Goyder South Hybrid Renewable Energy Facility – Stage1B

Native Vegetation Clearance Data Report

Clearance under the *Native Vegetation Regulations 2017*

24 September 2021

Prepared by Jesse Carpenter – EBS Ecology (NVC Accredited Consultant)

Goyder South Hybrid Renewable Energy Facility: Native Vegetation Clearance Data Report

24/09/2021

Version 2.1

Prepared by EBS Ecology for NEOEN

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Cover photograph: *Triodia irritans* grassland on steep, rocky hills in south of the Project Area.

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Glossary and abbreviations

BAM	Bushland Assessment Method
BDBSA	Biological Database of South Australia (maintained by DEW)
DAWE	Department of Agriculture, Water and the Environment (Commonwealth)
DEW	Department for Environment and Water (South Australia)
EBS	Environment and Biodiversity Services Pty Ltd (trading as EBS Ecology)
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
GWF 1 Stage 1A	Goyder Wind Farm 1 Pty Ltd Stage 1A
GWF 1 Stage 1B	Goyder Wind Farm 1 Pty Ltd Stage 1B
ha	Hectare(s)
IBRA	Interim Biogeographical Regionalisation of Australia
INTG	Iron-grass Natural Temperate Grassland Threatened Ecological Community
km	Kilometre(s)
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 Act	*National Parks and Wildlife Act 1972*
NV Act	*Native Vegetation Act 1991*
NVC	Native Vegetation Council
PBTL	Pygmy Bluetongue Lizard (*Tiliqua adelaidensis*)
PMST	Protected Matters Search Tool (under the EPBC Act; maintained by DAWE)
SA	South Australia(n)
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
TEC	Threatened Ecological Community
VA	Vegetation Association/s
var.	Variety (a taxonomic rank below that of species and subspecies, but above that of form)
WTG	Wind Turbine Generator

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1. Application information

Table 1. Application details.

Applicant:	NEOEN		
Key contact:	Tom Jenkins Project Manager NEOEN Level 6, 16 Marcus Clarke Street Canberra ACT 2601 email: tom.jenkins@neoen.com		
Landowner:	Various private owners – refer to Appendix C within Attachment 4 (Att 3 DA Package Appendix Vol 1).		
Site Address:	Approximately 10km south of Burra, across the suburbs of Burra, Hanson, Porter Lagoon, Koonoona and Apoinga.		
Local Government Area:	Regional Council of Goyder	**Hundred:**	Kooringa Apoinga Baldina Bright
Title ID:	refer to Appendix C within Attachment 4 (Att 3 DA Package Appendix Vol 1).	**Parcel ID**	refer to Appendix C within Attachment 4 (Att 3 DA Package Appendix Vol 1).

Table 2. Summary of the proposed clearance.

Purpose of clearance:	Clearance of native vegetation is proposed to allow for the construction and operation of 37 wind turbine generators (WTGs) and associated infrastructure for Goyder Wind Farm 1 Pty Ltd Stage 1B (referred to as GWF 1 Stage 1B). Associated infrastructure includes access tracks and underground cables as well as a temporary construction compound. GWF 1 Stage 1B is part of the larger Goyder South Hybrid Renewable Energy Facility (referred to as the Goyder South Project or Goyder South). Please refer to Section 2.2.1, Section 2.2.2 and Section 2.2.3 for more detailed information on the Goyder South Project and the staged approach associated with the Project.
Native Vegetation Regulation:	Regulation 12, Schedule 1; clause 34 Infrastructure
Description of the vegetation under application:	***Eucalyptus porosa* (Mallee Box) Open Woodland** A total of 18.76ha are included in the application. Low open woodland to woodland with an overstorey dominated by *Eucalyptus porosa*, with either *Allocasuarina verticillata* or *Callitris gracilis* also present. Situated on mid to upper slopes in sometimes steep terrain on rocky clay soils, especially in the south east of the Stage 1B Project Area. Poor to moderate condition – weed impacts range from low to high, with a dominance of exotic understorey species in patches that are small or situated in areas of deeper and gentle slope. Patches in rugged terrain with shallow soils have less weeds, with light grazing pressure on palatable shrubs in the midstorey. ***Eucalyptus leucoxylon* ssp. *pruinosa* Open Woodland** A total of 0.84ha are included in the application. The woodland is an isolated patch in poor condition with a mid and understorey heavily impacted by grazing and weed infestations, with exotic grasses dominant in the understorey. The

	upper storey contains trees of value to the landscape, with old-growth and hollows present. ***Austrostipa* spp. Mixed Open Grassland** The most extensive Vegetation Association, with a total of 174.24ha included in this application. Grasslands are generally in poor condition, with some patches of moderate condition vegetation. Native plant species diversity is low, although higher in areas of better condition. Impacted throughout by high grazing pressure and weed cover. Known habitat for EPBC Act Endangered Pygmy Bluetongue Lizard. ***Triodia irritans* (Spinifex) Grassland +/- Emergent *Eucalyptus oleosa* ssp. *oleosa*** A total of 8.38ha are included in the application. Hummock grasslands ranging from open to mid-dense and dominated by *Triodia irritans.* There are few shrubs, with sparse low *Enchylaena tomentosa* and *Dodonaea baueri.* The grassland occurs on high, rocky ridge tops on skeletal soils in steep ranges in the south east of the Stage 1B Project Area. Weeds including *Carrichtera annua, Asphodelus fistulosus* and *Gomphocarpus cancellatus* are widespread and common, although cover is generally low. ***Phragmites australis* (Common Reed) Grassland** A total of 0.19ha is included in the application. Confined to the channel and banks of Burra Creek, with patches occurring interspersed with exotic grasslands. Found along the length of Burra Creek, with the impacted area limited to where access roads and cable runs cross the watercourse.
Total proposed clearance – area (ha) and/or number of trees:	202.41 hectares (ha) is proposed to be cleared for GWF 1 Stage 1B
Level of clearance:	Level 4
Overlay (Planning and Design Code):	Native Vegetation Overlay
Map of proposed clearance area:	Refer to Figure 3, map of proposed clearance area and Vegetation Associations.
Mitigation Hierarchy:	NEOEN have completed ecological assessment of the GWF 1 Stage 1B Project Area (as part of assessment for the broader Goyder South Project) to identify and understand potential impacts to flora and fauna (as outlined in Section 2.2.5). The findings and recommendations of the investigations and assessments have informed the design, siting and layout of infrastructure associated with the Goyder South Project, to ensure that impacts to flora and fauna are initially avoided where possible and if not avoidable, minimised as much as possible. As a result, NEOEN has reduced the maximum number of proposed wind turbines substantially from over 200 turbines to about 157 (across the whole Goyder South Project), implemented evidence-based buffers and setbacks and relocated other infrastructure to avoid impacts. As part of flora and fauna assessment for the Goyder South Project, ecological constraints including, but not limited to, Wedge-tailed Eagle and Peregrine Falcon nests (active and in-active), Peppermint Box (*Eucalyptus odorata*) Closed Woodland (potential EPBC Act Threatened Ecological Community), Lomandra grassland and potential Iron-grass Natural Temperate Grassland of South Australia TEC, Pygmy Blue-tongue Lizards (PBTLs) and PBTL habitat, and other threatened flora species such as *Dodonaea subglandulifera*, *Acacia spilleriana*, *Dodonaea procumbens* and *Olearia pannosa* ssp. *pannosa* were identified by EBS Ecology (2020) to assist NEOEN to avoid and/or minimise impacts to these ecological constraints as much as possible.

	To avoid and protect a particular area containing Wedge-tailed Eagle and Peregrine Falcon nests (active and in-active) and Peppermint Box (Eucalyptus odorata) Closed Woodland (potential TEC), as well as some individual PBTLs and PBTL habitat, NEOEN delineated an Ecological Protection Zone (EPZ) within the Goyder South Project Area, with the intention of limiting infrastructure within the EPZ. However, following further investigations, NEOEN adjusted the Project Area boundary to exclude majority of the EPZ from the Project Area, despite the EPZ incorporating a large part of the pre-existing and pre-approved Stony Gap Project. With the exclusion of the EPZ, NEOEN have removed approximately 18 wind turbines from the original number of turbines proposed in January 2019 and the overall footprint of the Project, together with the Project Area boundary, has changed (to avoid and minimise impacts to ecology). It is EBS Ecology's opinion that NEOEN have taken particular consideration of the Mitigation Hierarchy. NEOEN have undertaken a number of actions to avoid and minimise impacts on native vegetation including: • The site planning for the Goyder South Project covers an extensive area, which has enabled NEOEN to locate most of the infrastructure on cleared farming land (either grazed or cropped); • NEOEN have withdrawn all infrastructure from a sensitive area (the EPZ) in the north-western part of the project area that was previously approved (Development Approval) as part of the Stony Gap wind farm; • NEOEN has sought and obtained approval for micro siting of up to 200m to enable site sensitive responses for infrastructure that does not have locational flexibility (e.g., wind turbines). NEOEN also propose to work closely with the contractors to minimise the extent of clearance at the micro level. A Construction Environmental Management Plan (CEMP) will be implemented to avoid/minimise/mitigate impact to flora and fauna during construction. Please refer to Section 4.4 for more detail.
SEB Offset proposal	On-ground Please refer to Section 6 for more detail.

2. Purpose of clearance

2.1. Description

Clearance of native vegetation is required to develop *Goyder Wind Farm 1 Pty Ltd Stage 1B* (referred to as **GWF 1 Stage 1B**), which is part of the proposed Goyder South Hybrid Renewable Energy Facility (referred to as the Goyder South Project).

GWF 1 Stage 1B will consist of 37 Wind Turbine Generators (WTGs) and associated infrastructure including access tracks and underground cables, as well as a temporary construction compound. Further detail regarding Goyder South specifications and extent of the expected impact footprint is discussed in Section 2.4.

2.2. Background

2.2.1. Overview of Goyder South Hybrid Renewable Energy Facility

NEOEN Australia is proposing to construct the Goyder South Hybrid Renewable Energy Facility (the Goyder South Project) which is located between Burra and Robertstown.

The Goyder South Project combines wind, solar and energy storage in one integrated project. The facility will be capable of delivering a steady, reliable, dispatchable output of power throughout the day and night.

The Goyder South Project will generate more than 4,800,000 MWh of power annually and is comprised of:

- A wind farm of up to 163 turbines with a capacity of up to 1200MW, a maximum hub height of 160m, a maximum blade length of 80m and an overall maximum height (tip height) of 240m;
- A solar farm (across two sites) of up to 3000 ha of solar panels with a capacity of up to 600MW;
- An energy storage facility (lithium-ion battery) with a capacity of up to 900MW/1,800MWh (2 hours);
- Associated infrastructure for connection to the electricity grid including three substations, access tracks, underground connection cabling and overhead transmission lines;
- Permanent operations and maintenance compounds;
- Temporary construction compounds for both wind and solar components, including concrete batching plants; and
- A number of meteorological masts (in addition to those already on the site) to record wind speed and other meteorological data, both pre- and post- construction.

The Project Area for Goyder South begins approximately 5 km south of the centre of Burra and extends approximately 27 km south before terminating approximately 5 km north of Robertstown. It spans the Worlds End Valley with turbines located on the western and eastern ridge lines extending between Burra and Robertstown. The northern solar site is proposed in the centre of the Worlds End valley, on the western side of the Worlds End Highway, while the southern solar site would be located further south to the east of the eastern ridgeline in the locality of Bright. Both sites are cleared, previously cropped sites which avoids further native vegetation clearance.

Land within the Project Area is generally privately owned and comprises predominantly dryland cropping and some limited grazing. Prior to European settlement, the Ngadjuri people occupied the land.

The region has a relatively low population density and most residential premises are located in a number of towns, with Burra being the largest and a key regional service centre.

The Goyder South Project Area covers a total area of approximately 30,000 ha and has a total asset footprint of approximately 3,300 ha which represents slightly more than 10% of the total area. The wind turbines are dispersed over an area of approximately 28,000 ha but the footprint is approximately 0.1% of this. The two solar farms are located on sites of 1,342 ha (Bright) and 2097 ha (Worlds End) although the developable area (avoiding vegetation and drainage lines) is 996 ha and 1925 ha respectively.

The location of Goyder South has been selected on the basis of a number of critical factors:

- Clearly established, excellent wind and solar resources
- Suitable topography for both wind (elevation) and solar (flat, minimal flood risk)
- Appropriate existing land uses (marginal agricultural viability, supporting mixed land use)
- Proximity to the national electricity grid infrastructure (Robertstown substation) and the proposed EnergyConnect interconnector with NSW
- Strong support from landowners, neighbours and Council
- Accessibility for construction and on-going maintenance
- Large project scale and low density of dwellings enable generous setbacks from dwellings and sensitive ecological areas.

The Burra/Robertstown region is typical of the dryer areas of the mid north region which can experience cool to cold winters and warm to hot summers. This area is on the edge of Goyder's Line and has experienced drought conditions for the last three years. An increasing challenge for the region will be the potential impact of climate change on rainfall patterns and temperatures. Trends associated with climate change could have significant impacts on the viability of current agricultural activities.

Based on NEOEN's discussions with landholders and Council, a greater proportion of the land in and around the project, which was once used for cropping, is already transitioning to grazing, especially in the World's End valley, which has been accelerated by the drought conditions in recent years. A report prepared by the Climate Council in 2016 identified that a key barrier to adaptation is a 'lack of financial resources (that) is preventing many landholders from preparing for climate change'. This report identified renewable energy projects as one opportunity to provide an alternative source of income for landholders and to support economic growth.

In the longer term, landowners in this already marginal area may struggle with increasingly frequent and severe periods of drought. Given this, some may find the diversified and secure income associated with the Goyder South Project helpful in working towards drought resilience, and NEOEN's discussions with landowners have indicated that this has been one of their main motivations in deciding to participate in the project.

2.2.2. Staging of the Goyder South Project

As the Goyder South Project will total up to $3 billion in investment, NEOEN proposes to implement the Project in stages, with each stage having its own legal entity, construction contracts and financing packages. An overview of each stage is outlined in Table 3.

Table 3. Stages of the Goyder South Project.

Stage	Main infrastructure	Legal entity
GWF 1 Stage 1A	38 WTGs; access tracks; cables	Goyder Wind Farm 1A Pty Ltd
GWF 1 Stage 1B	37 WTGs; access tracks; cables	Goyder Wind Farm 1B Pty Ltd
Overhead Transmission Line and Substation West	Approximately 34 km of overhead transmission line and a substation to which both GWF 1 Stage 1A and GWF 1 Stage 1B will connect.	Goyder Wind Farm Common Asset Pty Ltd
Battery	Lithium-ion battery facility (900MW/1800MWh – 2 hours)	NEOEN Australia Pty Ltd

As such, NEOEN is seeking consideration of native vegetation impacts for each stage of the Goyder South Project separately.

2.2.3. Native Vegetation Clearance Application Context

This Native Vegetation Clearance Application is for **GWF 1 Stage 1B**. Separate Native Vegetation Clearance Applications will be submitted for two other stages of the Goyder South Project, as follows:

- GWF 1 Stage 1A
- Overhead Transmission Line and Substation

The 'Battery' stage does not require a Native Vegetation Clearance Application as the battery facility is proposed to be located within cropped land and will not impact upon any native vegetation.

2.2.4. Landscape context

Interim Biogeographical Regionalisation of Australia

The Interim Biogeographical Regionalisation of Australia (IBRA) is a landscape-based approach to classifying the land surface across a range of environmental attributes, which is used to assess and plan for the protection of biodiversity. Under the IBRA, the landscapes of South Australia (SA) are classified according to Bioregion, Subregion and Environmental Association.

The Project Area falls within the Flinders Lofty Block Bioregion, Broughton Subregion and the Burra Hills Environmental Associations. The typical landform, soil, geology and vegetation of each of these associations are summarised in Appendix 1.

Climate

Climate data was sourced from the Eudunda Weather Station (site number: 024511), located approximately 40 km south of the southern boundary of the Project Area and the closest weather recording station. The Project Area

experiences relatively hot maximum temperatures in summer, with mean maximum temperatures highest in January (29.4 degrees) and February (29.1 degrees). The wettest months are August (55.6 millimetres (mm)), June (51.8 mm) and July (51.2 mm) (Bureau of Meteorology, 2021).

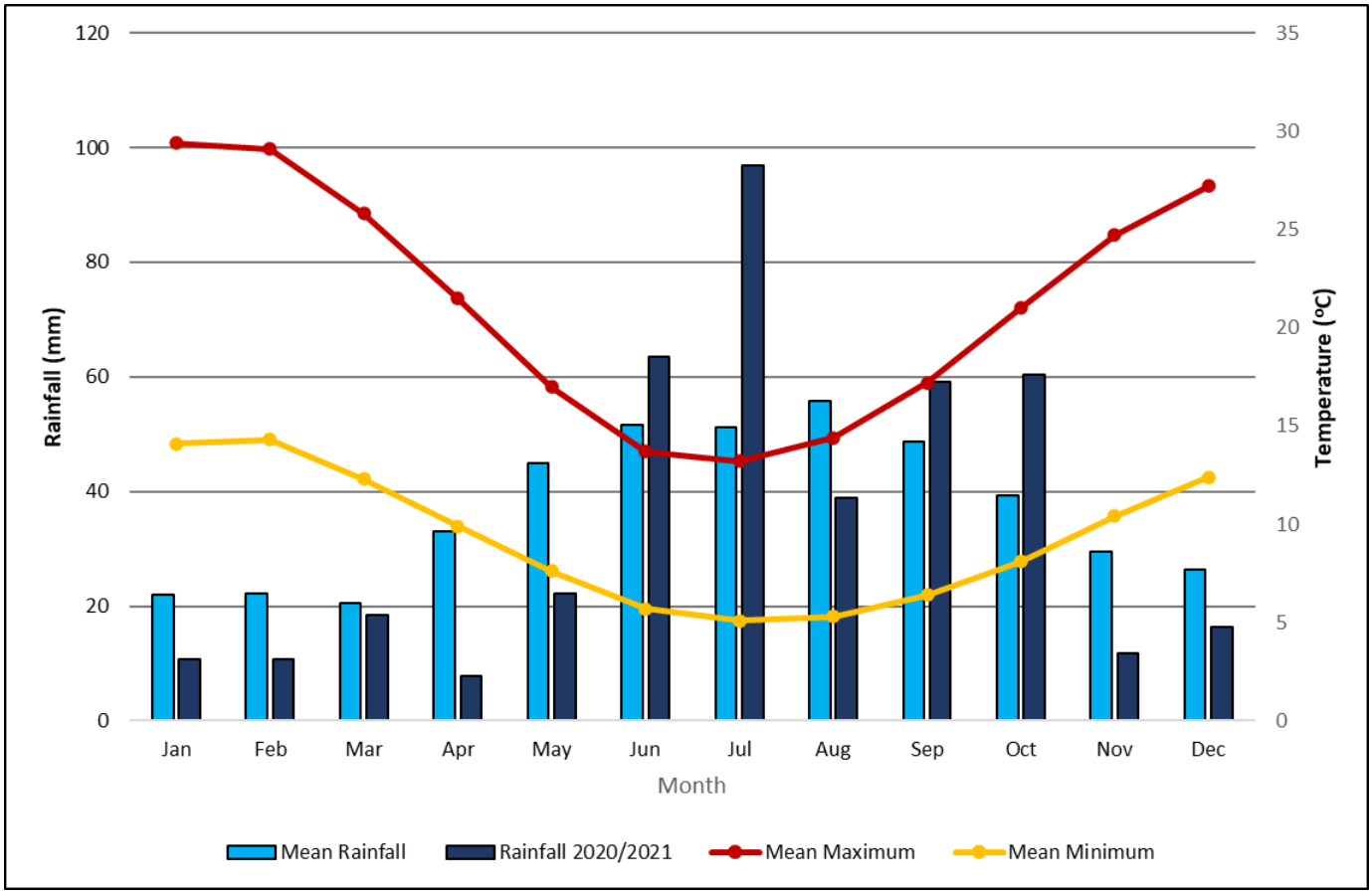

Figure 1. Mean monthly rainfall and maximum and minimum temperatures recorded at Eudunda Weather Station from 1965 to 2021. The graph also shows actual monthly rainfall from September 2020 to August 2021 (Bureau of Meteorology, 2021).

Watercourses and Wetlands

One named watercourse occurs in the GWF 1 Stage 1B Project Area: Burra Creek flows through the centre of the Project Area from the north to south (Figure 2). Burra Creek typically flows only after winter and spring rains, although it contains numerous semi-permanent waterholes, with remnant riparian vegetation in places. Extensive areas of cropping and exotic grassland also occur along the length of the creek.

Minor unnamed tributaries of Burra Creek and occur throughout the GWF 1 Stage 1B Project Area. All are ephemeral and generally do not contain riparian or aquatic vegetation.

There are no wetlands in the GWF 1 Stage 1B Project Area. The closest is Porter Lagoon, an ephemeral salt lake located approximately 5 km to the south-west.

Current Landuse

The Project Area is situated in an agricultural area, with land used for dryland agriculture, including cropping and grazing. Cropping areas contain little or no native vegetation. Land not used for cropping contains a mixture of exotic

and native pasture and remnant grassy woodland communities. These areas are currently used for cattle and sheep grazing.

2.2.5. Previous ecological studies

EBS Ecology has undertaken previous ecological studies of the Project Area on behalf of NEOEN and other parties since a wind farm was first proposed for the area in 2008. This includes both baseline flora and fauna studies and targeted surveys for threatened species and communities, as listed in Table 4. This Clearance Data Report in part draws on the findings of these studies to compliment the results of field work conducted in August 2021.

Reports documenting the most recent studies undertaken since 2019 are provided as Attachments 1, 2, and 3 as detailed below:

- Attachment 1: *Goyder Hybrid Renewable Energy Facility: Flora and Fauna Assessment*
- Attachment 2: *Goyder - Pygmy Blue-tongue Lizard Survey March 2021.*
- Attachment 3*: Goyder South Hybrid Renewable Energy Facility: Flora and Fauna Assessment Addendum.*

Older reports listed can be provided on request.

Table 4. Previous ecological studies of the Goyder Project Area.

Study	Year	Objectives	Reference
Baseline flora and fauna assessment.	2008	• Undertake a baseline survey of the Stony Gap Wind Farm Project (now Goyder Stage 1A and parts of Stage 1B)	EBS Ecology. (2008a). ***Stony Gap Wind Farm Flora Survey and Fauna Habitat Assessment.*** Adelaide: Report to Hydro Tasmania by EBS Ecology.
Targeted flora and fauna survey.	2008	• Undertake a flora survey targeted to proposed areas of impact. • Undertake targeted survey for Pygmy Blue-tongue Lizard and Flinders Ranges Worm Lizard. • Undertake a bat acoustic survey.	EBS Ecology. (2008b). ***Additional Stony Gap Wind Farm Flora and Fauna Survey November 2008.*** Adelaide: Report to Hydro Tasmania by EBS Ecology.
Targeted flora and fauna survey and vegetation mapping.	2011	• Undertake a flora survey targeted to proposed areas of impact. • Survey for raptor nests. • Map areas of suitable habitat for threatened species.	EBS Ecology. (2011). ***Stony Gap Wind Farm – Additional Flora and Fauna Assessment November and December 2010.*** Adelaide: Unpublished report to Hydro Tasmania by EBS Ecology.
Baseline flora and fauna assessment.	2012	• Baseline flora and fauna survey of Stony Gap Stage 2. • Survey for raptor nests. • Map Vegetation associations. • Map habitat suitable for threatened species.	EBS Ecology. (2012). ***Stony Gap Stage 2 Flora and Fauna Survey.*** Adelaide: Unpublished report to TRUenergy by EBS Ecology.
Targeted flora and fauna survey	2013	• Refine existing vegetation and fauna habitat mapping based on revised impact footprint.	EBS Ecology. (2013). ***Stony Gap Stage 2 Additional Flora and Fauna Assessments.*** Adelaide: Unpublished report to Energy Australia by EBS Ecology.
Baseline flora and fauna assessment.	2020	• Undertake a desktop assessment to determine the likelihood of occurrence of threatened species and communities. • Undertake field surveys to map native vegetation, ground truth the results of the	EBS Ecology. (2020). ***Goyder Hybrid Renewable Energy Facility: Flora and Fauna Assessment.*** Adelaide: Report to NEOEN by EBS Ecology.

