	Splendid Fairywren		2	
Melanodryas cucullata ssp. cucullata	Hooded Robin	NPW (R)	1	Observed and heard calling in *Casuarina pauper* woodland (VA A3)
Melopsittacus undulatus	Budgerigar		54	
Northiella haematogaster	Blue Bonnet		2	
Ocyphaps lophotes	Crested Pigeon		6	
Oreoica gutturalis	Crested Bellbird		4	

Scientific name	Common name	Conservation Rating (if applicable)	No.	Comments
Amphibians				
Pachycephala rufiventris	Rufous Whistler		2	
Pardalotus striatus	Striated Pardalote		1	
Petroica goodenovii	Red-capped Robin		4	Observed nesting in VA A1c and likely nesting behaviour in A1a, though nest not detected.
Phaps chalcoptera	Common Bronzewing		1	
Pomatostomus ruficeps	Chestnut-crowned Babbler		8	Group of individuals using VA A4.
Psephotus varius	Mulga Parrot		17	
Rhipidura leucophrys	Willie Wagtail		4	
Todiramphus pyrrhopygia	Red-backed Kingfisher		1	Observed flying over the site near Controversial Road.
Mammals				
Macropus giganteus	Eastern Grey Kangaroo		-	Numerous
Osphranter rufus	Red Kangaroo		-	Numerous
Ovis aries	Sheep*		-	Non-native
Reptiles				
Ctenophorus pictus	Painted Dragon		1	Observed under woody debris in VA A3.

9.3. Appendix 3. Desktop assessment and likelihood assessment of all species identified in PMST and BDBSA search.

Scientific Name (Common Name)	EPBC	NPW Act	Source	Simple presence (PMST) / year of last record (BDBSA)	Habitat requirements	Likelihood of occurrence within the Project Area
Callistemon brachyandrus (Prickly Bottlebrush)		R	2	2006	Grows mostly in sandy soils of alluvial flats in subarid regions of the Darling and lower Murray River (eFloraSA 2022).	**Unlikely** - no suitable sandy alluvial flat habitat in Project Area.
Dodonaea subglandulifera (Peep Hill Hop-bush)	EN	E	1	May	Occurs in isolated localities in semi-arid areas of south-east SA. Populations primarily occur on low hills on loamy soils associated with rocky (limestone, slate, shale) outcrops. The species has also been recorded from plains country in sandy soils over limestone.	**Unlikely** - not within known population distribution, no recent records, no preferred habitat and not observed during field survey.
Lepidium monoplocoides (Winged Pepper-cress)	EN	E	1	May	SA: MU, but now extinct in SA. Occurs predominantly in mallee scrub in semi-arid areas.	**Unlikely** - no recent records, declared extinct in SA. Suitable habitat is present.
Pterostylis xerophila (Desert Greenhood)	VU	V	1	May	Little is known of the precise habitat requirements of *P. xerophila*. In SA it has been found to occur in dry woodland on fertile red loamy soils on or around granite or quartzite rock outcrops. Commonly associated with Melaleuca uncinata (Broombush) and Mallee spp. *E. incrassata, socialis* and *leptophylla* (Duncan 2010).	**Unlikely** - no preferred red-loamy soil habitat in Project Area, no nearby records.
Swainsona pyrophila (Yellow Swainson-pea)	VU	R	1	May	Known from SA, NSW and Vic. Found in Mallee vegetation communities on a variety of soil types including well-drained sands, sandy loams and heavier clay loams. It is usually found after fire growing in association with *Eucalyptus incrassata* (Ridge-fruited Mallee), *E. socialis* (Beaked Red Mallee), *E. brachycalyx* (Gilja), *E. gracilis* (Yorrell), and *E. oleosa* (Red Mallee) mid mallee woodland over *Melaleuca uncinata* (Broombush) tall shrubland (Tonkinson and Robertson 2010).	**Unlikely** - no recent records nearby, though associated vegetation overstory species are present. Not observed during field assessment undertaken in spring.

Scientific Name (Common Name)	EPBC	NPW Act	Source	Simple presence (PMST) / year of last record (BDBSA)	Habitat requirements	Likelihood of occurrence within the Project Area
Anhinga novaehollandiae novaehollandiae (Australasian Darter)		R	2,3	2012; 2020	Found in wetlands and sheltered coastal waters, mainly in the Tropics and Subtropics. It prefers smooth, open waters, for feeding, with tree trunks, branches, stumps or posts fringing the water, for resting and drying its wings. Most often seen inland, around permanent and temporary water bodies at least half a metre deep, but may be seen in calm seas near shore, fishing. (Birdlife 2022)	**Unlikely** – Records within last 20 years, however no suitable trees located around dam area for suitable habitat. ***(Removed from BAM scoresheet due to lack of suitable wetland / aquatic habitat.)**
Aphelocephala leucopsis (Southern Whiteface)	VU		1,2,3,4	2020, 2022	Listed in 2023 due to documented population decline. Occurs across most of mainland Australia south of the tropics, living in a wide range of open woodland and shrublands where there is an understorey of grasses and/ or shrubs. The species feeds almost exclusively on the ground, favouring areas with lower tree densities. Nesting is usually in a hollow, crevice or low bush (DAWE, 2021).	**Known –** This species was detected during the field survey and multiple historical records occur within the Project Area vicinity.
Biziura lobata menziesi (Musk Duck)		R	2,3	2021; 2010	Lakes and deep swamps with reeds and open water. Nesting in dense old reed clumps in standing water at least 1 metre deep (Morcombe 2011).	**Unlikely** - no suitable aquatic habitat in Project Area. *
Botaurus poiciloptilus (Australasian Bittern)	EN	E	1, 2	Known; 2010	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spike rushes (*Eleocharis* spp. (Morcombe 2011).	**Unlikely –** Specialised wetland habitat of rushes not present in Project Area. *
Calidris ferruginea (Curlew Sandpiper)	CE, Mi (W)	E	1	May	Utilises inter-tidal mudflats of estuaries, lagoons, mangrove channels and around lakes, damns flood waters and flooded saltbush of inland lakes.	**Unlikely** - No nearby records, no preferred wetland habitat in Project Area. Flooded saltbush plains may occur on occasion, however there are likely to be much more suitable / preferable locations nearby.
Corcorax melanorhamphos (White-winged Chough)		R	2,3	2020; 2013	White-winged Choughs are found in open forests and woodlands. They tend to prefer the wetter areas, with lots of leaf-litter, for feeding, and available mud for nest building (BirdLife Australia 2020).	**Likely** - previous records in the area and suitable habitat present.
Coturnix ypsilophora australis (Brown Quail)		V	2,3	2012; 2011	Typically occurs in grass, crops, heaths, rainforest edges, grassy and spinifex woodland where it prefers damp rank vegetation (Morcombe 2011).	**Possible** - preferred damp / rank dense vegetated habitat only within small area mapped as A/B2 in Project Area. On edge of known distribution.

Scientific Name (Common Name)	EPBC	NPW Act	Source	Simple presence (PMST) / year of last record (BDBSA)	Habitat requirements	Likelihood of occurrence within the Project Area
Falco hypoleucos (Grey Falcon)	VU	R	1	Likely	The species occurs in arid and semi-arid Australia, including the MDB, EB, central Australia and WA. The species is mainly found where annual rainfall is less than 500 mm, except when wet years are followed by drought, when the species might become marginally more widespread, although it is essentially confined to the arid and semi-arid zones at all times (Schoenjahn 2018).	**Possible** - no nearby records, however suitable habitat occurs and the Project Area is within is known / preferred distribution and habitat characteristics.
Grantiella picta (Painted Honeyeater)	VU	R	1	May	Sparsely distributed from southern Victoria and south-eastern South Australia to far northern Qld. and eastern NT (Birdlife Australia, 2022). Rare vagrant to South Australia and generally rare throughout its range. Forest, woodland, dry scrub, often with abundant mistletoe. Dependent on mistletoe berries (Morecombe eGuide 2020).	**Unlikely** – Closest record from Gluepot Reserve approximately 5 km northeast, over 20 years ago. Some mistletoe in Project Area, but lacking abundant forage material.
Hieraaetus morphnoides (Little Eagle)		V	2,3	2012; 2019	Widespread across Australia in diverse habitats including coastal forest, woodland, open scrub, tree lined interior watercourse. Prefers areas where open country mixes with open forested hills, such as farmland areas.	**Likely** - recent nearby records and a variety of suitable habitat including for foraging and nesting.
Leipoa ocellata (Malleefowl)	VU	V	1	Known	Inhabits semi-arid regions of southern Australia. Typically occupies shrublands and low woodlands that are dominated by mallee vegetation, with sandy soil, an abundance of leaf litter, and long-unburnt fire history. It also occurs in other habitat types including eucalypt or native pine *Callitris* woodlands, *Acacia* shrublands, Broombush *Melaleuca uncinata* vegetation or coastal heathlands (Benshemesh 2007).	**Possible** – No preferred Mallee dominated habitat in Project Area and no suitable sandy areas with abundant leaf litter for nesting. May occur in Project Area for foraging or dispersal only.
Lophochroa leadbeateri leadbeateri (Eastern Major Mitchell's Cockatoo)	EN		1	Likely	Occurs in the Murray Darling, Eyre and Bulloo River basins, including in eastern SA. In SA the subspecies had disappeared from Adelaide and Mt Mary Plains by the 1950s. Occurs in arid and semi-arid woodlands dominated by mulga (*Acacia aneura*), mallee and box *Eucalypts*, slender cypress pine (*Callitris gracilis*) or belah (*Casuarina cristata*). Within these vegetation types, the subspecies main requirements are fresh	**Possible** -suitable foraging habitat occurs including presence of ephemeral water. Some hollows occur in the large Belah (*Casuarina pauper*) trees, however it is uncertain if these are large enough to host this species. No nearby records occur.