Study	Year	Objectives	Reference
		desktop study and determine the habitat value of the Project Area. • Identify ecological constraints to consider for Project design.	
Targeted Pygmy Blue-tongue Lizard survey	2021	• Determine the presence/absence of Pygmy Blue-tongue Lizards in the proposed impact footprint of the project.	EBS Ecology. (2021a). ***Goyder - Pygmy Blue-tongue Lizard Survey March 2021.*** Adelaide: Report to NEOEN by EBS Ecology.
Targeted survey of Iron-grass Natural Temperate Grassland (INTG) Threatened Ecological Community.	2021	• Field survey of areas mapped as INTG by EBS Ecology 2020. • Determine the condition class of INTG patches according to EPBC Act criteria. • Map INTG according to condition classes A, B or C.	EBS Ecology. (2021b). ***Goyder South Hybrid Renewable Energy Facility: Flora and Fauna Assessment Addendum.*** Adelaide: Report to NEOEN by EBS Ecology.

2.3. General location map

The proposed **GWF 1 Stage 1B** Project Area is approximately 4209.31ha in size and located in the centre of the northern extent of the Goyder South Project.

The Project Area is approximately 5.5km south of Burra and located between Koonoona Road and Top Road. It is approximately 11km long (north-south) and 7km wide (west-east) and located within the suburb of Burra and within the Regional Council of Goyder as shown in the map in Figure 2.

The extents of each Project Area and corresponding native vegetation blocks are shown in Table 5.

Table 5. Project Area attributes.

Project Area	Extent (ha)	Native Vegetation Blocks	Total Native Vegetation Extent (ha)	Total Native Vegetation Impact (ha)
GWF 1 Stage 1B	4226.36	BA	3788.28	202.41

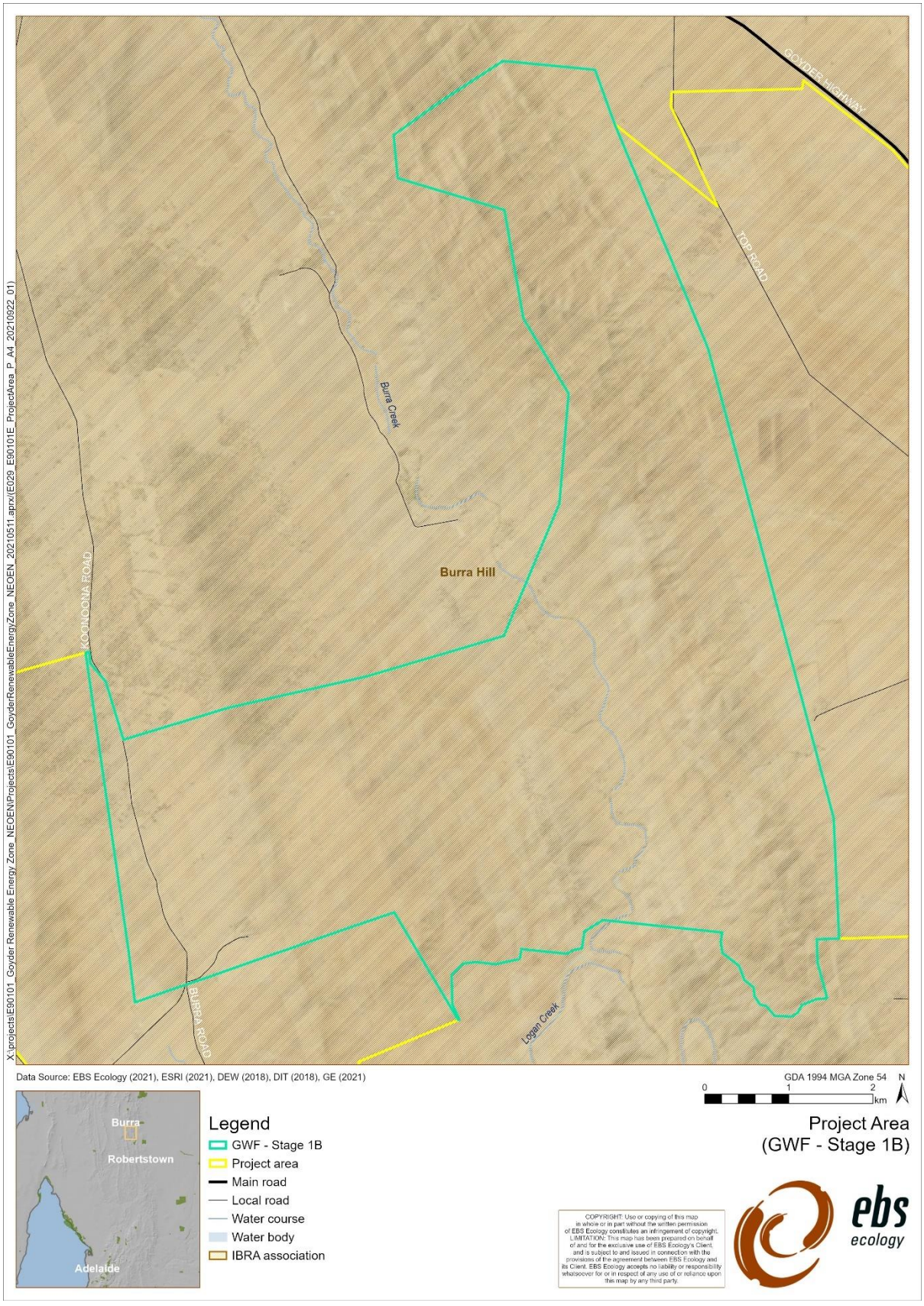

Figure 2. General location map of GWF 1 Stage 1B. The map also shows IBRA environmental associations and watercourses.

2.4. Details of the proposal

The proposal involves the construction and operation of 37 wind turbine generators (WTGs) and associated infrastructure for **GWF 1 Stage 1B** (as part of the Goyder South Project).

Wind Turbine Generators (WTGs)

The 37 WTGs will have a maximum height of 240m (200m for WTGs B017, B010 and B024 near Burra), a maximum blade length of 80m, a maximum rotor diameter of 160m and a maximum hub height of 160m. Blades will have non-reflective coatings. Footings may be either a mass concrete footing (raft style), pile-type rock anchors, or a combination of both, and up to 26m in diameter, the vast majority of which would be buried. Each WTG will also have a crane hardstand area of 50m x 30m.

Access tracks

Access tracks will be constructed to provide access throughout **GWF 1 Stage 1B**. The access tracks will be up to 10m wide during the construction phase to accommodate construction activities and cranes and designed to be of acceptable gradient for South Australian Country Fire Service (CFS) vehicles. Following construction, access tracks will be rehabilitated and reduced to the minimum widths requested by CFS (likely to be 7m).

Where required, stormwater drainage, such as open swale drains of between 1-3m in width, will be constructed adjacent to access tracks. In addition, in some sections of access track, batter slopes of between approximately 1-5m may be required.

Underground cables

Underground cabling will connect the WTGs to Substation West (which is part of a separate stage). Underground cabling for electrical transmission (33kV) and communications (fibre) will generally be located immediately adjacent to access tracks. It will be installed via trenching, which will be approximately 500mm wide per circuit and approximately 1.2m deep, with 900mm coverage over the top of the cables. However, the impact width during installation will be approximately 5m for single cables, plus 1m for each additional cable, as required, with a maximum of 8 cable circuits in some locations.

Temporary construction compound

A fenced construction compound area of approximately 200m x 420m will be required and will include a site office, staff facilities, a workshop, carpark and laydown/storage area. This will only be a temporary facility and will be rehabilitated post construction.

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

Native Vegetation Act 1991

This native vegetation clearance data report is for the construction and operation of 37 WTGs and associated infrastructure described above (in Section 2.4) for **GWF 1 Stage 1B**. Separate applications in the form of native vegetation clearance data reports will be submitted for other components (stages) of the Goyder South Project, including “GWF 1 Stage 1A” and the “Overhead Transmission Line and Substation West”.

Planning, Development and Infrastructure Act 2016 **(previously *Development Act 1993*)**

The Goyder South Hybrid Renewable Energy Facility (Application ID: 5332; Application number: 422/V009/20) received Development Approval on 3 March 2021.

Environment Protection and Biodiversity Conservation Act 1999

Ecological assessment for the Goyder South Project identified the following MNES:

- Peppermint Box (*Eucalyptus odorata*) Grassy Woodland of South Australia Threatened Ecological Community (TEC) – listed as Critically Endangered under the EPBC Act
- Iron-Grass Natural Temperate Grassland of South Australia (INTG) TEC – listed as Critically Endangered
- Pygmy Blue-tongue Lizard (PBTL (*Tiliqua adelaidensis*) – listed as Endangered under the EPBC Act
- *Dodonaea subglandulifera* (Peep Hill Hop-bush) – listed as Endangered under the EPBC Act
- *Acacia spilleriana* (Spiller's Wattle) - listed as Endangered under the EPBC Act
- *Dodonaea procumbens* (Trailing Hop Bush) – listed as Vulnerable under the EPBC Act
- *Olearia pannosa* ssp. *pannosa* (Silver Daisy-bush) – listed as Vulnerable under the EPBC Act

As significant impact assessment determined that the Goyder South Project has the potential to have a significant impact on MNES, the Project has been referred to the Department of Agriculture, Water and the Environment (DAWE) for assessment in accordance with the EPBC Act.

Environment Protection Act 1993

The construction contractor may require an Earthworks Drainage Licence during construction.

National Parks and Wildlife Act 1972

EBS Ecology has a Scientific Research Permit (K25613-20) which allows for flora collection.

Landscape South Australia Act 2019

The Goyder South Project requires a Water Affecting Activities Permit, which will be obtained prior to any works impacting a water course.

A permit may also be required to transport any declared weeds on a public road.

The requirement for these permits will be discussed with the Northern and Yorke Landscape Management Board and permits obtained where necessary.

Aboriginal Heritage Act 1988

The Goyder South Project requires approval/authorisation under the Aboriginal Heritage Act 1988 and has sought authorisation under Section 21, Section 23 and Section 29 of the Act, with the application currently with the Department of Premier and Cabinet, Aboriginal Affairs and Reconciliation (DPC-AAR) and State Heritage Committee.

***Native Title Act 1993* (Commonwealth) / *Native Title Act 1994* (SA)**

The Goyder South Project does not require approval/authorisation under the Commonwealth *Native Title Act 1993* or SA *Native Title Act 1994*.

2.6. Native Vegetation Regulation

The proposed clearance is suggested to be assessed under Schedule 1 *Regulation 12 (34) Infrastructure*.

34 — Infrastructure

(1) 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 Development Act 1993 has been obtained.

2.7. Development Application information

The Goyder South Hybrid Renewable Energy Facility (Application ID: 5332; Application number: 422/V009/20) received Development Approval on 3 March 2021.

Zone: Rural / Primary Production Zone
Subzone: -
Overlay: Native Vegetation Overlay

3. Method

3.1. Flora assessment

The flora assessment was undertaken by NVC Accredited Consultant Jesse Carpenter from 16 – 18 August 2021 in accordance with the Bushland Assessment Method (BAM) (Native Vegetation Council , 2020).

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 PMST, and fauna with 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.

3.2. Fauna assessment

A desktop assessment was undertaken to determine the potential for any threatened fauna species, and Threatened Ecological Communities (TECs) (both Commonwealth and State listed) to occur within the Project Area. This was achieved by undertaking database searches using a 5 km buffer of the Project Area (Search Area).

3.2.1. PMST report

A Protected Matters Search Tool (PMST) report was generated on 6/9/2021 to identify nationally threatened flora and fauna, migratory fauna and TECs under the EPBC Act relevant to the Project Area (Department of Agriculture, Water and the Environment, 2021). Only species and Threatened Ecological Communities (TEC) identified in the PMST report that are known to occur within the Search Area were assessed for their likelihood of occurrence within the Project Area.

3.2.2. BDBSA data extract

A data extract from the Biological Database of South Australia (BDBSA) was obtained from NatureMaps to identify flora and fauna species that have been recorded within 5 km of the Project Area (data extracted 4/8/2021; DEW 2021). 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 Australasian Wader Study

Group, which meet the Department for 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 have been undertaken within the Project Area since 2008 and have included both baseline and targeted surveys for the following:

- Threatened species including the Pygmy Blue-tongue Lizard (*Tiliqua adelaidensis*) and Flinders Ranges Worm Lizard (*Aprasia pseudopulchella*).
- Raptors and raptor nests, including Wedge-tailed Eagle (*Aquila audax*).
- Bats.
- Birds.

Surveys have been conducted in both autumn and spring to account for seasonal movements of fauna and activity such as raptor nesting.

Methods used for these targeted surveys are summarised in Table 6. Other fauna survey methods are documented in the reports listed in Section 2.2.2, including the Attachments 1, 2 and 3.

In 2020, fauna surveys were undertaken in line with the Clean Energy Council's (CEC) *Best Practice Guidelines For Implementation of Wind Energy Projects in Australia* (Clean Energy Council, 2008). According to the guidelines, the aim of the fauna habitat survey should be aimed at identifying important habitat components that are on site including (EBS Ecology, 2020):

- Vegetation communities that support a particular suite of fauna e.g., native grassland species and specific fauna species.
- Trees with hollows which provide shelter sites for arboreal mammals, nest sites for birds and roost/maternity sites for bats.
- Lakes, dams, ponds and streams that may provide habitat for waterbirds and frogs.

Table 6. Survey methods used for targeted fauna surveys in the Project Area.

Survey	Year	Methods	Reference
Pygmy Blue-tongue Lizard	2008 2012 2020 2021	• Active searching of preferred habitat for the presence of spider holes. • Burrows were checked using a fibre optic scope for the presence of lizards.	EBS Ecology 2008b EBS Ecology 2013 EBS Ecology 2021a
Flinders Ranges Worm Lizard	2008 2013	• Active searching of preferred habitat for the species, including looking under rocks, leaf litter and vegetation cover.	EBS Ecology 2008b EBS Ecology 2013
Raptor nests	2020	• Woodland areas assessed for potential nesting locations for Peregrine Falcon (*Falco peregrinus*) and Wedge-tailed Eagle. • Suitable areas searched for the presence of nests. • Nests targeted during spring surveys to determine their activity status.	EBS Ecology 2020
Bats		• Recording of ultrasonic echolocation calls using Anabat detectors. • Harp traps set for three consecutive nights.	EBS Ecology 2008b EBS Ecology 2012
Birds	2012 2020	• Fixed point count method, an observer spending 20 minutes at each point. • Area search method, an observer spending 20 minutes searching a 1-hectare area.	EBS Ecology 2012 EBS Ecology 2013

During this survey, dedicated bird surveys were undertaken at each BAM site. Surveys were undertaken using the area search method, whereby an observer actively searches a one-hectare area for birds. A set time period of 20 minutes was used for each search. Sites were surveyed only once.

Other fauna was recorded opportunistically while undertaken the vegetation survey. Any fauna observations made within the Project Area were recorded.

3.2.4. Likelihood of occurrence

The criteria for the likelihood of occurrence of threatened species within the Project Area are described in Table 7.

Table 7. 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

Geology and soils

The Project Area is centred on the Bald Hills Range, an area of moderately steep undulating hills interspersed with deep valleys.

Outcropping of sedimentary rocks such as siltstone and sandstone occurs on the higher hills, while valley floors contain alluvial deposits of gravel, sand and colluvium. Soils range from shallow clays and clay-loams over rock on the hills to deep loams and clay-loams in valleys.

Protected areas

There are no protected areas within the Goyder South development. However, several occur within 5 km of the Project Area. These are listed in Table 8.

Table 8. Protected areas near the Goyder South Project Areas.

Protected Area	Type	Location
Hopkins Creek	Conservation Park	2.7 km south of GWF 1 Stage 1B
HA 1520	Heritage Agreement	4 km south of GWF 1 Stage 1B
HA 1221	Heritage Agreement	3 km north-west of GWF 1 Stage 1B

Vegetation condition summary

Areas with deeper soil and of least slope have been extensively cleared and cultivated for growing crops and contain little or no native vegetation, with vegetation consisting of either crops or exotic grassland. Where these areas have not been cleared or cultivated recently, chenopod shrublands occur such as at the north-eastern section of the transmission line.

Elsewhere, hills historically cleared of native vegetation contain small, isolated patches of *Eucalyptus* sp., *Allocasuarina* sp. or *Callitris* sp. grassy woodland interspersed with open exotic or native grassland dominated by *Austrostipa* spp. or *Lomandra* spp. (Figure 4). Steep, rugged and difficult to access hills contain larger patches of remnant woodland, mallee and shrublands, sometimes with a *Triodia* understorey (Figure 5).

Native grasslands are generally in poor condition (Figure 6) and vary little throughout the Project Area. However, there are some areas in a moderate condition (Figure 7), particularly some patches dominated by *Lomandra* spp. Some grasslands include emergent trees or long-dead trees and logs indicating they were probably once woodland. Other vegetation types vary considerable in condition, ranging from poor to good, depending on land use history, current land use and topography.

Regardless of condition, all vegetation in the Project Area is impacted by grazing and weed encroachment. Grassland associations appear heavily grazed, with palatable emergent shrubs often over-utilised with little or no regeneration occurring (Figure 8). Some regeneration of shrubs was observed within grasslands where steep terrain or rock outcrops provided some protection from grazing (Figure 9).

Thirty-nine species of weeds were recorded, including seven species of plants Declared under the *Landscape South Australia Act 2019* (LSA Act) (Table 9). A further 40 weed species have been recorded by previous surveys. Weed cover of species such as *Carrichtera annua* (Wards Weed) was high throughout most of the Project Area (Figure 10).

Eighty-six species of native plants were recorded during this survey, with a further 65 species recorded by past surveys (Appendix 2).

Remnant woodland provides important habitat in the project Area, which is largely otherwise treeless. Grasslands in better condition also provide habitat, particularly for the EPBC Act Endangered species Pygmy Blue-tongue Lizard. Hill tops and steep slopes often have significant rock outcrops that are known to provide habitats for fauna such as bats and reptiles.

Table 9. Plants Declared as weeds under the *Landscape South Australia Act 2019* recorded during the survey.

Scientific Name	Common Name	Vegetation Association
Asphodelus fistulosus	Onion Weed	VA3, VA8, VA14
Cynara cardunculus	Artichoke Thistle	VA8
Diplotaxis tenuifolia	Lincoln Weed	VA3,
Echium plantagineum	Salvation Jane	VA8
Lycium ferocissimum	African Boxthorn	VA3, VA8
Marrubium vulgare	Horehound	VA3, VA8, VA14
Silybum marianum	Variegated Thistle	VA3, VA8, VA14

Vegetation Association summary

Vegetation Associations (VA) were mapped by EBS Ecology in 2020 (EBS Ecology, 2020) and further refined considering the results of this survey. Twenty-four VA were mapped in total, as listed in Table 10, with those in the GFW 1 Stage 1B shown in Figure 3. Of these, only five will be impacted by **GWF 1 Stage 1B**, as indicated in Table 10.

The five VA impacted by **GWF 1 Stage 1B** are described in further detail in Section 4.1.2. All other VA have been described in EBS Ecology 2020 (Attachment 1).

Table 10. Vegetation Associations (VA) mapped in the Goyder South Project Area. The table indicates the total extent of each VA and the extent expected to be impacted by the Goyder South project.

VA Code	VA Description	Project Area Total Extent (ha)	Total Area Impacted (ha)	Per-cent Impacted
VA1	*Maireana aphylla* (Cotton-bush) / *Atriplex stipitata* (Bitter Saltbush) Mixed Low Open Chenopod Shrubland.	0	0	0
VA2	*Lomandra multiflora* ssp. *dura* (Hard Mat-rush) / *Lomandra effusa* (Scented Mat-rush) Mixed Open Grassland.	0	0	0
VA3	*Eucalyptus porosa* (Mallee Box) Open Woodland.	335.30	18.76	9
VA4	*Eucalyptus odorata* (Peppermint Box) Closed Woodland.	38.73	0	
VA5	*Eucalyptus oleosa* ssp. *oleosa* (Red Mallee) Mixed Open Mallee.	0	0	
VA6	*Eucalyptus leucoxylon* ssp. *pruinosa* (Inland South Australian Blue Gum) Open Woodland.	87.05	0.84	0.9
VA7	*Eucalyptus camaldulensis* ssp. *camaldulensis* (River Red Gum) Woodland.	1.11	0	0
VA8	*Austrostipa* spp. (Spear Grass) Mixed Grassland.	3315.70	174.24	5
VA9	Exotic Grassland.	0	0	0
VA10	*Callitris gracilis* (Southern Cypress Pine) Low Open Woodland.	2.89	0	0
VA11	*Juncus* sp. (Rush) / *Cyperus gymnocaulos* (Spiny Flat-sedge) Mixed Low Closed Sedgeland.	6.73	0	0
VA12	*Alectryon oleifolius* ssp. *canescens* (Bullock Bush) Low Open Woodland.	0	0	0
VA13	*Atriplex nummularia* (Old-man Saltbush) Plantation.	0	0	0
VA14	*Triodia irritans* (Spinifex) Grassland +/- Emergent *Eucalyptus oleosa* ssp. *oleosa* (Red Mallee).	109.03	8.38	8
VA15	*Dodonaea lobulata* (Lobed-leaf Hop-bush) Shrubland.	0	0	0
VA16	*Beyeria lechenaultii* (Pale Turpentine Bush) Low Shrubland.	0	0	0
VA17	*Phragmites australis* (Common Reed) Grassland.	54.45	0.19	0.3
VA18	*Senna* spp. (Senna) / *Acacia rigens* (Nealie) Mixed Shrubland over Chenopod Shrubs.	0	0	0
VA19	*Nitraria billardierei* (Nitre-bush) Low Shrubland.	0	0	0
VA20	*Maireana pyramidata* (Black Bluebush) Low Shrubland.	0	0	0
VA21	*Eucalyptus gracilis* (White Mallee) Open Woodland	0	0	0
VA22	*Eucalyptus porosa* Open Woodland over *Eremophila* sp., *Acacia papyrocarpa* and *Maireana* spp.	0	0	0
VA23	*Eucalyptus porosa* / *Eucalyptus gracilis* Mixed Mallee	0	0	0
VA24	*Allocasuarina verticillata* Open Woodland over *Bursaria spinosa* ssp. *spinosa* and *Austrostipa* spp.	0	0	0
TOTAL		3950.99	202.41	5

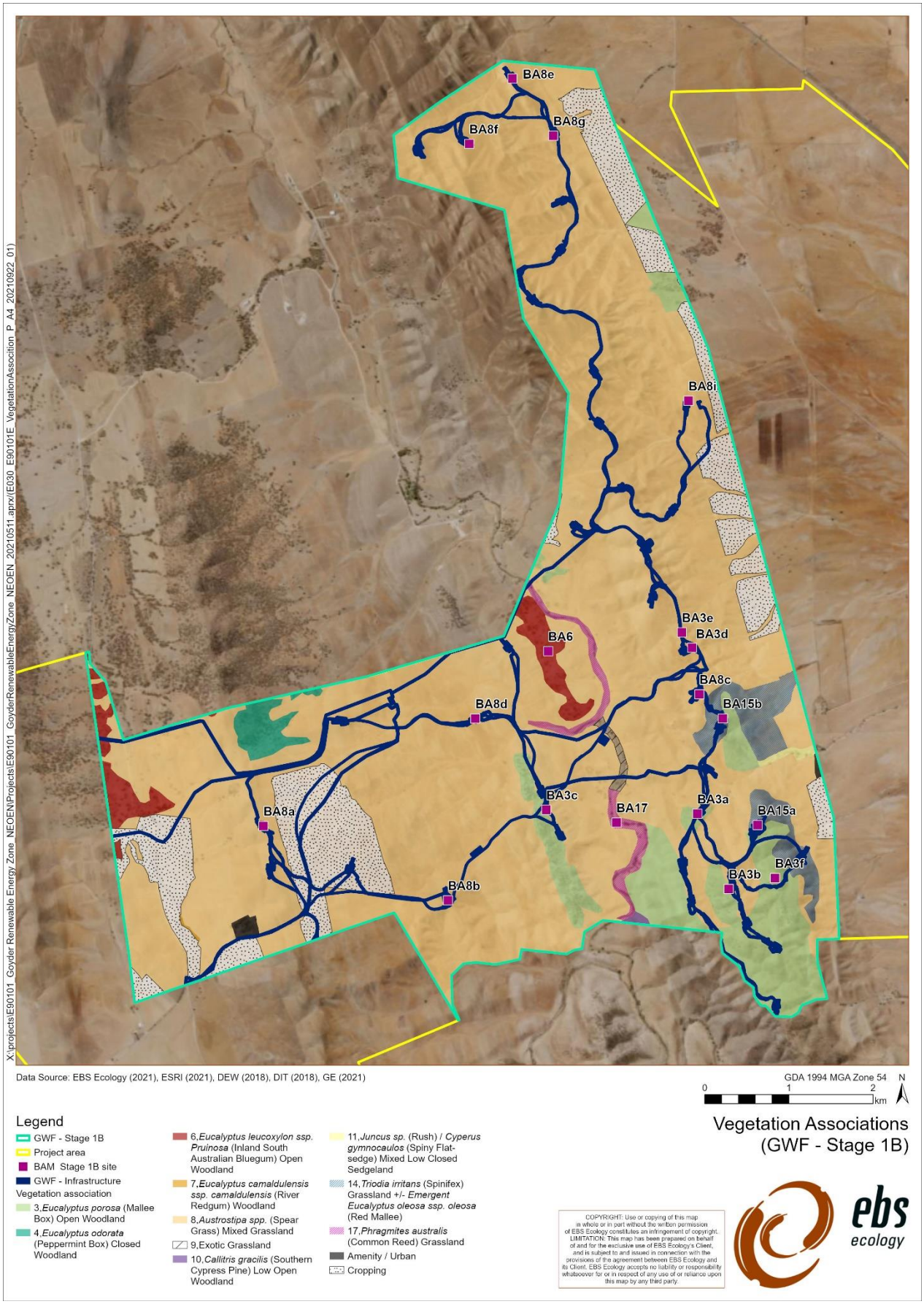

Figure 3. Vegetation Associations of the GWF 1 Stage 1B Project Area. The impact footprint is also shown.

4.1.2. Details of the vegetation associates/scattered trees proposed to be impacted

Of the 24 VA in the Goyder South Project Area, it is expected that only three will be impacted by the GWF 1 Stage 1B development. These associations are described in Table 11 to Table 15.

Table 11. Summary of VA3.

Vegetation Association	*Eucalyptus porosa* (Mallee Box) Open Woodland
Benchmark Community	Northern Agricultural 3.1 Woodlands with an Open Grassy Understorey.
BAM survey sites	BA3a BA3b BA3c BA3d BA3e BA3f

BA3a

BA3b

BA3c

BA3d

<table>
<tr><td colspan="3"> 
BA3e</td><td colspan="3"> 
BA3f</td></tr>
<tr><td>General description</td><td colspan="5">Low open woodland to woodland with an overstorey dominated by Eucalyptus porosa, with either Allocasuarina verticillata or Callitris gracilis also present. Patches in better condition have a sparse mid-storey of low shrubs including Enchylaena tomentosa, Dodonaea viscosa and Rhagodia parabolica with a grassy understorey of Austrostipa spp., Rytidosperma spp. and Lomandra multiflora ssp. dura and forbs such as Oxalis perennans, Vittadinia cuneata, Minuria leptophylla, Goodenia pinnatifida and Caesia calliantha. Patches in poor condition often lack a shrub Midstorey, with an understorey dominated by exotic species such as Avena barbata, Salvia verbenaca and Carrichtera annua.
Situated on mid to upper slopes in sometimes steep terrain on rocky clay soils, especially in the south east of the Stage 1B Project Area.
Weed impacts range from low to high, with a dominance of exotic understorey species in patches that are small or situated in areas of deeper and gentle slope. Patches in rugged terrain with shallow soils have less weeds, with light grazing pressure on palatable shrubs in the midstorey.</td></tr>
<tr><td>Threatened species or community</td><td colspan="5">Flinders Ranges worm Lizard - Likely
Australian Bustard - Possible
Brown Quail – Highly Likely
Peregrine Falcon - Known
Blue-winged Parrot - Possible
Elegant Parrot – Known
White-winged Chough – Known
Little Eagle – Likely
Hooded Robin – Known
Black-chinned Honeyeater – Possible
Jacky Winter – Likely
Satin Flycatcher – Known
Restless Flycatcher – Known
Scarlet Robin – Possible
Striped Honeyeater – Possible
Diamond Firetail – Known
Common Brushtail Possum – Possible
Painted Button-quail – Possible
Philotheca angustifolia ssp. angustifolia – Known
Cryptandra campanulata – Known
Rumex dumosus – Known</td></tr>
<tr><td>Landscape context score</td><td>1.19</td><td>Vegetation Condition Score</td><td>34.10 (Mean)</td><td>Conservation significance score</td><td>1.10 (BA3c, BA3d, BA3e) – 1.18 (BA3a</td></tr>
<tr><td>Unit biodiversity Score</td><td>45.88 (Mean)</td><td>Area (ha)</td><td>18.76</td><td>Total biodiversity Score</td><td>860.69 (Mean)</td></tr>
</table>

Table 12. Summary of VA6.

Vegetation Association	*Eucalyptus leucoxylon* ssp. *pruinosa* (South Australian Blue Gum) Open Woodland
Benchmark Community	Northern Agricultural 3.1 Woodlands with an Open Grassy Understorey.
BAM survey sites	BA6
	
General description	Open woodland with a grassy understorey dominated by the overstorey species *Eucalyptus leucoxylon* ssp. *pruinosa*, with an understorey of exotic forbs and native grasses including *Austrostipa* spp., *Arctotheca calendula, Medicago* sp. and *Salvia verbenaca*. The association occurs in the north-east of the Project Area on western facing slopes on shallow clay-loam soils, with vegetation condition improving up slope, away from the impact footprint. Weeds are dominant in the understorey, although some native grasses and forbs are present, with the declared weed *Marrubium vulgare* recorded beneath tree canopies. The woodland is extensively grazed by stock and kangaroos. The association contains the largest trees in the Project Area, many of which contain at least small hollows. They represent an important habitat element in the wider landscape of the Project Area.

Threatened species or community	• Flinders Ranges worm Lizard - Likely • Fork-tailed Swift - Possible • Australian Bustard - Possible • Brown Quail – Highly Likely • Peregrine Falcon - Known • Blue-winged Parrot - Possible • Elegant Parrot – Known • White-winged Chough – Known • Little Eagle – Likely • Hooded Robin – Known • Black-chinned Honeyeater – Possible • Jacky Winter – Likely • Satin Flycatcher – Known • Restless Flycatcher – Known • Scarlet Robin – Possible • Striped Honeyeater – Possible • Diamond Firetail – Known • Common Brushtail Possum – Possible • Painted Button-quail - Possible				
Landscape context score	1.19	**Vegetation Condition Score**	29.05	**Conservation significance score**	1.1
Unit biodiversity Score	38.02	**Area (ha)**	0.84	**Total biodiversity Score**	31.94

Table 13. Summary of VA8.

Vegetation Association	*Austrostipa* spp. (Spear Grass) Mixed Grassland.
Benchmark Community	Northern Agricultural 3.1 Woodlands with an Open Grassy Understorey. Northern Agricultural 3.2 Grasslands
BAM survey sites	BA8a BA8b BA8c BA8d BA8e BA8f BA8g BA8i BA8j

BA8a

BA8b

BA8c

BA8d

BA8e

BA8f

BA8g

BA8i

BA8j

General description	This association is represented by mostly poor condition open grassland. Native and exotic grasses occur as co-dominant including *Austrostipa* spp., *Aristida behriana*, *Rytidosperma* sp. and *Avena barbata*. Beneath the grasses, the understorey is dominated by the exotic forbs *Erodium botrys, Romulea* sp. and *Morea setifolia.* Areas in better condition have a higher cover of native forbs and spring annuals such as *Oxalis perennans, Enchylaena enchylaenoides, Pauridia glabella and Bulbine bulbosa.* Trunk-sized logs and long-dead trees are present in some patches of this grassland indicating that they were, at least in some areas, previously part of a woodland community.

	The most widespread vegetation association in the Project Area, found wherever previously wooded areas have been cleared and soils have not been cultivated. It occurs in all landscape positions and on a range of soil types. These grasslands are subject to significant grazing pressure from stock, with areas dominated by introduced plant species and present little habitat value for fauna. However, they are recognised as important habitat for the threatened Pygmy Blue-tongue Lizard.				
Threatened species or community	• Pygmy Blue-tongue Lizard (EPBC Act Endangered) • Flinders Ranges worm Lizard - Likely • Fork-tailed Swift - Possible • Australian Bustard - Possible • Brown Quail – Highly Likely • Peregrine Falcon - Known • Blue-winged Parrot - Possible • Elegant Parrot - Known				
Landscape context score	1.19	**Vegetation Condition Score**	13.7 (Mean)	**Conservation significance score**	1.10
Unit biodiversity Score	17.94 (Mean)	**Area (ha)**	174.24	**Total biodiversity Score**	3125.19 (Mean

Table 14. Summary of VA11.

Vegetation Association	*Phragmites australis* (Common Reed) Grassland				
Benchmark Community	NA 7.1 Riparian Woodlands				
BAM survey sites	BA17				
					
General description	Dense grassland confined to within creek beds and watercourses. *Phragmites australis* dominates mid-channel, while *Cynodon dactylon* and *Distichlis distichophylla* occur higher up the bank in less-often inundated areas. The association occupies areas with shallow ephemeral surface water and riffles – there are no larger pools present. Dead trees and emergent *Eucalyptus camaldulensis* ssp. *camaldulensis* indicate that the area was probably a riparian woodland pre-clearance. The association is impacted by stock access, with grazing pressure high and weed cover high where cover of *Phragmites australis* is less.				
Threatened species or community	• Australian Bustard • Banded Stilt • Brown Quail • Peregrine Falcon • Spotted Crake • Blue-winged parrot • Elegant Parrot • Australian Painted Snipe				
Landscape context score	1.22	**Vegetation Condition Score**	22.53	**Conservation significance score**	1.10
Unit biodiversity Score	30.23	**Area (ha)**	0.19	**Total biodiversity Score**	5.74

Table 15. Summary of VA14.

Vegetation Association	*Triodia irritans* (Spinifex) Grassland +/- Emergent *Eucalyptus oleosa* ssp. *oleosa*				
Benchmark Community	Northern Agricultural 3.2 Grasslands				
BAM survey sites	BA14a BA14b				
 **BA14a**			 **BA14b**		
General description	Hummock grasslands ranging from open to mid-dense and dominated by *Triodia irritans.* There are few shrubs, with sparse low *Enchylaena tomentosa* and *Dodonaea baueri.* Tussock grasses including *Austrostipa* spp. and *Cymbopogon ambiguous* occur in the understorey. There are very sparse emergent *Eucalyptus oleosa* ssp. *oleosa* and *Eucalyptus porosa* present. The grassland occurs on high, rocky ridge tops on skeletal soils in steep ranges in the south east of the Stage 1B Project Area. Weeds including *Carrichtera annua, Asphodelus fistulosus* and *Gomphocarpus cancellatus* are widespread and common, although cover is generally low.				
Threatened species or community	• Flinders Ranges worm Lizard - Likely • Fork-tailed Swift - Possible • Australian Bustard - Possible • Brown Quail – Highly Likely • Peregrine Falcon - Known • Blue-winged Parrot - Possible • Elegant Parrot – Known • *Philotheca angustifolia* ssp. *angustifolia* – Known				
Landscape context score	1.19	**Vegetation Condition Score**	38.78 (Mean)	**Conservation significance score**	1.08
Unit biodiversity Score	49.83 (Mean)	**Area (ha)**	8.38	**Total biodiversity Score**	417.58 (Mean)

4.1.3. Site map showing areas of proposed impact

A map showing the proposed design of the project including the impact footprint and the vegetation subject to this clearing application is provided as Figure 3. The map indicates the location of BAM survey sites. Note that the map shows vegetation mapping for the entire Project Area, only a proportion of which will be impacted, with the impact footprint of **GWF 1 Stage 1B** shown in the Figure.

4.1.4. Photo log

Figure 4. Small patches of remnant woodland (far left and far right) interspersed with exotic and native grasslands. Typical vegetation of areas with steeper terrain in the Project Area.

Figure 5. Larger patches of woodland and mallee on steep, rugged slopes in the south-east of the Project Area.

Figure 6. *Austrostipa* spp. grassland in poor condition with very low diversity and cover of native species. The presence of emergent trees and trunk-sized logs indicates that this was probably once a woodland.

Figure 7. *Austrostipa* spp. grassland in moderate condition. This area has a higher number of native plant species and a much greater cover of *Austrostipa* spp. tussocks.

Figure 8. Heavily grazed Dodonaea viscosa. This is typical of the level of grazing impact to palatable shrubs in heavily grazed parts of the Project Area.

Figure 9. Shrubs, such as these *Correa glabra* var. *turnbullii*, were present in grassland associations where they were protected from grazing.

Figure 10. Dense ground cover of *Carrichtera annua* (Ward's Weed) at the edge of *Eucalyptus porosa* woodland.

4.2. Threatened species assessment

4.2.1. Threatened fauna

The database search identified 47 threatened and migratory fauna species as having potential to occur within 5 km of the Project Area. Given vegetation and habitat occurring on the site, 24 have been assessed as at least possible of occurring in the Project Area, and these are listed in Table 16. An assessment of likelihood for all 47 species is provided in Appendix 3.

Throughout the history of the project, surveys have recorded 122 species of fauna, including one frog, six reptiles, 21 mammals and 94 bird species in the Project Area and adjoining stages of the Project (Appendix 4). This includes eight threatened species:

- White-winged Chough (*Corcorax melanorhamphos*); NPW Act Rare.
- Peregrine Falcon (*Falco peregrinus*); NPW Act Rare.
- Hooded Robin (*Melanodryas cucullata*); NPW Act Rare.
- Satin Flycatcher (*Myiagra cyanoleuca*); NPW Act Endangered.
- Restless Flycatcher (*Myiagra inquieta*); NPW Act Rare.
- Elegant Parrot (*Neophema elegans*); NPW Act Rare
- Diamond Firetail (*Stagonopleura guttata*); NPW Act Vulnerable.
- Pygmy Blue-tongue Lizard (*Tiliqua adelaidensis*); EPBC Act Endangered.

Two of these species, White-winged Chough and Diamond Firetail, were again recorded during this survey. The locations of Pygmy Blue-tongue Lizard (PBTL) records collected by EBS Ecology are mapped in Figure 11.

Four Wedge-tailed Eagle nests occur in the **GWF 1 Stage 1B** Project Area (Figure 11). Three were found to be in a moderate condition, with the nest in the western Project Area in a poor state and unlikely to have been used for some time.

Due to topography and access constraints, the nest in the south-eastern corner of the Project Area was not located until after the design of the project, including the sites of WGTs, was complete.

Table 16. Likelihood of occurrence of threatened fauna identified in the desktop assessment. The data source and threat levels are described in the table footer.

Scientific Name	Common Name	EPBC Act	NPW Act	Date of last record	Data Source	Species known habitat preferences	Likelihood of use for habitat
Aprasia pseudopulchella	Flinders Worm-lizard	VU		2016	1, 2	The Flinders Ranges Worm-lizard is known from the Flinders Ranges of South Australia, extending south to the western slopes and northern and central Mount Lofty Ranges. It is also found in the northern suburbs of Adelaide and the Mount Remarkable National Park. The species is known to occur within the Adelaide and Mount Lofty Ranges and the South Australian Arid Lands Natural Resource Management Region. Occurs in open woodland, native tussock grassland, riparian habitats and rocky isolates.	Likely
Apus pacificus	Fork-tailed Swift	Mi			2	Widespread but almost exclusively aerial. Mostly occur over inland plains and dry or open habitats.	Possible
Ardeotis australis	Australian Bustard		V	2018	1	Mainly occurs in inland Australia and is now scarce or absent from southern and south-eastern Australia. Mainly inhabits tussock and hummock grasslands, though prefers tussock grasses to hummock grasses; also occurs in low shrublands and low open grassy woodlands; occasionally seen in pastoral and cropping country, golf courses and near dams.	Possible
Cinclosoma castanotum	Chestnut-backed Quailthrush (Chestnut Quailthrush)		R	2012	1	Endemic to arid and semi-arid southern Australia, reaching its northern extent in the south of the Northern Territory. Throughout its distribution it occurs in a wide range of arid and semi-arid habitats; mainly in the low shrubs and undergrowth of mallee scrub, but also in Acacia scrubs, dry sclerophyll woodland, heath, and native pine.	Possible
Cladorhynchus leucocephalus	Banded Stilt		V	2003	1	Found mainly in saline and hypersaline (very salty) waters of the inland and coast, typically large, open and shallow wetlands.	Possible
Corcorax melanorhamphos	White-winged Chough		R	2021	1, 3, 5	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.	Known
Coturnix ypsilophora australis	Brown Quail		V	2015	1	Found across northern and eastern Australia, from the Kimberley region in Western Australia to Victoria and Tasmania, as well as in south-western Australia. It is also found in Papua New Guinea and Indonesia, and has been introduced to New Zealand. Prefers dense grasslands, often on the edges of open forests, and bracken. May sometimes be seen alongside roads.	Highly likely
Falco peregrinus macropus	Peregrine Falcon		R	2012	1, 3	This species prefers open habitats such as grasslands, tundra and meadows and nests on cliff faces and in crevices. It has an extremely large range and is found world-wide except for rainforests and cold, dry Arctic regions. This species has increasingly been observed inhabiting urban areas.	Known

Scientific Name	Common Name	EPBC Act	NPW Act	Date of last record	Data Source	Species known habitat preferences	Likelihood of use for habitat
Hieraaetus morphnoides	Little Eagle		V	2016	1	The Little Eagle is widespread in mainland Australia, central and eastern New Guinea. It is seen over woodland and forested lands and open country, extending into the arid zone. It tends to avoid rainforest and heavy forest.	Likely
Melanodryas cucullata cucullata	Hooded Robin (YP, MN, AP, MLR, MM, SE)		R	2019	1, 3	Occurs across south-eastern Australia, most of NSW, VIC and south-eastern SA. South-eastern subspecies found in Eucalypt woodland and Mallee and Acacia shrubland.	Known
Melithreptus gularis	Black-chinned Honeyeater		V	2006	1	The Black-chinned Honeyeater is found in the upper levels of open eucalypt forests and woodlands dominated by box and ironbark eucalypts. It is often found along waterways, especially in arid and semi-arid areas and in northern Australia. It is occasionally seen in gardens and street trees.	Possible
Microeca fascinans fascinans	Jacky Winter (MLR, SE)		R	2017	1	Widely distributed throughout mainland Australia. Prefer open woodland (Eucalypt and mallee) with an open shrub layer and bare ground. Often seen in farmland and parks.	Likely
Myiagra cyanoleuca	Satin Flycatcher	Mi	E	2019	1, 2, 3	Known inhabitant of forest, woodland, mangroves and coastal heath scrub. Prefers dense, wet gullies of heavy eucalypt forest in breeding season.	Known
Myiagra inquieta	Restless Flycatcher		R	2019	1, 3	Found throughout northern and eastern mainland Australia, as well as in south-western Australia. The Restless Flycatcher is found in open forests and woodlands and is frequently seen in farmland.	Known
Neophema chrysostoma	Blue-winged Parrot		V	2001	1	This species mainly occurs in Tasmania and Victoria, particularly in southern Victoria and the midlands and eastern areas of Tasmania however sparser populations are also found in western New South Wales and eastern South Australia, extending to south-west Queensland and occasionally into the Northern Territory. Prefers grasslands and grassy woodlands but will inhabit a range of habitats from coastal, sub-coastal and inland areas, right through to semi-arid zones.	Possible
Neophema elegans elegans	Elegant Parrot		R	2019	1, 3	The Elegant Parrot occurs in western Victoria and south-western New South Wales (along the lower reaches of the Darling River), eastern parts of South Australia, north to the Flinders Ranges and west to the Eyre Peninsula, and also in Western Australia. 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.	Known
Petroica boodang boodang	Scarlet Robin		R	2008	1	Found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. Lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs.	Possible

Scientific Name	Common Name	EPBC Act	NPW Act	Date of last record	Data Source	Species known habitat preferences	Likelihood of use for habitat
Plectorhyncha lanceolata	Striped Honeyeater		R	2017	1	The Striped Honeyeater is found in eastern Australia, mainly inland, from the Yorke Peninsula, South Australia to the coast of New South Wales, around Toukley, and north to Charters Towers, Queensland. The Striped Honeyeater is found in forests and woodlands, often along rivers, as well as mangroves and in urban gardens.	Possible
Porzana tabuensis	Spotless Crake		R	2002	1	Mostly coastal distribution: south-east Australia and coastal WA, TAS and many islands. Winter visitor to north east NT and north east QLD. Occurs inland irregularly, in good seasons. Found in well vegetated freshwater wetlands with rushes, reeds and cumbungi. Will also frequent muddy areas, reedbeds or wetlands.	Possible
Rostratula australis	Australian Painted-snipe	EN	E	2001	1, 2	The Australian Painted Snipe generally 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 lignum (Muehlenbeckia) or canegrass or sometimes tea-tree (*Melaleuca*).	Possible
Stagonopleura guttata	Diamond Firetail		V	2021	1	Endemic to Australia, occurring mainly on the inland slopes of the Great Dividing Range and in the AMLR/Eyre Peninsula region of SA. Reside in a wide range of Eucalypt dominated vegetation communities that have a grassy understorey, including woodland, forest and mallee. Most occur on the inland slopes of the Great Dividing Ranges, with only small pockets near the coast.	Known
Tiliqua adelaidensis	Pygmy Blue-tongue	EN	E	2021	1, 2, 3, 4	All known populations are located on private land, most of which is used for sheep grazing. The vegetation of all known sites is remnant native grassland or grassy woodland with a sparse over-storey of trees. Pygmy Blue-tongue Lizards do not appear to be confined to a particular floristic community of native grassland, and have been recorded at sites dominated by species including spear grasses (*Austrostipa spp*.), wallaby grasses (*Rytidosperma spp*.), bluebush (*Maireana spp*.), Brush Wire-grass (*Aristida behriana*) and iron-grasses (*Lomandra spp*.).	Known
Trichosurus vulpecula	Common Brushtail Possum		R	2008	1	Anywhere where trees with suitable hollows occur, including open forests and woodlands but also urban areas and cities. The species can be common in urban areas. One of the best-known marsupials; found in most treed environments, including cities, towns and farmland. Reintroduced to many locations, including the Flinders Ranges, along the River Murray (extant) and on Thistle Island (extant).	Possible
Turnix varius varius	Painted Buttonquail		R	2015	1	These birds range almost continuously, in appropriate habitat, from about the Atherton Tableland in Qld, round the coast to the Eyre Peninsula and north to the southern Flinders Ranges in SA, avoiding only the driest regions of Qld and NSW. Temperate and eastern tropical forests and woodlands form the habitats of this	Possible

Scientific Name	Common Name	EPBC Act	NPW Act	Date of last record	Data Source	Species known habitat preferences	Likelihood of use for habitat
						species. They appear to prefer closed canopies with some understory and deep leaf litter on the ground.	