Scientific Name (Common Name)	EPBC	NPW Act	Source	Simple presence (PMST) / year of last record (BDBSA)	Habitat requirements	Likelihood of occurrence within the Project Area
					surface water and trees with suitable nesting hollows (med to large entrance and >50cm deep). Eastern (DCCEEW 2023).	
Manorina melanotis (Black-eared Miner)	EN	E	1	May	Restricted to small local colonies in the mallee region of north-western Victoria, into the Murray mallee and Murray River regions of SA. Utilise mature mallee eucalyptus woodland in areas that have not been burnt for at least 50 years (BirdLife 2022).	**Unlikely** - No nearby records and no preferred Mallee dominated long unburnt vegetation in Project Area.
Melanodryas cucullata cucullata (Hooded Robin (YP, MN, AP, MLR, MM, SE))	EN	R	1,2,3,4	2010, 2020, 2022	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey.	**Known** - recent nearby records, suitable habitat and was detected on field survey in VA A2.
Morelia spilota (Carpet Python)		R	2	2010	Occurs across northern, eastern and southwestern Australia. Found from rainforest to a variety of semi-arid coastal and inland habitat. In SA it occurs in dry sclerophyll forest with ground cover and logs, and in the SAMBD lives in hollows of large River Red Gums and north-facing cliffs along the Murray River (DEH 2008).	**Possible** - no preferred riparian habitat in Project Area, however may occur in wet periods, though there is minimal suitable log-cover on the ground to support their extended presence.
Myiagra cyanoleuca (Satin Flycatcher)		E	2	1998	Inhabits forest and woodland, mangroves and coastal heath, but typically avoids rainforest. Uncommon migrant to SA, but typically has a summer breeding range in SE QLD to Tasmania, and in winter migrates to NE QLD and New Guinea (Morcombe 2011).	**Possible** - no preferred habitat in Project Area. Uncommon migrant, likely to utilise the Murray River corridor, but may not extend into less suitable habitat in arid shrublands.
Neophema chrysostoma (Blue-winged Parrot)	VU		1,2	1999	Partial migrant. During non-breeding period from autumn to early spring, birds are recorded from northern Vic, eastern SA, southwestern QLD and western NSW. Inhabit a range of habitats from coastal, sub-coastal and inland areas through to semi-arid zones, favouring grasslands, grassy woodlands and wetlands. Forage typically on the ground. Breed in	**Possible** -suitable foraging habitat occurs. Only one record nearby from over 20 years ago.