EPBC Act; Ex = Extinct, CR = Critically Endangered, EN = Endangered, VU = Vulnerable
NPW Act; E = Endangered, V = Vulnerable, R = Rare
Source; 1 = BDBSA, 2 = Protected Matters Search Tool, 3 = EBS Ecology 2020, 4 = EBS Ecology 2021a, 5 = This survey.

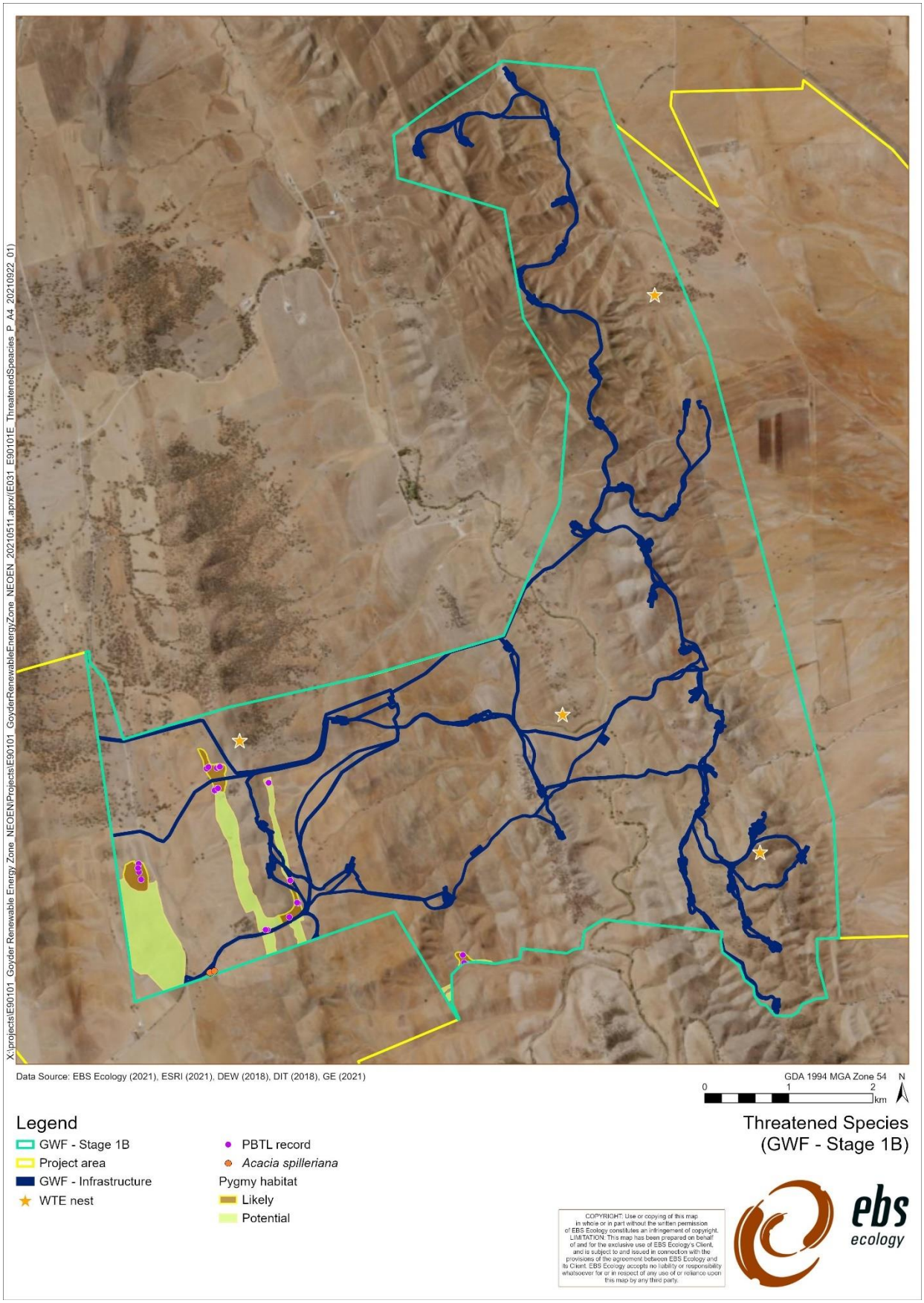

Figure 11. Records of EPBC Act listed threatened species and Wedge-tailed Eagle nests collected by EBS Ecology. Areas of potentially suitable Pygmy Bluetongue Lizard (PBTL) habitat are also shown.

4.2.2. Threatened flora

The database search identified 78 threatened flora species as having potential to occur within 5 km of the Project Area. Of these, 47 are at least possibly occur in the Project Area based on habitat available on the site. These 47 species and their likelihood of occurring in the Project Area are listed in Table 18. An assessment of likelihood for all 78 species is provided in Appendix 3.

Seven threatened flora species have been recorded in the Project Area, as listed in Table 17. Three were recorded during this survey, as indicated in the table. Some records are outside the area to be impacted by the Project.

Table 17. Threatened plant species recorded in the Project Area during the current and past surveys.

Scientific Name	Common Name	Status		Recorded during this survey	Vegetation Association	Comments
		EPBC Act	NPW Act			
Acacia spilleriana	Spiller's Wattle	EN	E	No	VA8	Several individuals have been recorded in roadside vegetation in the Stage 1B Project Area. They are outside the impact footprint of the project.
Cryptandra campanulata	Long-flowered Cryptandra		R	No	VA8, VA3	Distributed throughout these vegetation associations, but not common.
Eryngium ovinum	Blue Devil		V	No	VA8	Uncommon, but individuals have been located throughout these vegetation associations.
Maireana rohrlachii	Rohrlach's Blue Bush		R	No	VA8	Uncommon, but individuals have been located throughout these vegetation associations.
Philotheca angustifolia ssp. *angustifolia*	Narrow-leaf Wax-flower		V	Yes	VA3	Three plants located at BAM site BA3f, outside impact area.
Ptilotus erubescens	Hairy Tails		R	No	VA8	Uncommon, but widely distributed throughout the vegetation associations.
Rumex dumosus	Wiry Dock		R	Yes	VA3	Two plants located at the BAM site BA3a.

EPBC Act: Ex = Extinct; CR = Critically endangered; EN = Endangered; VU = Vulnerable.
NPW Act: E= Endangered; V = Vulnerable; R= Rare.

Table 18. Likelihood of occurrence of threatened flora identified in the desktop assessment. The data source and threat levels are described in the table footer.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	Habitat	Likelihood
Acacia glandulicarpa	Hairy-pod Wattle	VU	E	2008	1, 2	Semi-arid environments with a mean annual rainfall of 400–500 mm, with many records at sites coinciding with gentle slopes at the transition zone between heavy clay/gravel soils on the flats and sandy soils on the rises. Main population in western Victoria/SA border. The other SA sub-population located in the in the Booborowie-Burra Gorge-Hanson-Farrell Flat area (DSEWPC, 2014). It grows in alkaline soil on rocky hills in open scrub (at Burra), or in eucalypt open forest.	Possible
Acacia spilleriana	Spiller's Wattle	EN	E	2021	1, 2, 4, 5	Fragmented populations occurring in the northern Mount Lofty Ranges and in the ranges around Burra and Auburn. Most populations are on road verges, except for larger populations that occur in the Burra Gorge/Hallelujah Hills area. Grows on rocky hills, commonly along watercourses and roadsides. Associated with species such as *Acacia calamifolia* (Wallowa) and communities dominated by *Eucalyptus gracilis* (Yorrell), *E. socialis* (Beaked Red Mallee) and *E. brachycalyx* (Gilja) open scrub with a shrubby understorey and *E. camaldulensis* (River Red Gum) woodland.	Known
Amphibromus archeri	Pointed Swamp Wallaby-grass		R	1999	1	SA: FR EP NL MU SL KI SE. Grows in damp areas such as lagoons, waterholes and swamps, often on predominantly sandy soils. On EP, Known from one record north of Cleve and east of Mt Desperate. Grows in temporarily or permanently wet sites in open woodland communities.	Possible
Asperula syrticola	Southern Flinders Woodruff		R	2005	1	SA: FR EP NL MU. Grows under mallee and Eucalyptus woodlands. Also recorded from *Acacia pycnantha* Very Low Open Woodland over *Triodia sp*. Sometimes associated with limestone ridges.	Possible
Austrostipa breviglumis	Cane Spear-grass		R	2008	1	In SA occurs in FR, EP, NL and SL regions. Also from Vic. Habitat is rocky gullies to ridge tops, often in seasonally wet areas dominated by woodlands with *Eucalyptus odorata, Xanthorrhoea quadrangulata, Bursaria spinosa* and *Callitris glaucophylla*.	Possible
Austrostipa densiflora	Fox-tail Spear-grass		R	1994	1	SA: FR, EA, MU, SL, KI. Also from Qld, NSW and Vic. Occurs in a range of soils, especially sandy, but also rich soils associated with rocky places, including limestone. Has been recorded from disturbed places in woodlands and grasslands.	Possible
Austrostipa gibbosa	Swollen Spear-grass		R	2013	1	In SA grows in FR, NL, MU, SL and SE regions. Grows in rich loamy soils along creeks and in other seasonally wet places. Also prefers open forests and woodlands or grasslands with *Eucalyptus odorata, Acacia pycnantha, Allocasuarina verticillata* and *Rhytidosperma setaceum*.	Possible

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	Habitat	Likelihood
Austrostipa multispiculis	Many-flowered Spear-grass		R	1995	1	SA: NL MU SL KI. Grows in open grassland with *Austrostipa nodosa, A. eremophila* and *Rhytidosperma setaceum* and *Aristida sp*.	Likely
Austrostipa petraea	Flinders Range Spear-grass		R	1993	1	In SA, occurs in FR, EA, EP and NL regions. It has been recorded from rich soils but mainly in rocky places including limestone.	Likely
Bothriochloa macra	Red-leg Grass		R	2000	1	SA: FR EA EP NL MU YP SL SE. Eastern States of Australia. Grows on a variety of soil types in humid areas but in drier areas is restricted to run-on areas on clay or loamy soils. Occurs on most soil types but often dominant on poor, lower fertility soils and frequently invades degraded areas. Scattered recent records within southern EP. Mainly found in open grassy woodland communities and is often found in disturbed sites.	Possible
Caladenia tensa	Inland Green-comb Spider-orchid	EN		2007	1, 2	Various habitats have been described including Cypress Pine / Yellow Gum Woodland, Pine / Box woodland, mallee-heath sites, healthy woodland and mallee woodland, generally with rock outcrops. Flowering in spring (September - October).	Possible
Codonocarpus pyramidalis	Slender Bell-fruit	VU	E	2013	1, 2	Occurs as scattered individuals across areas of the Flinders Ranges, Northern Lofty Ranges and the eastern regions of SA such as within the Murray Darling Basin, Eyre Peninsula, Yorke and Adelaide. Grows along the crests of hills and ridges, slopes and along creeks, where the soil is either a loamy sand or sandy clay loam and where the pH is between 8.5–9. Throughout its range it is never common and only scattered trees are to be found.	Possible
Crassula peduncularis	Purple Crassula		R	1999	1	Grows in marshy areas which are rarely flooded; occurring mainly in south-eastern Australia. A few scattered records from southern WA; north-eastern N.S.W.; Tas. New Zealand; South America.	Possible
Cryptandra campanulata	Long-flower Cryptandra		R	2019	1	This species grows in shallow soils over rocks such as quartzite, granite, sandstone, limestone or shale, in the southern Flinders Ranges and northern Mt Lofty Ranges. Cryptandra campanulata is the most frequently encountered woody species in iron-grass grasslands (Turner 2012); it also occurs in heath and shrubland vegetation.	Known
Cullen parvum	Small Scurf-pea		V	2010	1	Generally associated with alluvial plains, creeks, ephemeral pools and river channels. It has also been reported from artificial drains and other disturbed sites. It grows in grassy woodland or open forest vegetation dominated by species of *Eucalyptus*, or in grasslands. Known from grasslands and grassy woodlands. Considered almost extinct in this region.	Possible

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	Habitat	Likelihood
Daviesia schwarzenegger	Mallee Bitter-pea		R*	2005	1	Found in the southern Flinders Ranges and the Mid-north in South Australia, growing in drier sites dominated by mallee eucalyptus on clay soils. Also found in New South Wales and Victoria	Possible
Dianella longifolia var. grandis	Pale Flax-lily		R	2013	1	Records mainly from the ranges. Occurs under a variety of overstorey *Eucalyptus* species but is a grassy woodland specialist, e.g., Blue Gum, Candlebark, Manna Gum, Stringybark and Grey Box.	Possible
Diuris behrii	Behr's Cowslip Orchid		V	2013	1	Mostly in native grassland, open woodland and grassy forest clearings in more fertile soils, especially amongst kangaroo grass and Triodia on gentle slopes and flats.	Possible
Dodonaea procumbens	Trailing Hop-bush	VU	V	2018	1, 3	In SA the species occurs near Port Lincoln, near Clare and Burra in the northern Mt Lofty Ranges, on Kangaroo Island and near Penola in the SE. *Dodonaea procumbens* grows in low-lying, often winter-wet areas in woodland, low open forests, heathland and grasslands, on sands and clay. Recorded in open *Eucalyptus camaldulensis, E. fasciculosa* and *E. leucoxylon* woodlands in low-lying areas, and in *Lepidosperma viscidum, Themeda triandra, Rhytidosperma spp., Austrostipa spp*. native grasslands.	Possible
Dodonaea subglandulifera	Peep Hill Hop-bush	EN	E	2012	1, 2	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.	Highly Likely
Echinopogon ovatus	Rough-beard Grass		R	2008	1	Grows in the shade.	Likely
Elatine gratioloides	Waterwort		R	2005	1	Aquatic annual found growing in or on the margins of stationary or slow-flowing water to 40 cm deep.	Possible
Eragrostis infecunda	Barren Cane-grass		R	2005	1	Occurs on seasonally wet, heavy soils and clays on river floodplains and shallow lakes.	Possible
Eryngium ovinum	Blue Devil		V	2019	1, 4	Widespread, chiefly in inland districts. Grows in damp clayey or sandy soils of open woodland and disturbed roadside sites and pastures.	Known
Festuca benthamiana	Bentham's Fescue		R	1988	1	Dryish upland sites.	Possible
Goodenia heteromera	Spreading Goodenia		R	1996	1	On periodically flooded river banks and flats.	Possible
Juncus australis	Austral Rush		R	2004	1	Grows in wet or seasonally wet grassland often in the shade.	Possible

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	Habitat	Likelihood
Juncus radula	Hoary Rush		V	1997	1	Grows in seasonally wet places in climatically rather dry regions.	Possible
Lachnagrostis limitanea	Spalding Blown-grass	EN	E	2005	1, 2	Endemic to the Northern Lofty Ranges Region of SA. Occurs in low-lying, flood-prone clay loam near watercourses in the Northern Lofty Flora Region of SA. The associated native vegetation is open sedgeland with Juncus kraussii and sedges over low-growing native herbaceous species, including: Sarcocornia quinqueflora, Distichlis distichophylla and Samolus repens.	Possible
Logania saxatilis	Rock Logania		R	2008	1	Steep-sided sandstone gorges in open woodland and in crevices in rocky outcrops.	Possible
Maireana excavata	Bottle Fissure-plant		V	2019	1	Occurs in native grasslands of the arid regions in shallow soils.	Highly likely
Maireana rohrlachii	Rohrlach's Bluebush		R	2014	1, 3, 4	Species occurs from few locations on EP, but mainly YP, Mid North, Fleurieu Peninsula, Murray lands and western Victoria. Preferred habitat includes heavy clay and calcareous loams with *Geijera linearifolia* (Sheep Bush) Very Open Shrubland, *Eremophila scoparia* (Silvery Emubush) low open shrubland. In Victoria it is found on saline or sandy loam soils rich in gypsum, often fringing lakes and in seasonally wet areas.	Known
Mentha satureioides	Native Pennyroyal		R	2001	1	Grows in sandy-clay to clay-rich soils, frequently in grassy areas and in open woodland communities.	Highly likely
Montia australasica	White Purslane		R	1993	1	Grows in moist areas including swamps and running water where the leaves reach their greatest lengths.	Unlikely
Olearia pannosa ssp. pannosa	Silver Daisy-bush	VU	V	2003	1	Endemic to SA where it is scattered throughout agricultural areas. Collections have been made in the EP, YP, FR, Southern MLR, Northern MLR, Murray Basin and SE botanical districts and a single collection from KI. Is generally found in sandy, flat areas and in hilly, rocky areas in woodland or mallee communities dominated by a wide range of *Eucalypt, Melaleuca* and *Callitris* species.	Possible
Philotheca angustifolia ssp. angustifolia	Narrow-leaf Wax-flower		R	2021	1, 5	Mallee on sandy soils.	Known
Philotheca verrucosa	Bendigo Wax-flower		V	2009	1	Occurs naturally on poor stony ground and on dry hills.	Highly likely
Podolepis jaceoides	Showy Copper-wire Daisy		R	1981	1	Occurs in grassland, woodland and mallee, typically on soils of higher nutrient status.	Possible.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	Habitat	Likelihood
Podolepis muelleri	Button Podolepis		V	1992	1	Occurs on coastal cliffs and on stony sites further inland.	Possible.
Ptilotus erubescens	Hairy-tails		R	2019	1	SA: FR NL MU SL SE. Grassy Woodlands, scrublands.	Known
Pultenaea kraehenbuehlii	Tothill Bush-pea		R	2009	1	Endemic to the Northern Mount Lofty Ranges in SA. It is confined to a narrow range of habitats on the upper rocky slopes of Tothill Range and one small outlying hill.	Possible
Rumex dumosus	Wiry Dock		R	2019	1, 4, 5	Grows in damp areas associated with mallee.	Known
Rytidosperma laeve	Smooth Wallaby-grass		R	2003	1	Ecologically variable, from alpine moorland to open grassland or light woodland, often in seasonally damp habitats.	Likely
Rytidosperma tenuius	Short-awn Wallaby-grass		R	2013	1, 6	Grows in altitudes between 5–750 m, on Tablelands usually in somewhat damp habitats, rarely dominant; along the coastal shelf a very common constituent of disturbed road verges.	Highly likely
Sclerolaena muricata var. villosa	Five-spine Bindyi		R	2003	1	Usually on heavier soils. Often in disturbed areas.	Likely
Senecio megaglossus	Large-flower Groundsel	VU	E	1993	1, 2	Endemic to SA where it is Confined to the Northern Mt Lofty Ranges and Southern Flinders Ranges of SA. Found in rocky creek banks and rocky gorge/valley slopes but also in sandhills. Associated with herb lands or grassland with *Lomandra effusa, Triodia irritans* or *Austrostipa* sp.; tall open-shrubland with *Pittosporum angustifolium, Alectryon oleifolius, Cassinia laevis, Eremophila longifolia, Acacia calamifolia* and *Bursaria spinosa* and *Triodia irritans* and *Callitris columellaris* and *Eucalyptus camaldulensis* woodlands.	Possible
Thysanotus tenellus	Grassy Fringe-lily		R	2008	1	In SA, the species prefers *Eucalyptus* woodlands*, Lomandra effusa* Open Grasslands, *Dodonaea lobulata* shrublands and Bluebush shrublands.	Likely

EPBC Act; Ex = Extinct, CR = Critically Endangered, EN = Endangered, VU = Vulnerable
NPW Act; E = Endangered, V = Vulnerable, R = Rare
Source; 1 = BDBSA, 2 = Protected Matters Search Tool, 3 = EBS Ecology 2020, 4 = EBS Ecology 2021b, 5 = This survey, 6 = EBS Ecology 2008a.

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

To calculate the impact to native vegetation, all infrastructure associated with **GWF 1 Stage 1B**, including WTG sites, access tracks, cable routes and a construction compound has been mapped in Arc GIS and overlaid onto native vegetation association information. This includes all associated infrastructure and construction areas, such as turbine site hardstands, crane hardstands, stockpiles, batter slopes and construction compounds/laydown areas, which will require clearance of native vegetation.

A 5 m buffer has been applied to the outer extent of access tracks and hardstands to allow for construction access and stockpiling.

To calculate the amount of native vegetation clearance required for underground cables an impact width of 12 m along all cable routes has been used, which is considered to be a conservative figure as cable impact widths will vary from 6 – 12 m, depending on the number of cables within each cable run.

Indirect clearance

Construction and operation of the Goyder South Project has the potential to cause indirect impacts to native vegetation associated with construction machinery, dust, weeds, herbicide use, altered hydrology/stormwater drainage and potentially changes to local grazing regimes/levels. However, the construction contractor and wind farm operator will be required to implement a Construction Environmental Management Plan (CEMP) and Operational Environmental Management Plan (respectively) to identify and document potential impacts to flora and fauna (and the environment in general) as well as the management measures that will be implemented to avoid, minimise, manage and mitigate these potential indirect impacts. In particular, as part of the CEMP, a *Flora and Fauna Management Plan* will be implemented to specifically address (avoid/minimise/manage/mitigate) potential impacts to flora and fauna.

Other stages

A summary of the native vegetation clearance associated with each Stage of the Goyder South Project is presented in Table 19.

Table 19. Cumulative Clearance Summary for the Goyder South Project.

Stage / Clearance Application	Area of Impact (ha)	Total Biodiversity Score	SEB Points Required	SEB Area Required (ha)	SEB Payment ($)	Admin Fee ($)
GWF 1 Stage 1A	132.99	2567.74	2696.12	337.02	$1,141,532.63	$62,784.33
GWF 1 Stage 1B	202.41	4391.08	4610.64	576.32	$1,952,138.42	$107,367.61
Overhead Transmission Line and Substation	116.60	3530.15	3429.32	428.67	$1,451,967.68	$79,858.72
Battery	0	0	0	0	0	0
Totals	**452**	**10488.97**	**10736.08**	**1342.01**	**$4,545,638.73**	**$250,010.66**

Refer to the individual native vegetation clearance assessment reports for ***GWF 1 Stage 1A*** and the ***Overhead Transmission Line and Substation*** for more detail on the proposed clearance associated with those stages of the Goyder South Project.

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 NP&W Act.

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

All stages of the project design have been undertaken considering vegetation mapping, threatened ecological community mapping and the known locations of threatened species populations. Whilst every effort has been made to avoid sensitive areas where possible, such as locating turbines outside of *Lomandra* spp. Grasslands, engineering and landscape constraints mean that clearing of native vegetation cannot be completely avoided.

b) Minimisation – 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).

As far as is practicable, the development has been placed in areas with no native vegetation or avoided native vegetation in better condition or of higher conservation value. This has included the following:

- The Threatened Ecological Community *Iron-grass Natural Temperate Grassland of South Australia* has largely been avoided.
- The Threatened Ecological Community *Peppermint Box (*Eucalyptus odorata*) Grassy Woodland of South Australia* has been avoided.
- Impact to woodland vegetation has been limited to disturbed edges of patches, avoiding further fragmentation.
- No scattered trees will be cleared.
- Existing access tracks will be utilised wherever possible.

Where native vegetation cannot be avoided, NEOEN will minimise impact to flora and fauna, including threatened species, and avoid over clearing by implementing their *Construction Environmental Management Plan* (CEMP). The CEMP details the management strategies that will be implemented to minimise impact to a number of environmental receptors, and includes the following sub-management plans:

1. Flora and Fauna and Rehabilitation.
2. Weed, Pest and Disease Control
3. Water Quality Protection.
4. Soil Management, Erosion and Sediment Control.
5. Construction Noise and Vibration.

6. Air Quality Control

7. Materials, Fuels and Waste Management.

8. Protection of Sites of Cultural and Natural Heritage Significance

9. Temporary Concrete Batch Plants.

The CEMP is provided as Attachment 4.

The CEMP includes provision for the development of a *Flora and Fauna Management Plan*. This plan will address site-specific management actions such as the following:

- Maintaining 1km buffers where possible and other management actions to protect active Wedge-tailed Eagle nests from WTGs impact. These actions are being developed as part of the *Flora and Fauna Management Plan.*
- Micro siting of infrastructure in sensitive areas such as Pygmy Blue-tongue Lizard habitat or near threatened plant populations.
- Future on-going flora and fauna monitoring programmes.

The *Flora and Fauna Management Plan* is in development and can be provided on completion.

The Project has been referred under the EPBC Act for the following matters of national environmental significance:

- Threatened species – Pygmy Blue-tongue Lizard, *Dodonaea procumbens, Dodonaea subglandulifera, Acacia spilleriana* and *Olearia pannosa* ssp. *pannosa*.
- Threatened Ecological Communities – *Iron-grass Natural Temperate Grassland of South Australia* and *Peppermint Box (*Eucalyptus odorata*) Grassy Woodland of South Australia.*

It is expected that the Commonwealth Department of Agriculture, Water and the Environment will require further impact minimisation measures beyond the above. Once known, this information can be provided if required.

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.

The Project includes areas of both temporary and permanent clearance. Temporary clearance areas will be rehabilitated according to the strategies discussed in the CEMP (Attachment 4).

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.

The NVC will only consider an offset once avoidance, minimization and restoration have been documented and fulfilled. The SEB Policy explains the biodiversity offsetting principles that must be met.

NEOEN plans to offset the Project by providing an on-ground SEB. This is further discussed in Section 6.

4.5. 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.

Assessment of the Project against the Principles of Clearance is shown in Table 20. The Project is seriously at variance with Principles 1(b), 1(e) and 1(f).

Table 20. Assessment against the Principles of Clearance.

Principle of clearance	Considerations
Principle 1(a) – it comprises a high level of diversity of plant species	**Relevant Information** Number of plant species recorded VA3: 93 (69 native, 24 exotic) VA6: 18 (9 native, 9 exotic) VA8: 53 (27 native, 26 exotic) VA14: 35 (26 native, 9 exotic) VA17: 13 (8 native, 5 exotic) Bushland Plant Diversity Score VA3: 18 VA6: 12 VA8: 8.9 VA14: 15 VA17: 10
	Assessment against the principles Seriously at Variance No vegetation associations At Variance VA3 VA6 VA14 VA17
	Moderating factors that may be considered by the NVC 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 a 5 km radius to be impacted) it may reduce the impact from 'at variance' to 'not at variance'. The total area of each VA in the Stage 1B Project Area compared to impact is shown in Table 10.
Principle 1(b) – significance as a habitat for wildlife	**Relevant information** The following threatened species have been recorded or may use the vegetation under application: • Pygmy Blue-tongue Lizard - Known

	• Flinders Ranges worm Lizard - Likely • Fork-tailed Swift - Possible • Australian Bustard - Possible • Brown Quail – Highly Likely • Peregrine Falcon - Known • Blue-winged Parrot - Possible • Elegant Parrot – Known • White-winged Chough – Known • Little Eagle – Likely • Hooded Robin – Known • Black-chinned Honeyeater – Possible • Jacky Winter – Likely • Satin Flycatcher – Known • Restless Flycatcher – Known • Scarlet Robin – Possible • Striped Honeyeater – Possible • Diamond Firetail – Known • Common Brushtail Possum – Possible • Painted Button-quail – Possible Generally, however, the extensive grasslands have a low diversity of fauna and patches of woodland are highly fragmented, usually small in extent, with mainly common species recorded during the survey. Woodland trees provide hollows and shelter refuge for common species such as kangaroos and birds and extensive rock outcrops occur on ridgetops that are also important habitat in an otherwise cleared landscape. Un-ploughed grasslands in the Stage 1B Project Area are known to be essential habitat for the Pygmy Bluetongue Lizard and the species has been recorded there during a number of previous fauna surveys. <u>Threatened Fauna Score (TFS)</u> VA3: 0.1 VA6: 0.1 VA8: 0.1 VA14: 0.08 VA17: 0.1 <u>Unit biodiversity Score (UBS)</u> VA3: 45.88 VA6: 38.02 VA8: 17.65 VA14: 49.83 VA17: 30.23
	<u>Assessment against the principles</u> <u>Seriously at Variance</u> All Vegetation Associations.
	<u>Moderating factors that may be considered by the NVC</u> <u>Impact Significance</u> The following criteria are used to determine whether an action will have a significant impact on listed threatened fauna species and therefore clearance will be raised to 'Seriously at variance'**.**

	A clearance action will have or is likely to have a significant impact on a threatened species if it may: • lead to a long-term decrease in the size of a population, or • reduce the area of occupancy of the species, or • fragment an existing population into two or more populations, or • adversely affect habitat critical to the survival of a species, or • modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or • result in invasive species that are harmful to a threatened species becoming established in the threatened species habitat, or • interfere with the recovery of the species. If the NVC are of the opinion that the clearance will not have a significant impact on fauna habitat, the clearance may be reduced to At variance. <u>Significant benefit</u> If the SEB provides a benefit to the threatened species that is well over and above what is required in the SEB Policy and Guide, it may be reduced to 'At variance'. <u>Common species</u> If the vegetation provides habitat for native species that are relatively common, and the area of clearance is not considered essential habitat to maintain the local population, it may be reduced to 'At variance'. <u>Non-essential habitat</u> If the clearance is of non-essential habitat for threatened species and the clearance will have a negligible impact on that species local population over the long term (i.e., next 20 to 50 years), it may be reduced to 'At variance'.
Principle 1(c) – plants of a rare, vulnerable or endangered species	**<u>Relevant information</u>** The following threatened plant species have been recorded in the impacted areas of the Stage 1B Project Area: • *Cryptandra campanulata* – Throughout BA8 and BA3, but not common. • *Eryngium ovinum* – Uncommon, but individuals have been located throughout BA8 • *Maireana rohrlachii* – Uncommon, but individuals have been located throughout BA8 • *Philotheca angustifolia* ssp. *angustifolia* – Three plants located at BAM site BA3f, outside the impact footprint. • *Ptilotus erubescens* – Uncommon, but individuals have been located throughout BA8. • *Rumex dumosus* – Two plants located at the BAM site BA3a. <u>Threatened Flora Score(s)</u> VA3: 0.08 VA6: 0 VA8: 0 VA14: 0 VA17: 0
	<u>Assessment against the principles</u> <u>Seriously at Variance</u> No Vegetation Associations <u>At Variance</u> VA3

<table>
<tr><td></td><td><u>Moderating factors that may be considered by the NVC</u>

<u>Impact Significance</u>
The following criteria are used to determine whether an action will have a significant impact on listed threatened fauna species and therefore clearance will be raised to ‘Seriously at variance’.
A clearance action will have or is likely to have a significant impact on a threatened species if it may:
• lead to a long-term decrease in the size of a population, or
• reduce the area of occupancy of the species, or
• fragment an existing population into two or more populations, or
• adversely affect habitat critical to the survival of a species, or
• modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
• result in invasive species that are harmful to a threatened species becoming established in the threatened species habitat, or
• interfere with the recovery of the species.

If the NVC are of the opinion that the clearance will not have a significant impact on fauna habitat, the clearance may be reduced to At variance.

<u>Number of plants to be cleared</u>
If less than 1% of the individual plants are affected within the immediate vicinity (within a 1 km radius) of the proposed clearance, or the affected individuals can be transplanted or replaced easily, the proposed clearance may be tempered to ‘At variance’.

<u>Significant benefit</u>
If the SEB provides a benefit to the threatened species that is well over and above what is required as detailed in the related SEB Policy and Guide, it may be reduced to ‘At variance’.</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><u>Relevant information</u>

There are no threatened communities being impacted by Goyder WF Stage 1B

<u>Threatened Community Score</u>

VA3: 1.0
VA6: 1.0
VA8: 1.0
VA14: 1.0
VA17: 1.0</td></tr>
<tr><td><u>Assessment against the principles</u>

<u>Seriously at Variance</u>

No vegetation Associations</td></tr>
<tr><td><u>Moderating factors that may be considered by the NVC</u></td></tr>
<tr><td>Principle 1(e) – it is significant as a remnant of vegetation in an area which has been extensively cleared</td><td><u>Relevant information</u>

<table>
<tr><th>IBRA Subregion</th><th>Remnancy</th><th>IBRA Association</th><th>Remnancy</th><th>BAM Sites</th></tr>
<tr><td>Broughton</td><td>10</td><td>Burra Hills</td><td>45</td><td>BA3, BA8, BA6, BA11, BA14</td></tr>
</table>

Remnant grasslands in the Stage 1B Project Area are generally in poor condition, with the exception of Triodia irritans grassland in steep terrain. Woodlands exist in small, highly fragmented patches that are heavily impacted by weeds and grazing activity, except in the south east of the Project Area. Here, woodlands are often part of more extensive remnant patches that extend beyond the boundary of the Stage 1B Project Area. They are generally in a better</td></tr>
</table>

	condition, with less weeds and a higher diversity of native plant species. Although they remain heavily grazed. Total Biodiversity Score 4391.08
	Assessment against the principles Seriously at Variance (TBS >500)
	Moderating factors that may be considered by the NVC Impact significance The following criteria are used to determine whether a clearance proposal will have a significant impact on a remnant in a highly landscape and therefore clearance will be raised to 'Seriously at variance' with this principle. An action has, will have, or is likely to have a significant impact on a remnant in a highly cleared landscape if it does, will, or is likely to: • impact on a tree species or vegetation community that has been selectively removed within the IBRA Association or IBRA Subregion and are therefore underrepresented in the vegetation that remains. • Impact on a remnant in relatively good condition, particularly if the vegetation within the IBRA Association or IBRA Subregion where vegetation has largely been degraded. Quality of remnant If the vegetation is in poor to very poor condition, is continuing to degrade and its long term (next 20 to 50 years) persistence is unlikely, then it may be reduced to 'At variance'**.**
Principle 1(f) – it is growing in, or in association with, a wetland environment	**Relevant information** Vegetation Association 17 is wetland vegetation growing in the Burra Creek channel and banks. The association is degraded, with high impact from weeds and trampling and grazing from livestock. The Association is extensive beyond the impact area, being found throughout the Burra Creek and its tributaries.
	Assessment against the principles Seriously at Variance VA17
	Moderating factors that may be considered by the NVC Impact Significance The following criteria are used to determine whether a clearance action will have a significant impact on a wetland, and therefore be 'seriously at variance' with the principle. Clearance will have a significant impact on the ecological character of a wetland if it is likely to result in: • Areas of the wetland being destroyed or substantially modified. • A substantial and measurable change in the hydrological regime of the wetland. • The habitat or lifecycle of native species dependent upon the wetland being seriously affected. • A substantial and measurable change in the physio-chemical status of the wetland. • The introduction of invasive species. Quality of wetland

	If the wetland has been highly degraded and is in poor to very poor condition, then it may be reduced to 'At variance'. Area of impact If the wetland is relatively small, considering the wetlands within the same system or within close proximity (within 5 km radius), then it may be reduced to 'At variance'.
Principle 1(g) – it contributes significantly to the amenity of the area in which it is growing or is situated	**Relevant information** All vegetation is situated on private property. In a few areas, grassland and shrubland vegetation occurs alongside public roads, while woodland is restricted to remote areas on properties. These woodland areas, although some distance from any areas frequented by the public, are often situated on hillsides and ridge tops that are visible from the area's public road network. The wind farm development will be become a highly visible component of the landscape once complete, although remote from any areas accessible to the general public.
	N/A
	Moderating factors that may be considered by the NVC In determining if the clearance is at variance with the principle, the NVC will have regard to the local Council's recommendations (if any) in relation to the application.

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.

4.6. Risk assessment

The level of risk associated with the application

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

Total clearance	No. of trees	0
	Area (ha)	202.41
	Total biodiversity Score	4391.08
Seriously at variance with principle 1(b), 1(c) or 1 (d)		1(b), 1(e) and 1(f)
Risk assessment outcome		Level 4

5. Clearance summary

A clearance summary for the **GWF 1 Stage 1B** is presented in Table 22, with a summary of the total SEB provided in Table 23. Refer to Section 4.3 for a summary of clearance associated with the other stages of the Goyder South Project and the individual Native Vegetation Clearance Data Reports for clearance associated with the other stages.

Table 22. Clearance summary table.

Vegetation Association	Block	BAM Site	Impact Area (ha)	Species Diversity Score	TEC Score	Threatened Plant Score	Threatened Fauna Score	Vegetation Condition Score	Unit Biodiversity Score	Total Biodiversity Score	SEB Pts	Ha Required	SEB	Admin. Fee	Total
VA3	BA	BA3a	18.76	22	1	0.08	0.1	33.44	46.96	880.92	924.97	115.62	$391,629.43	$21,539.62	$413,169.05
	BA	BA3b	18.76	22	1	0.04	0.1	45.63	61.89	1161.15	1219.21	152.4	$516,210.28	$28,391.57	$544,601.85
	BA	BA3c	18.76	18	1	0	0.1	46.54	60.92	1142.81	1199.95	149.99	$508,059.59	$27,943.28	$536,002.87
	BA	BA3d	18.76	10	1	0	0.1	9.91	12.98	243.42	255.59	31.95	$108,216.83	$5,951.93	$114,168.76
	BA	BA3f	18.76	14	1	0	0.1	24.44	31.99	600.11	630.11	78.76	$266,789.28	$14,673.41	$281,462.69
		BA3 Mean	18.76	22	1	0.04	0.1	44.63	60.54	1135.7	1192.48	149.06	$504,896.08	$27,769.28	$532,665.36
VA6	BA	BA6	0.84	12	1	0	0.1	29.05	38.02	31.94	33.54	4.19	$14,198.99	$780.94	$14,979.93
VA8	BA	BA8a	174.24	8	1	0	0.1	19.09	24.99	4354.51	4572.23	571.53	$1,935,878.34	$106,473.31	$2,042,351.65
	BA	BA8b	174.24	6	1	0	0.1	6.29	8.23	1434.34	1506.06	188.26	$637,662.63	$35,071.44	$672,734.07
	BA	BA8c	174.24	12	1	0	0.1	16.09	21.06	3669.2	3852.7	481.59	$1,631,229.98	$89,717.65	$1,720,947.63
	BA	BA8d	174.24	10	1	0	0.1	5.64	7.38	1285.8	1350.09	168.76	$571,627.60	$31,439.52	$603,067.12
	BA	BA8e	174.24	8	1	0	0.1	8.9	11.65	2029.91	2131.49	266.43	$902,436.48	$49,634.01	$952,070.49
	BA	BA8f	174.24	4	1	0	0.1	8.64	11.31	1971.3	2069.86	258.73	$876,377.36	$48,200.75	$924,578.11
	BA	BA8g	174.24	8	1	0	0.1	16.54	21.66	3773.42	3962.09	495.26	$1,677,543.23	$92,264.88	$1,769,808.11
	BA	BA8i	174.24	12	1	0	0.1	11.9	15.58	2714.21	2849.92	356.24	$1,206,653.90	$66,365.96	$1,273,019.86
	BA	BA8j	174.24	12	1	0	0.1	28.25	36.98	6443.49	6765.67	845.71	$2,864,576.74	$157,551.72	$3,022,128.46
		BA8 Mean	174.24	8.89				13.70	17.94	3125.19	3281.45	410.18	$1,389,360.67	$76,414.84	$1,465,775.51
VA14	BA	BA14a	8.38	12.0	1	0	0.08	27.48	35.31	295.93	310.72	38.84	$131,559.79	$7,235.79	$138,795.58
	BA	BA14b	8.38	18.0	1	0	0.08	50.07	64.35	539.23	566.19	70.77	$239,726.03	$13,184.93	$252,910.96
		BA14 Mean	8.38	15.0				38.775	49.83	417.58	438.455	54.805	$185,642.91	$10,210.36	$195,853.27
VA17	BA	BA17	0.19	10	1	0	0.1	22.53	30.23	5.74	6.03	0.75	$2,553.35	$140.43	$2,693.78
STAGE 1B TOTAL			**202.41**						181.61	4391.08	4610.64	576.32	$1,952,138.42	$107,367.61	$2,059,506.02

Table 23. Totals summary table.

	Total Biodiversity score	Total SEB points required	SEB Payment	Admin Fee	Total Payment
Application	4391.08	4610.64	$1,952,138.42	$107,367.61	$2,059,506.02

Economies of Scale Factor	0.5
Rainfall (mm)	321mm

6. 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.

ON-GROUND SEB

NEOEN have negotiated with a local landowner to purchase land located south of GWF 1 Stage 1B, which includes the Worlds End Gorge (Figure 12). This land comprises two parcels totalling approximately 955 ha and is expected to achieve the total required SEB associated with the entire Goyder South Project ('GWF 1 Stage 1A', 'GWF 1 Stage 1B' and the 'Overhead Transmission Line and Substation' stages). This would secure a significant area of native vegetation in a highly cleared landscape and provide connectivity between World's End Gorge, Hopkins Creek Conservation Park and other heritage agreements.

NEOEN have commenced a process of seeking a partner to assist with the delivery of the on-ground SEB. With further details of the on-ground SEB provided in Attachment 5 and Attachment 6.

Detailed assessment of the SEB area, including refined vegetation mapping and SEB Management Plan are currently in development.

Should results of this assessment indicate that the SEB area in Figure 12 cannot achieve the required SEB points in full, NEOEN is committed to investigating further impact minimisation and offset strategies through discussion with the Department for Environment and Water and the NVC.

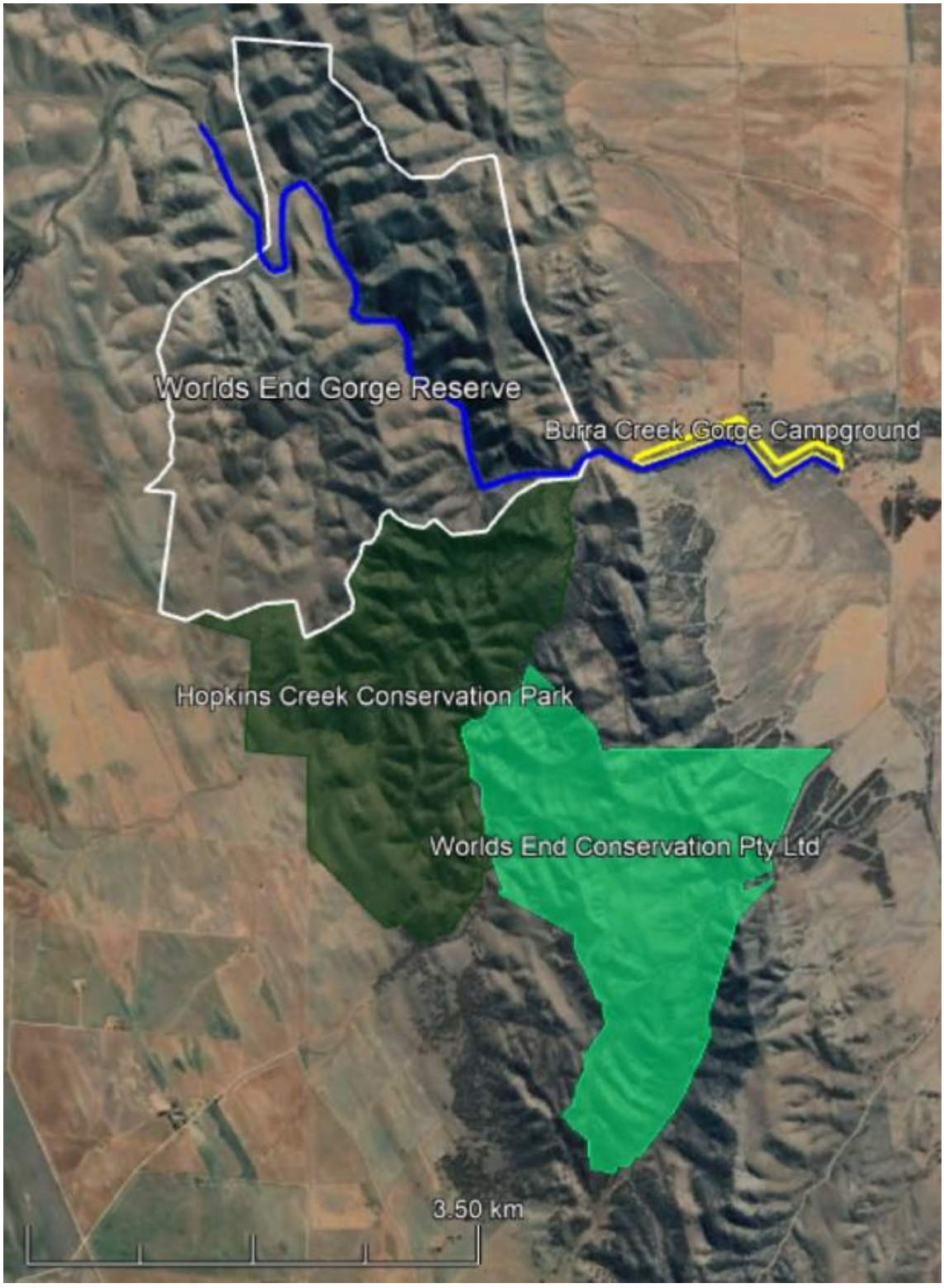

Figure 12. Proposed On-ground SEB Area north of Hopkins Creek Conservation Park (white polygon).