Scientific Name (Common Name)	EPBC	NPW Act	Source	Simple presence (PMST) / year of last record (BDBSA)	Habitat requirements	Likelihood of occurrence within the Project Area
					Tasmania, south eastern SA and southern Victoria in nest hollows (DCCEEW, 2022)	
Neophema elegans elegans (Elegant Parrot)		R	2,3	2004; 1999	In South Australia it occurs in the east, north to the Flinders Ranges and west to the Eyre Peninsula. Inhabiting open habitats, the Elegant Parrot can be found in a wide variety of habitats, including grasslands, shrublands, mallee, woodlands and thickets, bluebush plains, heathlands, saltmarsh and farmland (BirdLife Australia 2020).	**Likely** - suitable foraging habitat in Project Area and recent nearby records.
Numenius madagascariensis (Eastern Curlew)	CE, Mi (W)	E	1	May	Typically a coastal species where it utilises tidal mudflats, sand spits of estuaries, mangroves, lake shores and ocean beaches to forage. Occasional migrant to SA. (Morcombe 2011)	**Unlikely** - no preferred coastal habitat in Project Area and no nearby records.
Pachycephala inornata (Gilbert's Whistler)		R	2,3	2012; 2019	Dry woodland, mallee, mulga with shrubby understorey and abundant litter, where it feeds in shrubs on the ground (Morcombe 2011).	**Likely** - suitable foraging habitat in Project Area and recent nearby records.
Pedionomus torquatus (Plains-wanderer)	CE	E	1	Likely	The Plains-wanderer occurs at scattered sites in Queensland, NSW, Victoria and SA. Inhabits sparse, treeless, lowland native grasslands with approximately 50% bare ground, most vegetation less than 5 cm in height, with some widely-spaced plants up to 30 cm high. Typically, this occurs on hard red-brown clay soils (Commonwealth of Australia 2012).	**Unlikely** - no nearby records and no preferred grassland habitat. Some potentially suitable fringe habitat of chenopod shrubland occurs and the Project Area is within likely area of distribution.
Pezoporus occidentalis (Night Parrot)	EN	E	1	May	The distribution of the Night Parrot is very poorly understood. There are a small number of confirmed and well-regarded records from arid and semi-arid regions of Qld. SA, WA, and the NT. It inhabits arid and semi-arid areas that are characterised by having dense, low vegetation. Based on accepted records, the habitat of the Night Parrot consists of Triodia grasslands in stony or sandy environments, and of samphire and chenopod shrublands, including genera such as *Atriplex, Bassia* and Maireana, on floodplains and claypans, and on the margins of salt lakes, creeks or other sources of water (Burbridge 2020).	**Unlikely** - no preferred arid salt lake or *Triodia* habitat present in Project Area. No records, and not within current known distribution.

Scientific Name (Common Name)	EPBC	NPW Act	Source	Simple presence (PMST) / year of last record (BDBSA)	Habitat requirements	Likelihood of occurrence within the Project Area
Philemon citreogularis citreogularis (Little Friarbird)		R	2,3	2005; 2018	Open forests, woodlands, river edges, swampy woodlands, mangroves. Nomadic in the north and a summer migrant to the SE of Australia (Morcombe 2011).	**Unlikely** - the Project Area is on the very western edge of this species range, and it is likely to be an uncommon migrant along the Murray River corridor in unusual seasonal conditions. No suitable riparian woodland habitat in the Project Area.
Plectorhyncha lanceolata (Striped Honeyeater)		R	2,3	2010; 2017	Utilises drier open forest, woodland, mallee, mulga, heath and mangroves. Is a generalist feeder and diet includes insects, seeds, fruits and nectar (Morcombe 2011).	**Likely** - suitable foraging habitat occurs in the Project Area and there are recent nearby records.
Polytelis anthopeplus monarchoides (Regent Parrot (eastern))	VU	V	1, 2, 3	Likely; 2013; 2019	The Regent Parrot (eastern) occurs in the lower MDB region of SA, NSW and Vic, with three separate breeding areas including the lower Murray River area upstream from Swan Reach in SA. The species primarily inhabits riparian River Red Gum *(Eucalyptus camaldulensis)* forests or woodlands and adjacent Black Box *(E. largiflorens)* woodlands. Critical habitat includes all known nesting sites, foraging, shelter and essential travel / dispersal routes and buffer areas of up to 20 km from known breeding areas. (DCCEEW 2020b; Baker-Gabb and Hurley 2011).	**Likely** - the Project Area contains suitable foraging habitat within the 20 km critical habitat buffer from known breeding populations of Regent Parrots.
Rostratula australis (Australian Painted Snipe)	EN	E	1	Likely	Inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of Duma, Canegrass or sometimes tea-tree species (DOE 2014).	**Unlikely** - preferred vegetation type and supporting habitat is not found within the Project Area despite recent nearby records.
Stagonopleura guttata (Diamond Firetail)	VU	V	1,3	2012	Inhabits grassy ground cover underneath open forest, woodland, mallee, acacia scrub and timber belts along watercourses and roadsides. Feeds exclusively on the ground and often moves and nests in loose flocks. Can be sedentary or locally migratory.	**Likely** - suitable foraging habitat occurs in the Project Area and there are recent nearby records.