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8. Appendices

Appendix 1. IBRA Bioregions, Subregions and Environmental Associations of the Project Area

Flinders Lofty Block IBRA bioregion	
Temperate to arid Proterozoic ranges, alluvial fans and plains, and some outcropping volcanics, with the semi-arid to arid north supporting native cypress, Black Oak (belah) and mallee open woodlands, *Eremophila* and *Acacia* shrublands, and bluebush/saltbush chenopod shrublands on shallow, well-drained loams and moderately-deep, well-drained red duplex soils. The increase in rainfall to the south corresponds with an increase in low open woodlands of *Eucalyptus obliqua* and *E. baxteri* on deep lateritic soils, and *E. fasciculosa* and *E. cosmophylla* on shallower or sandy soils.	
Broughton IBRA subregion	
This subregion is characterised by a series of wide undulating intramontane basins with red duplex soils, separated by low but distinct northerly trending strike ridges. In the north the region leads into the Southern Flinders Ranges with no sharply defined landform boundary but a land use boundary marking the northern extremity of wheat cultivation. Due to widespread clearing for farming the only significant remnant of native vegetation is found in the Mount (Mt) Remarkable area, where an open forest dominated by *Eucalyptus cladocalyx* or by *E. goniocalyx* and *E. leucoxylon* on reddish dense loams remains. Degraded remnants of *E. leucoxylon* and *E. odorata* woodlands can still be found on stony crests and steep slopes.	
Remnant vegetation	Approximately 106330 ha of the subregion is mapped as remnant native vegetation, of which 3064 ha is formally conserved.
Landform	Hills and valleys; alternating subparallel hilly ridges and valleys with a general N-S trend in north. In south, hilly dissected tableland.
Geology	Dissected lateritized surface in south.
Soil	Hard setting loams with red clayey subsoils, highly calcareous loamy earths, hard setting loams with mottled yellow clayey subsoil, coherent sandy soils, cracking clays.
Vegetation	Assumed native vegetation cover.
Conservation significance	55 species of threatened fauna, 113 species of threatened flora. 0 wetlands of national significance.
Burra Hill IBRA environmental association	
Remnant vegetation	Approximately 32624 ha of the association is mapped as remnant native vegetation, of which 1786 ha is formally conserved.
Landform	Steep strike ridge on metasediments with dissected footslopes.
Geology	Metasediments and alluvium.
Soil	Reddish powdery calcareous loams, hard pedal red duplex soils and reddish calcareous earths.
Vegetation	Woodland of SA Blue Gum and Peppermint Box and woodland of SA Blue Gum.
Conservation significance	20 species of threatened fauna, 54 species of threatened flora. 0 wetlands of national significance.

Appendix 2. Flora species recorded in the Project Area during this and previous field surveys.

Scientific Name	Common Name	EPBC Act	NPW Act	Recorded this survey
Acacia argyrophylla	Silver Mulga-bush			
Acacia notabilis	Notable Wattle			
Acacia oswaldii	Umbrella Wattle			
Acacia pycnantha	Golden Wattle			Yes
Acacia rigens	Nealie			
Acacia spilleriana	Spiller's Wattle	EN	E	
Acaena echinata	Sheep's Burr			
Acrotriche patula	Prickly Ground-berry			Yes
*Adonis microcarpa**	Pheasant's Eye			
*Aira cupaniana**	Small Hair-grass			
Alectryon oleifolius ssp. canescens	Bullock Bush			Yes
Allocasuarina verticillata	Drooping Sheoak			Yes
*Aloe barbadensis**	Aloe			
Alternanthera denticulata	Lesser Joyweed			
Amaranthus sp.	Amaranth			
Amyema miquelii	Box Mistletoe			
*Arctotheca calendula**	Cape Weed			Yes
Aristida behriana	Brush-wire Grass			
Arthropodium strictum	Common Vanilla Lily			
Asperula conferta	Common Woodruff			
*Asphodelus fistulosus**	Onion Weed			Yes
Astroloma humifusum	Cranberry Heath			
Astroloma sp.	Heath			Yes
Atriplex semibaccata	Berry Saltbush			Yes
Atriplex stipitata	Bitter Saltbush			Yes
Atriplex vesicaria	Bladder Saltbush			
Austrostipa blackii	Crested Spear-grass			
Austrostipa elegantissima	Feather Spear-grass			
Austrostipa eremophila	Desert Spear-grass			
Austrostipa mollis	Soft Spear-grass			
Austrostipa nitida	Balcarra Spear-grass			
Austrostipa scabra	Rough Spear-grass			Yes
Austrostipa sp.	Spear-grass			Yes
Austrostipa trichophylla				Yes
*Avena barbata**	Bearded Oat			Yes
*Avena sp.**	Oat			Yes
Boerhavia dominii	Tarvine			
Brachyachne ciliaris	Hairy Native Couch			Yes
Brachyscome perpusilla	Tiny Daisy			Yes
*Brassica sp.**				Yes

Scientific Name	Common Name	EPBC Act	NPW Act	Recorded this survey
*Briza maxima**	Large Quaking-grass			
*Bromus diandrus**	Great Brome			Yes
*Bromus hordeaceus**	Soft Brome			
*Bromus madritensis**	Compact Brome			
*Bromus rubens**	Red Brome			
*Bromus sp.**	Brome			
Bulbine bulbosa	Bulbine-lily			Yes
Bursaria spinosa ssp. Spinosa	Sweet Bursaria			
Caesia calliantha	Blue Grass-lily			Yes
Caesia sp.	Grass-lily			Yes
Callitris gracilis	Southern Cypress Pine			Yes
Calostemma purpureum	Pink Garland-lily			Yes
*Carduus tenuiflorus**	Slender Thistle			
*Carrichtera annua**	Ward's Weed			Yes
*Carthamus lanatus**	Saffron Thistle			Yes
Cassinia laevis ssp. laevis	Curry Bush			Yes
Cassytha melantha	Coarse Dodder-laurel			Yes
Cheilanthes austrotenuifolia	Annual Rock-fern			Yes
Chloris truncata	Windmill Grass			
Chrysocephalum apiculatum	Common Everlasting			Yes
Chrysocephalum semipapposum	Clustered Everlasting			Yes
*Cirsium sp.**	Thistle			
Clematis leptophylla				Yes
Clematis microphylla	Old Man's Beard			
Convolvulaceae sp.	Bindweed Family			Yes
Convolvulus angustissimus	Narrow-leaf Bindweed			Yes
Convolvulus erubescens complex				Yes
Convolvulus sp.	Bindweed			Yes
Cryptandra campanulata ssp. campanulata	Long-flowered Cryptandra			Yes
*Cucumis myriocarpus**	Paddy Melon			
Cymbopogon ambiguus	Lemon-grass			Yes
*Cynara cardunculus ssp. Flavescens**	Artichoke Thistle			Yes
*Cynosurus echinatus**	Rough Dog's-tail Grass			
Dianella brevicaulis	Short-stem Flax-lily			Yes
Dianella revoluta var. revoluta	Black-anther Flax-lily			
*Diplotaxis tenuifolia**	Lincoln Weed			Yes
Dissocarpus biflorus	Twin flower saltbush			
Dissocarpus paradoxus	Cannonball Burr			
Dodonaea baueri	Crinkled Hop-bush			Yes
Dodonaea viscosa ssp.	Sticky Hop-bush			Yes
*Echium plantagineum**	Salvation Jane			Yes
*Echium plantagineum**	Salvation Jane			
Einadia nutans ssp.	Climbing Saltbush			Yes

Scientific Name	Common Name	EPBC Act	NPW Act	Recorded this survey
Enchylaena tomentosa var.	Ruby Saltbush			Yes
Enneapogon nigricans	Black-head Grass			
Enteropogon acicularis	Curly Windmill Grass			
*Erodium botrys**	Long Heron's-bill			Yes
*Erodium cicutarium**	Cut-leaf Heron's-bill			Yes
Eryngium ovinum	Blue Devil			
Eucalyptus camaldulensis ssp. camaldulensis	River Red Gum			
Eucalyptus gracilis	Yorrell			Yes
Eucalyptus leucoxylon ssp. pruinosa	Inland South Australian Blue Gum			Yes
Eucalyptus odorata	Peppermint Box			Yes
Eucalyptus oleosa	Red Mallee			
Eucalyptus porosa	Mallee Box			Yes
Eucalyptus socialis	Red Mallee			
Eucalyptus sp.				Yes
Euphorbia drummondii	Caustic Weed			
Eutaxia microphylla	Common Eutaxia			
Geijera linearifolia	Sheep Bush			Yes
Geranium retrorsum	Grassland Geranium			
*Geranium sp.**	Geranium			Yes
Glyceria sp.	Sweet-grass			Yes
Glycine rubiginosa	Twining Glycine			Yes
*Gomphocarpus cancellatus**	Broad-leaf Cotton-bush			Yes
Gonocarpus elatus	Hill Raspwort			Yes
Gonocarpus tetragynus	Small-leaf Raspwort			
Goodenia pinnatifida	Cut-leaf Goodenia			Yes
*Hedera helix**	English Ivy			Yes
*Hedypnois cretica**	Crete Weed			
*Hedypnois rhagadioloides**	Cretan Weed			
Helichrysum leucopsideum	Satin Everlasting			
*Heliotropium curassavicum**	Smooth Heliotrope			
*Heliotropium europaeum**	Common Heliotrope			Yes
*Holcus lanatus**	Yorkshire Fog			
*Hordeum leporinum**	Wall Barley-grass			
*Hordeum vulgare**	Barley			Yes
Hybanthus floribundus	Shrub-violet/Slender Violet			Yes
Hydrocotyle laxiflora	Stinking Pennywort			
*Hypochaeris glabra**	Smooth Cat's Ear			Yes
*Hypochaeris radicata**	Rough Cat's Ear			Yes
Juncus flavidus	Yellow Rush			
Juncus subsecundus	Finger Rush			
Kennedia prostrata	Scarlet Runner			
*Lactuca serriola f.**	Prickly Lettuce			Yes
*Lepidium africanum**	Common Peppercress			Yes

Scientific Name	Common Name	EPBC Act	NPW Act	Recorded this survey
Lepidosperma sp.	Sword-sedge/Rapier-sedge			Yes
Lepidosperma viscidum	Sticky Sword-sedge			
*Lolium rigidum**	Wimmera Ryegrass			
*Lolium sp.**	Ryegrass			
Lomandra effusa	Scented Mat-rush			Yes
Lomandra multiflora ssp.	Many-flower Mat-rush			Yes
*Lycium ferocissimum**	African Boxthorn			Yes
Maireana aphylla	Cotton-bush			Yes
Maireana brevifolia	Short-leaf Bluebush			Yes
Maireana ciliata	Hairy Fissure-plant			Yes
Maireana enchylaenoides	Wingless Fissure-plant			Yes
Maireana erioclada	Rosy Bluebush			
Maireana pentatropis	Erect Mallee Bluebush			
Maireana pyramidata	Black Bluebush			Yes
Maireana rohrlachii	Rohrlach's Bluebush			
Maireana sp.	Bluebush/Fissure-plant			Yes
*Malva parviflora**	Small-flowered Mallow			
*Marrubium vulgare**	Horehound			Yes
*Medicago minima**	Little Medic			Yes
*Medicago polymorpha**	Burr Medic			
*Medicago sp.**	Medic			Yes
Melaleuca lanceolata	Dryland Tea-tree			Yes
*Mesembryanthemum crystallinum**	Common Iceplant			
*Mesembryanthemum sp.**	Iceplant			Yes
Minuria leptophylla	Minnie Daisy			Yes
*Moraea setifolia**	Thread Iris			Yes
Myoporum montanum	Native Myrtle			Yes
*Neatostema apulum**	Hairy Sheepweed			
Neurachne alopecuroidea	Fox-tail Mulga-grass			
*Nicotiana glauca**	Tobacco tree			
*Olea europaea**	Olive			
Olearia pimeleoides	Pimelea Daisy-bush			
Olearia sp.	Daisy-bush			Yes
*Onopordum acaulon**	Horse Thistle			Yes
*Onopordum sp.**	Thistle			Yes
Oxalis perennans	Native Sorrel			Yes
Pauridia glabella var. glabella	Tiny Star			Yes
*Petrorhagia dubia**	Velvet Pink			
*Phalaris sp.**	Canary Grass			
Philotheca angustifolia ssp. angustifolia	Narrow-leaf Wax-flower		R	Yes
Phragmites australis	Common Reed			
Pimelea curviflora var. micrantha	Silky Riceflower			
Pimelea stricta	Erect Riceflower			Yes

Scientific Name	Common Name	EPBC Act	NPW Act	Recorded this survey
Pittosporum angustifolium	Native Apricot			Yes
*Plantago lanceolatum**	Plantain			
*Poa annua**	Winter Grass			Yes
*Polygonum aviculare**	Wireweed			
Ptilotus spathulatus	Pussy-tails			Yes
Rhagodia candolleana ssp.	Sea-berry Saltbush			Yes
Rhagodia parabolica	Mealy Saltbush			Yes
Rhagodia sp.	Saltbush			Yes
Rhagodia spinescens	Berry Saltbush			
*Romulea minutiflora**	Small-flower Onion-grass			Yes
*Romulea rosea var. australis**	Common Onion-grass			
*Romulea sp.**	Onion-grass			Yes
Rumex brownii	Slender Dock			
Rumex dumosus	Wiry Dock		R	Yes
*Rumex pulcher**	Fiddle Dock			
Rytidosperma caespitosum	Common Wallaby-grass			
Rytidosperma fulva	Leafy Wallaby-grass			
Rytidosperma racemosa var. racemosa	Slender Wallaby-grass			
Rytidosperma setaceum	Small-flower Wallaby-grass			
Rytidosperma sp.	Wallaby-grass			Yes
Salsola australis	Buckbush			Yes
*Salvia verbenaca var.**	Wild Sage			Yes
*Scabiosa atropurpurea**	Pincushion			Yes
Scaevola sp.	Fanflower			Yes
Scleranthus pungens	Prickly Knawel			Yes
Sclerolaena patenticuspis	Spear-fruit Copperburr			
Senecio sp.	Groundsel			Yes
Senna artemisioides ssp. petiolaris				
Sida corrugata	Corrugated Sida			
Sida petrophila	Rock Sida			Yes
Sida sp.	Sida			Yes
*Silybum marianum**	Variegated Thistle			Yes
*Sisymbrium sp.**	Wild Mustard			Yes
*Solanum nigrum**	Black Nightshade			Yes
Soliva sessilis	Jo-jo			Yes
*Sonchus oleraceus**	Sow-thistle			
*Taraxacum officinale**	Dandelion			
Themeda triandra	Kangaroo Grass			
Thysanotus patersonii	Twining Fringe-lily			
*Tribulus terrestris**	Caltrop			
Trichanthodium skirrophorum	Woolly Yellow-heads			
*Trifolium angustifolium**	Narrow-leaf Clover			Yes
*Trifolium arvense**	Hares foot clover			

Scientific Name	Common Name	EPBC Act	NPW Act	Recorded this survey
*Trifolium campestre**	Hop Clover			
*Trifolium glomeratum**	Cluster Clover			
*Trifolium resupinatum**	Shaftal Clover			
*Trifolium sp.**	Clover			
Triodia irritans	Spinifex			Yes
Triodia sp.	Spinifex			Yes
Trymalium wayi	Grey Trymalium			Yes
Vittadinia australasica	Sticky New Holland Daisy			
Vittadinia blackii	Narrow-leaf New Holland Daisy			
Vittadinia cuneata	Fuzzy New Holland Daisy			
Vittadinia cuneata var.	Fuzzy New Holland Daisy			Yes
Vittadinia sp.	New Holland Daisy			Yes
Wahlenbergia sp.	Native Bluebell			Yes
Wahlenbergia stricta ssp. stricta	Tall Bluebell			Yes
Westringia rigida	Stiff Westringia			
Wurmbea dioica ssp. dioica	Early Nancy			Yes
Zygophyllaceae sp.	Twinleaf Family			Yes
Zygophyllum aurantiacum/eremaeum	Shrubby Twinleaf			Yes

EPBC Act; Ex = Extinct, CR = Critically endangered, EN = Endangered; VU = Vulnerable
NPW Act; E= Endangered, V = Vulnerable, R= Rare
*** indicates and introduced species.**

Appendix 3. Likelihood of occurrence of threatened species

Threatened fauna

Scientific Name	Common Name			Sighting Date	Data Source	PMST Report	Habitat	Likelihood
		EPBC Act	NPW Act					
Actitis hypoleucos	Common Sandpiper	Mi	R		2	May occur	Habitat is banks, rocks and sandy beaches near water. Found in coastal or inland wetlands, both saline or fresh.	Unlikely No known records and very limited habitat in the Project Area.
Anhinga novaehollandiae novaehollandiae	Australasian Darter		R	2000	1		Habitat is lakes, rivers, swamps; rarely coastal.	Unlikely No suitable open water lake pr swamp habitat in the Project Area.
Anseranas semipalmata	Magpie Goose		E	1983	1		Habitat is rush and sedge dominated swamps and flood plains. The species historically occurred throughout much of Australia and has recently declined in range since the time of European settlement in Australia. Records show that, similar to current distributions, the Magpie Goose was abundant on the coastal plains of Northern Australia, the Gulf of Carpentaria and the East Coast of Australia, however populations were also present in the southern region of Western Australia and areas of New South Wales, Victoria and South Australia.	Unlikely No records in the past twenty years and very limited habitat in the Project Area.

Scientific Name	Common Name			Sighting Date	Data Source	PMST Report	Habitat	Likelihood
		EPBC Act	NPW Act					
Aprasia pseudopulchella	Flinders Worm-lizard	VU		2016	1, 2	Known to occur	The Flinders Ranges Worm-lizard is known from the Flinders Ranges of South Australia, extending south to the western slopes and northern and central Mount Lofty Ranges. It is also found in the northern suburbs of Adelaide and the Mount Remarkable National Park. The species is known to occur within the Adelaide and Mount Lofty Ranges and the South Australian Arid Lands Natural Resource Management Region. Occurs in open woodland, native tussock grassland, riparian habitats and rocky isolates.	Likely in all vegetation associations. The Project Area falls within the known distribution of the species, there are recent records nearby and suitable habitat is widespread throughout the Project Area. Although targeted surveys have were carried out and no lizards located in the Project Area, the species is cryptic and difficult to find. Survey effort has not been sufficient to indicate this species is absent.
Apus pacificus	Fork-tailed Swift	Mi			2	Likely to occur	Widespread but almost exclusively aerial. Mostly occur over inland plains and dry or open habitats.	Possible in all vegetation association. This species is exclusively aerial in Australia. Although it may possibly occur over the Project Area, it is unlikely to use terrestrial habitats.
Ardeotis australis	Australian Bustard		V	2018	1		Mainly occurs in inland Australia and is now scarce or absent from southern and south-eastern Australia. Mainly inhabits tussock and hummock grasslands, though prefers tussock grasses to hummock grasses; also occurs in low shrublands and low open grassy woodlands; occasionally seen in pastoral and cropping country, golf courses and near dams.	Possible in all vegetation associations. Suitable habitat is widespread in the Project Area and there are recent records within 5 km of the Project Area.

Scientific Name	Common Name			Sighting Date	Data Source	PMST Report	Habitat	Likelihood
		EPBC Act	NPW Act					
Biziura lobata menziesi	Musk Duck		R	1996	1		Endemic to Australia. Occurs in deep freshwater lagoons, with dense reed beds. They are normally seen singly or in pairs, but may form medium to large groups in the winter.	Unlikely No deep aquatic habitats in the Project Area.
Botaurus poiciloptilus	Australasian Bittern	EN			2	May occur	Found mainly in freshwater wetlands and, rarely, in estuaries or tidal wetlands, favouring wetlands dominated by sedges, rushes and reeds growing over a muddy or peaty substrate.	Unlikely No known records and very limited habitat in the Project Area.
Calidris acuminata	Sharp-tailed Sandpiper	Mi			2	Known to occur	During the non-breeding season, most of the world population of Sharp-tailed Sandpipers occurs in Australia. In SA and Victoria, numbers are generally highest between January and early February. In Gulf St Vincent, SA, some arrive during September–October, with the greatest numbers during December. Movements occur during the non-breeding period where birds appear to be dispersive, moving to temporary or flooded wetlands and leaving them when they dry. On migration, they forage and roost on rocky and sandy beaches, freshwater habitats and inland saltwater habitats.	Unlikely No known records and very limited habitat in the Project Area.

Scientific Name	Common Name			Sighting Date	Data Source	PMST Report	Habitat	Likelihood
		EPBC Act	NPW Act					
Calidris ferruginea	Curlew Sandpiper	CR			2	Likely to occur	In South Australia, Curlew Sandpipers occur in widespread coastal and subcoastal areas east of Streaky Bay. Important sites include Imperial Chemical Industries (ICI) and Price Saltfields, and The Coorong. Occasionally they occur in inland areas south of the Murray River and elsewhere. Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters.	Unlikely No known records and very limited habitat in the Project Area.

Scientific Name	Common Name			Sighting Date	Data Source	PMST Report	Habitat	Likelihood
		EPBC Act	NPW Act					
Calidris melanotus	Pectoral Sandpiper	Mi	R		2	May occur	In South Australia, the Pectoral Sandpiper is found mostly in the south-east, from north to the Murray River and west to Yorke Peninsula. Outside of this region the species is occasionally recorded in Innamincka, Welcome Bore and Mintabie. In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	Unlikely No known records and very limited habitat in the Project Area.
Cinclosoma castanotum (NC)	Chestnut-backed Quailthrush (Chestnut Quailthrush)		R	2012	1		Endemic to arid and semi-arid southern Australia, reaching its northern extent in the south of the Northern Territory. Throughout its distribution it occurs in a wide range of arid and semi-arid habitats; mainly in the low shrubs and undergrowth of mallee scrub, but also in Acacia scrubs, dry sclerophyll woodland, heath, and native pine.	Possible in VA10. Most woodland in the Project Area is not suitable habitat for the species due to the lack of low shrubs and understorey vegetation. However, the species may occur in *Callitris* sp. woodland where a higher shrub cover occurs.
Cladorhynchus leucocephalus	Banded Stilt		V	2003	1		Endemic to Australia, mainly in the south and inland. Found mainly in saline and hypersaline (very salty) waters of the inland and coast, typically large, open and shallow wetlands.	Possible in VA17 Recorded within the past 10 years, but very limited habitat (Burra Creek) in the Project Area.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Report	Habitat	Likelihood
Corcorax melanorhamphos	White-winged Chough		R	2021	1, 3, 5		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.	Known in VA6, VA10 and VA24 The species has been recorded during this and past surveys in the Project Area. Confined to remnant woodland patches.
Coturnix ypsilophora australis	Brown Quail		V	2015	1		Found across northern and eastern Australia, from the Kimberley region in Western Australia to Victoria and Tasmania, as well as in south-western Australia. It is also found in Papua New Guinea and Indonesia, and has been introduced to New Zealand. Prefers dense grasslands, often on the edges of open forests, and bracken. May sometimes be seen alongside roads.	Highly likely in all vegetation associations. Although not recorded during any survey of the Project Area, suitable habitat is extensive and recent records occur within 5 km of the Project Area.
Falco hypoleucos	Grey Falcon	VU			2	Likely to occur	The species occurs in arid and semi-arid Australia, including the Murray-Darling Basin, Eyre Basin, central Australia and Western Australia (Marchant and Higgins 1993). 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. The species frequents timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined water courses. The species has been observed hunting in treeless	Unlikely. There are no recent records within 5 km of the Project Area and habitat is unsuitable.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Report	Habitat	Likelihood
							areas and frequents tussock grassland and open woodland, especially in winter.	
Falco peregrinus macropus	Peregrine Falcon		R	2012	1		This species prefers open habitats such as grasslands, tundra and meadows and nests on cliff faces and in crevices. It has an extremely large range and is found world-wide except for rainforests and cold, dry Arctic regions. This species has increasingly been observed inhabiting urban areas.	Known in all vegetation associations. The species has been recorded in the Project Area by previous surveys.
Galaxias rostratus	Flathead Galaxias	CR			2	May occur	The flathead galaxias is only known from the southern half of the Murray-Darling Basin system. The species once occurred in the middle reaches, usually below 150 m in altitude, of the Lachlan, Murrumbidgee and Murray river catchments in New South Wales, and the Mitta Mitta, Kiewa, Ovens, Loddon, Goulburn and Murray river catchments in Victoria. There have been isolated records from a lagoon near Bathurst in New South Wales (in the Macquarie River catchment) and from the Lower Murray River in South Australia. The flathead galaxias inhabits a variety of habitats including billabongs, lakes, swamps and rivers, with a preference for still or slow flowing waters. The species has a preference for schooling in midwater	Unlikely. No aquatic habitats are being impacted.