Scientific Name (Common Name)	EPBC	NPW Act	Source	Simple presence (PMST) / year of last record (BDBSA)	Habitat requirements	Likelihood of occurrence within the Project Area
Stictonetta naevosa (Freckled Duck)		V	2	2006	Breeds on densely vegetated freshwater swamps, creeks or temporary floodwaters and feeds in the shallows. Nests in the fork of a branch hanging low over water.	**Unlikely** - no suitable aquatic habitat in Project Area. *
Nyctophilus corbeni (South-eastern Long-eared Bat)	VU	V	1	May	Overall, the distribution of the south eastern form coincides approximately with the Murray Darling Basin with the Pilliga Scrub region being the distinct stronghold for this species. Inhabits a variety of vegetation types, including mallee, Buloke *(Allocasuarina luehmannii)* and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark.	**Unlikely** - limited distribution within SA. Closest records around Calperum Station, Danggali CP and Chowilla CP, however records are all from early to mid- 1990s, with no more recent observations. Potentially suitable habitat occurs including nesting hollows in Buloke woodland remnants.
Trichosurus vulpecula (Common Brushtail Possum)		R	2	2004	Dry eucalypt forest, woodlands and suburban areas, foraging on leaves, and fruits. Sleep in tree hollows or other dark confined spaces such as hollow logs, dense vegetation and even ceilings and walls of buildings (AoLA 2022).	**Possible** - some potentially suitable foraging habitat, though few hollows large enough to support nesting animals.
Morelia spilota (Carpet Python)		R	2	2010	Occurs across northern, eastern and southwestern Australia. Found from rainforest to a variety of semi-arid coastal and inland habitat. In SA it occurs in dry sclerophyll forest with ground cover and logs, and in the SAMBD lives in hollows of large River Red Gums and north-facing cliffs along the Murray river (DEH 2008).	**Possible** - no preferred riparian habitat in Project Area, however may occur in wet periods, though there is minimal suitable log-cover on the ground to support their extended presence.
Bidyanus bidyanus (Silver Perch)	CE	NA	1	Known	Aquatic habitat associated with the Murray River.	**Unlikely** - no suitable aquatic habitat in Project Area. *
Craterocephalus fluviatilis (Murray Hardyhead)	EN	NA	1	Likely	Aquatic habitat associated with the Murray River.	**Unlikely** - no suitable aquatic habitat in Project Area. *
Galaxias rostratus (Flathead Galaxias)	CE	NA	1	May	Aquatic habitat associated with the Murray River.	**Unlikely** - no suitable aquatic habitat in Project Area. *
Maccullochella peelii (Murray Cod)	VU	NA	1	Known	Aquatic habitat associated with the Murray River.	**Unlikely** - no suitable aquatic habitat in Project Area. *

Scientific Name (Common Name)	EPBC	NPW Act	Source	Simple presence (PMST) / year of last record (BDBSA)	Habitat requirements	Likelihood of occurrence within the Project Area
Litoria raniformis (Southern Bell Frog)	VU	V	1, 2	Known; 2010	Three distinct groups of records in SA. One group is located in the far south-east of the state (to near Keith) and adjoining Vic. populations, one group along the Murray River from Victoria to the coast, and a small group in the Mt Lofty Ranges (MLR). The group in the MLR is likely to represent an unintentionally introduced population originating from captive stock and is likely to have now died out. Populations in the Murray lower lakes (Lake Alexandrina, Lake Albert and the Eastern Mount Lofty Ranges tributaries) are known to have declined significantly due to drought and have not recovered since water flows have returned in 2007. This species is found mostly amongst emergent vegetation, including *Typha* sp. (bullrush), *Phragmites* sp. (reeds) and *Eleocharis* sp. (sedges), in or at the edges of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds and farm dams.	**Unlikely** - the distribution of this species is within the bounds of the Murray River and associated aquatic habitat. Aquatic habitat in the Project Area is minimal, ephemeral and / or man-made and does not contain emergent vegetation that supports this species. *

Conservation status

EPBC Act (National); NPW Act (State / SA). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. ssp.: the conservation status applies at the sub-species level.

Source of Information

1. EPBC Act Protected Matters Report (Accessed on 21/09/2022) – 5 km buffer applied to Project Area.
2. Biological Database of South Australia data extract (21/09/2022) - 5 km buffer applied to Project Area.
3. Birdlife records included as part of BDBSA data extract (21/09/2022) – 5 km buffer applied to Project Area.
4. Observed / recorded on site during field survey.

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