Scientific Name	Common Name			Sighting Date	Data Source	PMST Report	Habitat	Likelihood
		EPBC Act	NPW Act					
Gallinago hardwickii	Latham's Snipe	Mi			2	May occur	The range extends inland over the eastern tablelands in south-eastern Queensland (and occasionally from Rockhampton in the north), and to west of the Great Dividing Range in New South Wales. The species is widespread in Tasmania and is found in all regions of Victoria except for the north-west. In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g., swamps, flooded grasslands or heathlands, around bogs and other water bodies). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity. Latham's Snipe occurs in temperate and tropical regions of Australia.	Unlikely. No known records and very limited habitat in the Project Area.
Grantiella picta	Painted Honeyeater	VU			2	Likely to occur	Sparsely distributed from southern Victoria and south-eastern South Australia to far northern Queensland and eastern Northern Territory. Forest, woodland, dry scrub, often with abundant mistletoe. Dependent on mistletoe berries.	Unlikely. There are no nearby records of the species. Suitable woodland habitat is very limited and generally has a very low cover of mistletoe species.

Scientific Name	Common Name			Sighting Date	Data Source	PMST Report	Habitat	Likelihood
		EPBC Act	NPW Act					
Hieraaetus morphnoides	Little Eagle		V	2016	1		The Little Eagle is widespread in mainland Australia, central and eastern New Guinea. It is seen over woodland and forested lands and open country, extending into the arid zone. It tends to avoid rainforest and heavy forest.	Likely in VA6, VA10 and VA24. Woodland habitats are suitable for the species, with recent records within 5 km of the Project Area.
Leipoa ocellata	Malleefowl	VU	V		2	Likely to occur	The original distribution of Malleefowl covered much of the southern half of the continent from the west coast to the Great Dividing Range in the east. The Malleefowl is now found principally in the semi-arid to arid zone in shrublands and low woodlands dominated by mallee and associated habitats such as Broombush (*Melaleuca uncinata*) and Scrub Pine (*Callitris verrucosa*). Malleefowl also occur in Red Ironbark (*Eucalyptus sideroxylon*) woodland at the eastern limit of their distribution and in Brown Stringybark (*E. baxteri/E. araneosa*) woodland in the south of Victoria and South Australia. A sandy substrate and abundance of leaf litter are clear requirements for the construction of the birds' incubator-nests. Densities of the birds are generally greatest in areas of higher rainfall and on more fertile soils and where shrub diversity is greatest.	Unlikely. There are no recent nearby records and no suitable Mallee habitat in the Project Area.

Scientific Name	Common Name			Sighting Date	Data Source	PMST Report	Habitat	Likelihood
		EPBC Act	NPW Act					
Maccullochella peelii	Murray Cod	VU			2	May occur	The distribution of the Murray Cod occurs in the following bioregions according to the Interim Biogeographic Regionalisation for Australia (IBRA7): Murray-Darling Depression, Riverina, NSW South Western Slopes, South Eastern Highlands, Cobar Peneplain, Darling Riverine Plains, Brigalow Belt South and Nandewar The Murray Cod utilises a diverse range of habitats from clear rocky streams, such as those found in the upper western slopes of NSW (including the ACT), to slow-flowing, turbid lowland rivers and billabongs.	Unlikely. No aquatic habitats will be impacted.
Melanodryas cucullata cucullata	Hooded Robin (YP, MN, AP, MLR, MM, SE)		R	2019	1, 3		Occurs across south-eastern Australia, most of NSW, VIC and south-eastern SA. South-eastern subspecies found in Eucalypt woodland and Mallee and Acacia shrubland.	Known in VA6, VA10 and VA24. Previous surveys of the Project Area have recorded the species in woodland areas.
Melithreptus gularis	Black-chinned Honeyeater		V	2006	1		The Black-chinned Honeyeater is found in the upper levels of open eucalypt forests and woodlands dominated by box and ironbark eucalypts. It is often found along waterways, especially in arid and semi-arid areas and in northern Australia. It is occasionally seen in gardens and street trees.	Possible in VA6. Although there are recent records of the species nearby, habitat is limited to *Eucalyptus* sp. woodlands, which are not extensive in the Project Area.
Microeca fascinans fascinans	Jacky Winter (MLR, SE)		R	2017	1		Widely distributed throughout mainland Australia. Prefer open woodland (Eucalypt and mallee) with an open shrub layer and bare ground. Often seen in farmland and parks.	Likely in VA6, VA10 and VA24 Not recorded in the Project Area by previous surveys, however woodland habitats are suitable for

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Report	Habitat	Likelihood
								the species and there are recent records nearby.
Motacilla cinerea	Grey Wagtail	Mi			2	May occur	European and Asian species. Migrates south in winter, usually to Indonesia and NG. Rarely reaches Australia, but when it does, favours habitat near freshwater streams, also mown grass, ploughed land or near sewage ponds.	Unlikely. No wetland habitat will be impacted by the Project.
Motacilla flava	Yellow Wagtail	Mi				May occur	Open country near swamps, salt marshes, sewage ponds, grassed surrounds to airfields, bare ground. Occasionally on drier inland plans. Rare but regular visitor around Aust coast especially the NW coast Broome to Darwin.	Unlikely. No wetland habitat will be impacted by the Project.
Myiagra cyanoleuca	Satin Flycatcher	Mi	E	2019	1, 2, 3	Known to occur	Known inhabitant of forest, woodland, mangroves and coastal heath scrub. Prefers dense, wet gullies of heavy eucalypt forest in breeding season.	Known in VA6, VA10 and VA24 Recorded in the Project Area during previous surveys, with suitable habitat restricted to woodland areas.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Report	Habitat	Likelihood
Myiagra inquieta	Restless Flycatcher		R	2019	1, 3		Found throughout northern and eastern mainland Australia, as well as in south-western Australia. The Restless Flycatcher is found in open forests and woodlands and is frequently seen in farmland.	Known in VA6, VA10 and VA24. Recorded in the Project Area during previous surveys, with suitable habitat restricted to woodland areas.
Neophema chrysostoma	Blue-winged Parrot		V	2001	1		This species mainly occurs in Tasmania and Victoria, particularly in southern Victoria and the midlands and eastern areas of Tasmania however sparser populations are also found in western New South Wales and eastern South Australia, extending to south-west Queensland and occasionally into the Northern Territory. Prefers grasslands and grassy woodlands but will inhabit a range of habitats from coastal, sub-coastal and inland areas, right through to semi-arid zones.	Possible in all vegetation associations.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Report	Habitat	Likelihood
Neophema elegans elegans	Elegant Parrot		R	2019	1, 3		The Elegant Parrot occurs in western Victoria and south-western New South Wales (along the lower reaches of the Darling River), eastern parts of South Australia, north to the Flinders Ranges and west to the Eyre Peninsula, and also in Western Australia. 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.	Known in all vegetation associations. Previously recorded in the Project Area, the species is likely to occur mostly in woodland vegetation, although it may utilise grasslands for foraging.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Report	Habitat	Likelihood
Numenius madagascariensis	Eastern Curlew	CR			2	May occur	Within Australia, the Eastern Curlew has a primarily coastal distribution. The species is found in all states, particularly the north, east, and south-east regions including Tasmania. Eastern Curlews are rarely recorded inland. They have a continuous distribution from Barrow Island and Dampier Archipelago, Western Australia, through the Kimberley Division and along Northern Territory, Queensland, and NSW coasts and the islands of Torres Strait. They are patchily distributed elsewhere. The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves. The birds are also found in saltworks and sewage farms.	Unlikely. No wetland habitat is being impacted by the Project.

Scientific Name	Common Name			Sighting Date	Data Source	PMST Report	Habitat	Likelihood
		EPBC Act	NPW Act					
Nyctophilus corbeni	Corben's Long-eared Bat				2	May occur	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, Bulloke *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. The Project Area is outside the core area of distribution of the species, there are no recent records within 5 km and suitable woodland habitat is limited in extent.
Pachycephala inornata	Gilbert's Whistler		R	1986	2		Sparsely distributed over much of the arid and semi-arid zone of inland southern Australia, from the western slopes of NSW to the Western Australian wheatbelt. Habitat is shrubby woodland and mallee.	Unlikely. Records within 5 km of the Project Area are before 1995 and there is very limited shrubby woodland habitat in the Project Area.
Pandion haliaetus	Osprey	Mi			2	May occur	Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands.	Unlikely. No known records and very limited habitat in the Project Area.

Scientific Name	Common Name			Sighting Date	Data Source	PMST Report	Habitat	Likelihood
		EPBC Act	NPW Act					
Pedionomus torquatus	Plains Wanderer	CR			2	May occur	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.	Unlikely. There are no records of the species within 5 km of the Project Area. Although the Project Area is dominated by grasslands, habitat that meets the specialised needs of the species, in terms of vegetation cover and other characteristics, are very limited.
Petroica boodang boodang	Scarlet Robin		R	2008	1		Found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. Lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs.	Possible in VA6, VA10 and VA24. There are records within 20 years within 5 km, however habitat is limited to woodland areas.

Scientific Name	Common Name			Sighting Date	Data Source	PMST Report	Habitat	Likelihood
		EPBC Act	NPW Act					
Pezoporus occidentalis	Night Parrot	EN			2	Extinct in area	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 Queensland, South Australia, Western Australia, and the Northern Territory. 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.	Unlikely. The species is extinct in the Project Area.
Plectorhyncha lanceolata	Striped Honeyeater		R	2017	1		The Striped Honeyeater is found in eastern Australia, mainly inland, from the Yorke Peninsula, South Australia to the coast of New South Wales, around Toukley, and north to Charters Towers, Queensland. The Striped Honeyeater is found in forests and woodlands, often along rivers, as well as mangroves and in urban gardens.	Possible in VA6, VA10 and VA24. There are records of the species in the past 10 years, however habitat in limited to small patches of woodland areas.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Report	Habitat	Likelihood
Porzana tabuensis	Spotless Crake		R	2002	1		Mostly coastal distribution: south-east Australia and coastal WA, TAS and many islands. Winter visitor to north east NT and north east QLD. Occurs inland irregularly, in good seasons. Found in well vegetated freshwater wetlands with rushes, reeds and cumbungi. Will also frequent muddy areas, reedbeds or wetlands.	Possible. Recorded within the past 20 years, but very limited habitat in the Project Area.
Rostratula australis	Australian Painted-snipe	EN	E	2001	1, 2	May occur	The Australian Painted Snipe generally 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 lignum (Muehlenbeckia) or canegrass or sometimes tea-tree (*Melaleuca*).	Possible. Recorded within the past 20 years, but very limited habitat in the Project Area.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Report	Habitat	Likelihood
Stagonopleura guttata	Diamond Firetail		V	2021	1, 3, 5		Endemic to Australia, occurring mainly on the inland slopes of the Great Dividing Range and in the AMLR/Eyre Peninsula region of SA. Reside in a wide range of Eucalypt dominated vegetation communities that have a grassy understorey, including woodland, forest and mallee. Most occur on the inland slopes of the Great Dividing Ranges, with only small pockets near the coast.	Known in VA6, VA10 and VA24. The species was recorded during the field survey in woodland areas.
Tiliqua adelaidensis	Pygmy Blue-tongue	EN	E	2021	1, 2, 3, 4	Known to occur	The Pygmy Blue-tongue Lizard is now known from 31 sites, ranging from Peterborough in the north to Kapunda in the south, and to the South Hummocks (north of Port Wakefield) in the west (Figure 1). All known populations are located on private land, most of which is used for sheep grazing. The vegetation of all known sites is remnant native grassland or grassy woodland with a sparse over-storey of trees. Pygmy Blue-tongue Lizards do not appear to be confined to a particular floristic community of native grassland, and have been recorded at sites dominated by species including spear grasses (*Austrostipa spp*.), wallaby grasses (*Rytidosperma spp*.), bluebush (*Maireana spp*.), Brush Wire-grass (*Aristida behriana*) and iron-grasses (*Lomandra spp*.).	Known in VA2 and VA8. The species has been recorded in the Project Area in grassland areas.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Report	Habitat	Likelihood
Trichosurus vulpecula	Common Brushtail Possum		R	2008	1		Anywhere where trees with suitable hollows occur, including open forests and woodlands but also urban areas and cities. The species can be common in urban areas. One of the best-known marsupials; found in most treed environments, including cities, towns and farmland. Reintroduced to many locations, including the Flinders Ranges, along the River Murray (extant) and on Thistle Island (extant).	Possible in VA6, VA10 and VA24. Records occur within 5 km of the Project Area in the last 20 years, however suitable habitat is limited to woodland areas.

Scientific Name	Common Name			Sighting Date	Data Source	PMST Report	Habitat	Likelihood
		EPBC Act	NPW Act					
Tringa nebularia	Common Greenshank					May occur	In South Australia, the species is found throughout the area east of 145° E, but there are a few records from the Flinders Ranges. It is also occasionally seen inland west of 145° E. It is found in all coastal regions west to, at least, Streaky Bay, with scattered records elsewhere along the coast. This species is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats. It will also use artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores.	Unlikely. No wetland habitat is being impacted by the Project.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Report	Habitat	Likelihood
Turnix varius varius	Painted Buttonquail		R	2015	1		These birds range almost continuously, in appropriate habitat, from about the Atherton Tableland in Qld, round the coast to the Eyre Peninsula and north to the southern Flinders Ranges in SA, avoiding only the driest regions of Qld and NSW. Temperate and eastern tropical forests and woodlands form the habitats of this species. They appear to prefer closed canopies with some understory and deep leaf litter on the ground.	Possible in VA6, VA10 and VA24. Recorded in the last 10 years within 5 km of the Project Area, however suitable habitat is very limited, with most woodland areas not having required habitat elements of deep litter and closed canopies.

EPBC Act; Ex = Extinct, CR = Critically Endangered, EN = Endangered, VU = Vulnerable
NPW Act; E = Endangered, V = Vulnerable, R = Rare
Source; 1 = BDBSA, 2 = Protected Matters Search Tool, 3 = EBS Ecology 2020, 4 = EBS Ecology 2021a, 5 = This survey

Threatened flora

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Result	Habitat	Likelihood
Acacia genistifolia	Broom Wattle		E	1990	1		Only recently collected in SA and confined to limited colony on the Gap Road north of Mintaro. Also, in N.S.W. & Vic.	Unlikely. Project Area is outside the known area of occurrence of the species.
Acacia glandulicarpa	Hairy-pod Wattle	VU	E	2008	1, 2	Known to occur	Semi-arid environments with a mean annual rainfall of 400–500 mm, with many records at sites coinciding with gentle slopes at the transition zone between heavy clay/gravel soils on the flats and sandy soils on the rises. Main population in western Victoria/SA border. The other SA sub-population located in the in the Booborowie-Burra Gorge-Hanson-Farrell Flat area (DSEWPC, 2014). It grows in alkaline soil on rocky hills in open scrub (at Burra), or in eucalypt open forest.	Possible in VA6. Habitat in the project Area limited to VA6, with no records of the species despite numerous surveys being undertaken in the Project Area.
Acacia iteaphylla	Flinders Ranges Wattle		R	2004	1		SA: FR E NL SL SE, but naturally occurs in the Flinders Ranges, across to the Gawler Ranges, and on the Eyre Peninsula. Naturalised beyond its native range in some parts of south-eastern and southern SA. Also naturalised in some parts of NSW, in the coastal and sub-coastal districts of south-western WA and in the central and western parts of Vic. Grows mainly among rocky outcrops on hillsides or along rocky creeks in valleys.	Unlikely. The Project Area is outside the natural area of occurrence for the species.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Result	Habitat	Likelihood
Acacia menzelii	Menzel's Wattle	VU			2	May occur	Endemic to SA, the species is confined to localised areas around Monarto and Murray Bridge, Lofty Ranges and Flinders Ranges (around Brachina). The Northern Flinders Ranges populations are considered relicts. It occurs as scattered shrubs; either on roadsides, or in low open shrubby woodland on more rocky sites and found in open *Eucalyptus* scrub where associated species include *Eucalyptus socialis* (Beaked-red Mallee), *E. incrassata* (Ridge-fruited Mallee), *Callitris gracilis* (Southern Cypress Pine) and *E. odorata* (Peppermint Box on calcareous loamy earths.	Unlikely. The Project Area is outside the natural area of occurrence for the species.
Acacia montana	Mallee Wattle		R	1977	1		SA: EP NL MU SL SE. A small occurrence in the Northern Lofty region between Clare and Jamestown then into the Murray region near Truro and along the Murray near Murray Bridge to Mannum. In open forests or tall shrublands associated with *Eucalyptus gracilis* and *E. socialis*. Soils: hard alkaline red duplex and grey-brown calcareous loamy earths. Rainfall 350-500 mm.	Unlikely. The Project Area is outside the natural area of occurrence for the species.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Result	Habitat	Likelihood
Acacia spilleriana	Spiller's Wattle	EN	E	2021	1, 2, 4, 5	Known to occur	Endemic to SA, this species has severely fragmented populations occurring in the northern Mount Lofty Ranges and in the ranges around Burra and Auburn. Most populations are on road verges, except for larger populations that occur in the Burra Gorge/Hallelujah Hills area. Grows on rocky hills, commonly along watercourses and roadsides. Associated with species such as *Acacia calamifolia* (Wallowa) and communities dominated by *Eucalyptus gracilis* (Yorrell), *E. socialis* (Beaked Red Mallee) and *E. brachycalyx* (Gilja) open scrub with a shrubby understorey and *E. camaldulensis* (River Red Gum) woodland.	Known in VA8 Not detected in the Project Area during the survey, however the species occurs nearby, in roadside vegetation.
Amphibromus archeri	Pointed Swamp Wallaby-grass		R	1999	1		SA: FR EP NL MU SL KI SE. Grows in damp areas such as lagoons, waterholes and swamps, often on predominantly sandy soils. On EP, Known from one record north of Cleve and east of Mt Desperate. Grows in temporarily or permanently wet sites in open woodland communities.	Possible in VA17 Recorded within 40 years, but very limited habitat in the Project Area.
Asperula syrticola	Southern Flinders Woodruff		R	2005	1		SA: FR EP NL MU. Grows under mallee and Eucalyptus woodlands. Also recorded from *Acacia pycnantha* Very Low Open Woodland over *Triodia sp*. Sometimes associated with limestone ridges.	Possible in VA6. There are records of the species within the last 20 years, however habitat is very limited in the project Area to VA6.
Atriplex australasica			R	1921	1		Found in wet brackish situations, often coastal. SA: MU YP SL KI SE.	Unlikely.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Result	Habitat	Likelihood
								No recent records and no brackish wetland habitat in the Project Area.
Austrostipa breviglumis	Cane Spear-grass		R	2008	1		In SA occurs in FR, EP, NL and SL regions. Also from Vic. Habitat is rocky gullies to ridge tops, often in seasonally wet areas dominated by woodlands with *Eucalyptus odorata, Xanthorrhoea quadrangulata, Bursaria spinosa* and *Callitris glaucophylla*.	Possible in VA6, VA10 and VA24. Habitat is limited to woodland areas on rocky hill tops and slopes.
Austrostipa densiflora	Fox-tail Spear-grass		R	1994	1		SA: FR, EA, MU, SL, KI. Also from Qld, NSW and Vic. Occurs in a range of soils, especially sandy, but also rich soils associated with rocky places, including limestone. Has been recorded from disturbed places in woodlands and grasslands.	Possible in all vegetation associations. Habitat is broadly suitable for the species, however there are no records within 5 km of the Project Area since 1995.
Austrostipa gibbosa	Swollen Spear-grass		R	2013	1		In SA grows in FR, NL, MU, SL and SE regions. Grows in rich loamy soils along creeks and in other seasonally wet places. Also prefers open forests and woodlands or grasslands with *Eucalyptus odorata, Acacia pycnantha, Allocasuarina verticillata* and *Rhytidosperma setaceum*.	Possible in VA17 Recorded within 40 years, but very limited habitat in the Project Area.
Austrostipa multispiculis	Many-flowered Spear-grass		R	1995	1		SA: NL MU SL KI. Grows in open grassland with *Austrostipa nodosa, A. eremophila* and *Rhytidosperma setaceum* and *Aristida sp*.	Likely in VA2 and VA8. Although not recorded within 5 km since 1995, all grasslands in the Project Area provide suitable habitat.
Austrostipa petraea	Flinders Range Spear-grass		R	1993	1		In SA, occurs in FR, EA, EP and NL regions. It has been recorded from rich soils but mainly in rocky places including limestone.	Likely in VA2 and VA8. Although not recorded within 5 km since 1995, all grasslands in the Project Area provide suitable habitat.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Result	Habitat	Likelihood
Austrostipa pilata	Prickly Spear-grass		V	2003	1		SA: FR NL MU. Known from 6 localities ranging from northern FR to Monarto. Prefers Mallee vegetation, hillslopes, sandy loam to clay loam soils. *Eucalyptus socialis, Callitris glaucophylla, E. intertexta, Atriplex vesicaria, Rhytidosperma caespitosum* and *Triodia irritans*.	Unlikely. There are no mallee habitats in the Project Area.
Bothriochloa macra	Red-leg Grass		R	2000	1		SA: FR EA EP NL MU YP SL SE. Eastern States of Australia. Grows on a variety of soil types in humid areas but in drier areas is restricted to run-on areas on clay or loamy soils. Occurs on most soil types but often dominant on poor, lower fertility soils and frequently invades degraded areas. Scattered recent records within southern EP. Mainly found in open grassy woodland communities and is often found in disturbed sites.	Possible in VA6, VA10 and VA24. Habitat for the species is limited to woodland areas.
Caladenia gladiolata	Bayonet Spider-orchid	EN	E	1981	1		Endemic to SA. Emerges in winter and produces a single flower stem in Aug-Sep. Grows in woodland dominated by South Australian Blue Gum (*Eucalyptus leucoxylon*), Sugar Gum (*E. cladocalyx*) or Pink Gum (*E. fasciculosa*). Grows on moderate to steep slopes in sandy loam soils with scattered shale and quartzite.	Unlikely. No records since 1995 and no suitable sandy loam soils in the Project Area.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Result	Habitat	Likelihood
Caladenia tensa	Inland Green-comb Spider-orchid	EN		2007	1, 2	Known to occur	Various habitats have been described including Cypress Pine / Yellow Gum Woodland, Pine / Box woodland, mallee-heath sites, healthy woodland and mallee woodland, generally with rock outcrops. Flowering in spring (September - October).	Possible in VA6, VA10 and VA24. Recent records from within 5 km, but very limited woodland habitat in the Project Area.
Centrolepis cephaloformis ssp. cephaloformis	Cushion Centrolepis		R	1992	1		In mallee and disturbed communities on sand and other infertile soils, also on the margins of clay pans and salt marshes. SA: FR EP NL MU YP SL SE.	Unlikely. There are no suitable sandy soils, clay pans or salt lakes in the Project Area.
Codonocarpus pyramidalis	Slender Bell-fruit	VU	E	2013	1, 2	Known to occur	Occurs as scattered individuals across areas of the Flinders Ranges, Northern Lofty Ranges and the eastern regions of SA such as within the Murray Darling Basin, Eyre Peninsula, Yorke and Adelaide. Grows along the crests of hills and ridges, slopes and along creeks, where the soil is either a loamy sand or sandy clay loam and where the pH is between 8.5–9. Throughout its range it is never common and only scattered trees are to be found.	Possible in all vegetation associations. Recent records indicate that the species might occur in the Project Area, however areas of suitable soil are limited.
Crassula peduncularis	Purple Crassula		R	1999	1		Grows in marshy areas which are rarely flooded; occurring mainly in south-eastern Australia. SA: FR, EP, NL, MU, SL, KI, SE. A few scattered records from southern WA; north-eastern N.S.W.; Tas. New Zealand; South America.	Possible in VA17 Recorded within 40 years, but very limited habitat in the Project Area.
Crassula sieberiana	Sieber's Crassula		E	2009	1		In SA, the majority of the distribution is confined within the AMLR, disjunct from the remaining extant distribution in other States. Listed as occurring	Possible in VA17 Recorded within 20 years, but very limited habitat in the Project Area.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Result	Habitat	Likelihood
							in *Eucalyptus odorata* grassy woodland. Also grows in semi-arid areas, especially in sand. Within the AMLR the preferred broad vegetation groups are Riparian, Grassy Woodland and Wetland.	
Cryptandra campanulata	Long-flower Cryptandra		R	2019	1		Occurs in the FR, EA, NL and MU regions of SA. This species grows in shallow soils over rocks such as quartzite, granite, sandstone, limestone or shale, in the southern Flinders Ranges and northern Mt Lofty Ranges. Cryptandra campanulata is the most frequently encountered woody species in iron-grass grasslands (Turner 2012); it also occurs in heath and shrubland vegetation.	Known in VA8 and VA24.
Cullen parvum	Small Scurf-pea		V	2010	1		SA: FR EA NL MU SL. Generally associated with alluvial plains, creeks, ephemeral pools and river channels. It has also been reported from artificial drains and other disturbed sites. It grows in grassy woodland or open forest vegetation dominated by species of *Eucalyptus*, or in grasslands. Known from grasslands and grassy woodlands. Considered almost extinct in this region.	Possible in VA17 Recorded within 20 years, but very limited habitat in the Project Area.
Daviesia benthamii ssp. humilis (NC)	Mallee Bitter-pea		R	2003	1		Known from across SA's southern flora regions, on deep sands of sand dunes and sand plains in association with Mallee/Spinifex communities. Habitat preferences include Mallee associations with *Eucalyptus phenax ssp. phenax* (White Mallee) Low Mallee over *Melaleuca uncinata* (Broombush), *Eucalyptus*	Unlikely. The Project Area does not contain any associated vegetation communities or deep sand soils.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Result	Habitat	Likelihood
							incrassata (Ridge-fruited Mallee), Low Mallee and *Eucalyptus oleosa* (Red Mallee) / *Eucalyptus brachycalyx* (Gilja) Mallee. ||Scattered through mallee districts of SA, Vic and NSW from EP in the west to Wyalong in east. Grows on a variety of soils including skeletal on mountain slopes, sandy loam over limestone and gravelly clay, typically in mallee dominated by shrubby *Eucalyptus sp.*	
Daviesia schwarzenegger	Mallee Bitter-pea		R*	2005	1		Found in the southern Flinders Ranges and the Mid-north in South Australia, growing in drier sites dominated by mallee eucalyptus on clay soils. Also found in New South Wales and Victoria	Possible in VA6. Although there are recent records near the Project Area, habitat is very limited to *Eucalyptus* woodland areas.
Dianella longifolia var. grandis	Pale Flax-lily		R	2013	1		Records mainly from the ranges. Occurs under a variety of overstorey *Eucalyptus* species but is a grassy woodland specialist, e.g., Blue Gum, Candlebark, Manna Gum, Stringybark and Grey Box.	Possible in VA6. Although there are recent records near the Project Area, habitat is very limited to *Eucalyptus* woodland areas.
Diuris behrii	Behr's Cowslip Orchid		V	2013	1		Mostly in native grassland, open woodland and grassy forest clearings in more fertile soils, especially amongst kangaroo grass and Triodia on gentle slopes and flats.	Possible in VA2 and VA8. Not recorded in extensive flora surveys of *Lomandra* spp. grasslands in the Project Area, however the plant would be difficult to find outside of flowering season. Recent records nearby suggest that the species is possible despite survey results.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Result	Habitat	Likelihood
Dodonaea procumbens	Trailing Hop-bush	VU	V	2018	1, 3	Known to occur	Endemic to south-eastern Australia, occurring in about 55 wild populations. In SA the species occurs near Port Lincoln, near Clare and Burra in the northern Mt Lofty Ranges, on Kangaroo Island and near Penola in the SE. *Dodonaea procumbens* grows in low-lying, often winter-wet areas in woodland, low open forests, heathland and grasslands, on sands and clays, with SA populations recorded in open *Eucalyptus camaldulensis, E. fasciculosa* and *E. leucoxylon* woodlands in low-lying areas, and in *Lepidosperma viscidum, Themeda triandra, Rhytidosperma spp., Austrostipa spp*. native grasslands, and shrubs including *Acacia acinacea, D. viscosa* and *Bursaria spinosa*. On KI and near Penola, the species grows in Eucalyptus baxteri open forest, sometimes in *Xanthorrhoea* thickets.	Known in VA2.
Dodonaea subglandulifera	Peep Hill Hop-bush	EN	E	2012	1, 2	Known to occur	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.	Likely in all vegetation associations. Known from nearby areas. Not recorded during field surveys in the Project Area, but may occur in unsurveyed vegetation.
Echinopogon ovatus	Rough-beard Grass		R	2008	1		Grows in the shade.	Likely in all vegetation associations. Little habitat information, with recent records within 5 km of the Project Area. Not recorded by field surveys.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Result	Habitat	Likelihood
Elatine gratioloides	Waterwort		R	2005	1		Aquatic annual found growing in or on the margins of stationary or slow-flowing water to 40 cm deep.	Possible in VA17 Recorded within 20 years, but very limited habitat in the Project Area.
Eragrostis infecunda	Barren Cane-grass		R	2005	1		Occurs on seasonally wet, heavy soils and clays on river floodplains and shallow lakes.	Possible in VA17 Recorded within 20 years, but very limited habitat in the Project Area.
Eryngium ovinum	Blue Devil		V	2019	1, 4		Widespread, chiefly in inland districts. Grows in damp clayey or sandy soils of open woodland and disturbed roadside sites and pastures.	Known in VA2 and VA8.
Eryngium vesiculosum	Prostrate Blue Devil		R	2021	1		Mainly in sandy flats, often near the sea.	Unlikely. There are no sandy flats in the Project Area.
Eucalyptus cajuputea	Green Mallee		R	2003	1		Widespread but localized, in mallee shrubland on shallow light soils on rocky rises.	Unlikely. There is no mallee vegetation in the Project Area and the species was not recorded despite surveying all woodland areas.
Eucalyptus percostata	Ribbed White Mallee		R	1994	1		Occurs between Quorn and Napperby in mallee on the slopes and foots of rocky hills.	Unlikely. The Project Area is outside the distribution extent of the species.
Festuca benthamiana	Bentham's Fescue		R	1988	1		Dryish upland sites.	Possible in all vegetation associations. Habitat information is scarce, and there are records of the species within the last 40 years.
Goodenia heteromera	Spreading Goodenia		R	1996	1		On periodically flooded river banks and flats.	Possible in VA17 Recorded within 40 years, but very limited habitat in the Project Area.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Result	Habitat	Likelihood
Juncus australis	Austral Rush		R	2004	1		Grows in wet or seasonally wet grassland often in the shade.	Possible in VA17 Recorded within 20 years, but very limited habitat in the Project Area.
Juncus radula	Hoary Rush		V	1997	1		Grows in seasonally wet places in climatically rather dry regions.	Possible in VA17 Recorded within 40 years, but very limited habitat in the Project Area.
Lachnagrostis limitanea	Spalding Blown-grass	EN	E	2005	1, 2	Known to occur	Endemic to the Northern Lofty Ranges Region of SA. Occurs in low-lying, flood-prone clay loam near watercourses in the Northern Lofty Flora Region of SA. The associated native vegetation is open sedgeland with Juncus kraussii and sedges over low-growing native herbaceous species, including: Sarcocornia quinqueflora, Distichlis distichophylla and Samolus repens.	Possible in VA17 Recorded within 20 years, but very limited habitat in the Project Area.
Lachnagrostis robusta	Tall Blown-grass		R	2008	1		Occurs around margins of salt lakes and in saline depressions.	Unlikely. There are no salt lakes in the Project Area.
Lepidium pseudotasmanicum	Shade Peppercress		V	1997	1		Previously recorded in *Cassinia complanata, Dodonaea angustissima, Rhagodia parabolica, Olearia decurrens* low shrubland over *Einadia nutans, Oxalis perennans, Danthonia* sp., and a range of exotic grasses and herbs. In dark brown loams (dry). In quartzite rocks.	Unlikely. There are no suitable shrubland habitats in the Project Area.
Leptorhynchos elongatus	Lanky Buttons		E	2003	1		Prefers sandy and sandy loam soils in woodlands and grasslands.	Unlikely. Soils of the Project Area are clays and clay-loams.
Leptorhynchos orientalis	Eastern Annual Buttons		R	1938	1		Presumed extinct in the Mount Lofty Ranges and now only	Unlikely.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Result	Habitat	Likelihood
							known on the Eyre Peninsula in South Australia.	The Project Area is outside the known distribution of the species.
Lobelia concolor	Poison Pratia		R	1993	1		Usually in heavy soil in moist depressions or sometimes associated with irrigated pastures.	Unlikely. The project avoids wet depression areas.
Logania saxatilis	Rock Logania		R	2008	1		Steep-sided sandstone gorges in open woodland and in crevices in rocky outcrops.	Possible in VA10 and VA24. Recent records nearby, however habitat is very limited to small patches of VA10 and VA24.
Maireana excavata	Bottle Fissure-plant		V	2019	1		Occurs in native grasslands of the arid regions in shallow soils.	Highly likely in VA2 and VA8. Recent records nearby and extensive suitable habitat in the Project Area.
Maireana rohrlachii	Rohrlach's Bluebush		R	2014	1, 3, 4		Species occurs from few locations on EP, but mainly YP, Mid North, Fleurieu Peninsula, Murray lands and western Victoria. Preferred habitat includes heavy clay and calcareous loams with *Geijera linearifolia* (Sheep Bush) Very Open Shrubland, *Eremophila scoparia* (Silvery Emubush) low open shrubland. In Victoria it is found on saline or sandy loam soils rich in gypsum, often fringing lakes and in seasonally wet areas.	Known in VA2 and VA8.
Mentha satureioides	Native Pennyroyal		R	2001	1		Grows in sandy-clay to clay-rich soils, frequently in grassy areas and in open woodland communities.	Known in VA8.
Montia australasica	White Purslane		R	1993	1		Grows in moist areas including swamps and running water where the leaves reach their greatest lengths.	Unlikely. There are no swamps or aquatic habitats in the Project Area.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Result	Habitat	Likelihood
Myoporum parvifolium	Creeping Boobialla		R	2008	1		Subpopulations scattered throughout the EP and also throughout southern SA and Vic. Occurs in sandy coastal areas, Red Gum woodlands, *Melaleuca halmaturorum* (Swamp Teatree) Very Low Open Forests and dune swales.	Possible in VA17 Recorded within 20 years, but very limited habitat in the Project Area.
Olearia pannosa ssp. pannosa	Silver Daisy-bush	VU	V	2003	1	Known to occur	Endemic to SA where it is scattered throughout agricultural areas. Collections have been made in the EP, YP, FR, Southern MLR, Northern MLR, Murray Basin and SE botanical districts and a single collection from KI. Is generally found in sandy, flat areas and in hilly, rocky areas in woodland or mallee communities dominated by a wide range of *Eucalypt, Melaleuca* and *Callitris* species.	Possible in VA6 and VA10. Recorded near the Project Area by EBS Ecology, but suitable habitat is very limited within VA6 and VA10.
Olearia picridifolia	Rasp Daisy-bush		R	2003	1		Mainly associated with limestone. In mallee and heath communities.	Unlikely. There are no Mallee over limestone habitats in the project Area.
Phebalium glandulosum ssp. macrocalyx	Glandular Phebalium		E*	1981	1		Occurs mainly on sandy soils supporting heathland and mallee.	Unlikely. No suitable habitat in the Project Area.
Philotheca angustifolia ssp. angustifolia	Narrow-leaf Wax-flower		R	2008	1		Mallee on sandy soils.	Unlikely. No suitable habitat in the Project Area.
Philotheca verrucosa	Bendigo Wax-flower		V	2009	1		Occurs naturally on poor stony ground and on dry hills.	Known in VA10.
Phlegmatospermum eremaeum	Spreading Cress		R	2010	1		Annual herb growing in semi-arid regions. Occurs in mallee on calcareous clay or loam.	Unlikely.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Result	Habitat	Likelihood
								No suitable habitat in the Project Area.
Podolepis decipiens	Bright Podolepis		R*	1981	1		In woodland, mallee, heath and more arid vegetation types.	Unlikely. Suitable habitat is very limited and there have been no records of the species nearby within the past 20 years.
Podolepis jaceoides	Showy Copper-wire Daisy		R	1981	1		Occurs in grassland, woodland and mallee, typically on soils of higher nutrient status.	Possible. Habitat throughout the Project Area is broadly suitable, however there have been no recent records in the past 20 years.
Podolepis muelleri	Button Podolepis		V	1992	1		Occurs on coastal cliffs and on stony sites further inland.	Possible. Habitat throughout the Project Area is broadly suitable, however there have been no recent records in the past 20 years.
Prasophyllum pallidum	Pale Leek-orchid	VU			2	May occur	Pale Leek-orchid is known singly or in groups in better soils of woodland and grassy open forest from the Flinders Ranges to the Northern and Southern Lofty regions of SA. Recorded in woodlands and forests dominated by *Eucalyptus leucoxylon, E. goniocalyx, E. fasciculosa, E. microcarpa, Callitris gracilis/Eucalyptus fasciculosa*, and *Allocasuarina verticillata* over *Lissanthe strigosa, Amphipogon strictus* and *Tricoryne elatior*.	Unlikely. There are no records of the species within 5 km of the Project Area and potential habitat is very limited.
Ptilotus angustifolius	Narrow-leaf Yellow-tails (or Regal Fox Tails?)		E	1994	1		Endemic to South Australia and from near Quorn, north-east of Port Augusta, south to Victor Harbor, growing on rocky slopes or hills, occurring in *Eucalyptus microcarpa* associa tions.	Unlikely. *Eucalyptus microcarpa* associations do not occur in the Project Area.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Result	Habitat	Likelihood
Ptilotus erubescens	Hairy-tails		R	2019	1		SA: FR NL MU SL SE. Grassy Woodlands, scrublands.	Known in VA2 and VA8.
Pultenaea kraehenbuehlii	Tothill Bush-pea		R	2009	1		Endemic to the Northern Mount Lofty Ranges in SA. It is confined to a narrow range of habitats on the upper rocky slopes of Tothill Range and one small outlying hill.	Known in VA10 and VA24.
Rumex dumosus	Wiry Dock		R	2019	1, 4, 5		Grows in damp areas associated with mallee.	Known in VA24.
Rytidosperma laeve	Smooth Wallaby-grass		R	2003	1		Ecologically variable, from alpine moorland to open grassland or light woodland, often in seasonally damp habitats.	Likely in all vegetation associations. Little habitat information, with recent records within 5 km of the Project Area. Not recorded by field surveys.
Rytidosperma tenuius	Short-awn Wallaby-grass		R	2013	1, 6		Grows in altitudes between 5–750 m, on Tablelands usually in somewhat damp habitats, rarely dominant; along the coastal shelf a very common constituent of disturbed road verges.	Known in VA2 and VA8
Sclerolaena muricata var. villosa	Five-spine Bindyi		R	2003	1		Usually on heavier soils. Often in disturbed areas.	Likely in VA2 and VA8. Limited habitat information and recent records nearby.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Result	Habitat	Likelihood
Senecio megaglossus	Large-flower Groundsel	VU	E	1993	1, 2	Likely to occur	Endemic to SA where it is Confined to the Northern Mt Lofty Ranges and Southern Flinders Ranges of SA. Found in rocky creek banks and rocky gorge/valley slopes but also in sandhills. Associated with herb lands or grassland with *Lomandra effusa, Triodia irritans* or *Austrostipa* sp.; tall open-shrubland with *Pittosporum angustifolium, Alectryon oleifolius, Cassinia laevis, Eremophila longifolia, Acacia calamifolia* and *Bursaria spinosa* and *Triodia irritans* and *Callitris columellaris* and *Eucalyptus camaldulensis* woodlands.	Possible in VA2 and VA8. Records within 20 years, however extensive surveys of suitable habitat have not detected the species.
Swainsona behriana	Behr's Swainson-pea		V	2013	1		Mostly grows in light soils in moist grassland especially in woodland and forest clearings.	Unlikely. The Project Area is characterised by heavy soils.
Swainsona pyrophila	Yellow Swainson-pea	VU			2	Likely to occur	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.	Unlikely. There are no records of the species within 5 km and the habitat is unsuitable.
Thelymitra aristata	Great Sun-orchid		E*	2008	1		Found in the south-east in South Australia, north of Mt Gambier, growing in clay or gravel soils in forest or scrubland around swamp margins in damp sands.	Unlikely. Recent records nearby, but no suitable forest habitat.

Scientific Name	Common Name	EPBC Act	NPW Act	Sighting Date	Data Source	PMST Result	Habitat	Likelihood
Thelymitra carnea	Small Pink Sun-orchid		R	1982	1		Occurs singly or in small groups in soil which is boggy in winter but dries hard in summer, usually in open clearings in light scrubland. Rare in this State and usually found with *T. flexuosa* and *T. rubra*.	Unlikely. No records in the past 20 years and no suitable habitat in the Project Area.
Thelymitra grandiflora	Great Sun-orchid		R	2011	1		Occurs singly or as small clumps of plants in forest clearings, woodland and scrub in well drained gravelly clay soils which may be laterite or podosols, or mixed with sand, extending to dry rocky ridges in better soils.	Unlikely. Recent records nearby, but no suitable forest habitat.
Thysanotus tenellus	Grassy Fringe-lily		R	2008	1		In SA, the species prefers *Eucalyptus* woodlands, *Lomandra effusa* Open Grasslands, *Dodonaea lobulata* shrublands and Bluebush shrublands.	Likely in VA2 and VA6. Recent records nearby, with suitable habitat in VA2 and VA6.

EPBC Act; Ex = Extinct, CR = Critically Endangered, EN = Endangered, VU = Vulnerable
NPW Act; E = Endangered, V = Vulnerable, R = Rare
Source; 1 = BDBSA, 2 = Protected Matters Search Tool, 3 = EBS Ecology 2020, 4 = EBS Ecology 2021b, 5 = This survey, 6 = EBS Ecology 2008a

Appendix 4. Fauna species recorded in the Project Area during this and previous field surveys.

CLASS	Scientific Name	Common Name	Status		Recorded during this survey
			EPBC Act	NPW Act	
AMPHIBIA	*Crinia signifera*	Common Froglet			
AVES	*Acanthagenys rufogularis*	Spiny-cheeked Honeyeater			
AVES	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill			Yes
AVES	*Acanthiza nana*	Yellow Thornbill			
AVES	*Acanthiza uropygialis*	Chestnut-rumped Thornbill			
AVES	*Accipiter cirrocephalus cirrocephalus*	Collared Sparrowhawk			
AVES	*Accipiter fasciatus*	Brown Goshawk			
AVES	*Acrocephalus australis*	Australian Reed-Warbler			
AVES	*Aegotheles cristatus*	Australian Owlet-nightjar			
AVES	*Alauda arvensis*	Eurasian Skylark			Yes
AVES	*Anas gracilis*^	Grey Teal			
AVES	*Anas superciliosa*	Pacific Black Duck			
AVES	*Anthochaera carunculata*	Red Wattlebird			
AVES	*Anthus australis*	Australian Pipit			
AVES	*Aphelocephala leucopsis*	Southern Whiteface			
AVES	*Aquila audax*	Wedge-tailed Eagle			Yes
AVES	*Artamus cyanopterus*	Dusky Woodswallow			
AVES	*Barnardius zonarius barnardi*	Mallee Ringneck			
AVES	*Chenonetta jubata*^	Maned Duck			
AVES	*Chrysococcyx basalis*	Horsfield's Bronze-Cuckoo			Yes
AVES	*Cincloramphus cruralis*	Brown Songlark			Yes
AVES	*Circus assimilis*	Spotted Harrier			Yes
AVES	*Climacteris picumnus*	Brown Treecreeper			
AVES	*Colluricincla harmonica*	Grey Shrike-thrush			Yes
AVES	*Coracina novaehollandiae*	Black-faced Cuckooshrike			
AVES	*Corcorax melanorhamphos*	White-winged Chough		R	Yes
AVES	*Corvus coronoides*	Australian Raven			
AVES	*Corvus mellori*	Little Raven			Yes
AVES	*Corvus sp.*				
AVES	*Coturnix pectoralis*	Stubble Quail			Yes
AVES	*Cracticus torquatus*	Grey Butcherbird			
AVES	*Dacelo novaeguineae*	Laughing Kookaburra			
AVES	*Daphoenositta chrysoptera*	Varied Sittella			
AVES	*Dicaeum hirundinaceum*^	Mistletoebird			
AVES	*Dromaius novaehollandiae*	Emu			
AVES	*Egretta novaehollandiae*	White-faced Heron			
AVES	*Elanus axillaris*	Black-shouldered Kite			
AVES	*Elseyornis melanops*	Black-fronted Dotterel			
AVES	*Eolophus roseicapilla*	Galah			Yes
AVES	*Epthianura albifrons*	White-fronted Chat			Yes
AVES	*Epthianura aurifrons*	Orange Chat			
AVES	*Epthianura tricolor*	Crimson Chat			
AVES	*Falco berigora*	Brown Falcon			Yes
AVES	*Falco cenchroides*	Nankeen Kestrel			
AVES	*Falco peregrinus*	Peregrine Falcon		R	
AVES	*Gavicalis virescens*	Singing Honeyeater			
AVES	*Geopelia placida*^	Peaceful Dove			
AVES	*Grallina cyanoleuca*	Magpielark			
AVES	*Gymnorhina tibicen*	Australian Magpie			Yes

CLASS	Scientific Name	Common Name	Status		Recorded during this survey
			EPBC Act	NPW Act	
AVES	*Hirundo neoxena*	Welcome Swallow			
AVES	*Lichenostomus ornatus*	Yellow-plumed Honeyeater			
AVES	*Lichenostomus virescens*	Singing Honeyeater			
AVES	*Malurus lamberti*	Variegated Fairywren			
AVES	*Malurus splendens*	Splendid Fairy-wren			
AVES	*Manorina flavigula*	Yellow-throated Miner			
AVES	*Megalurus gramineus*	Little Grassbird			
AVES	*Melanodryas cucullata cucullata*	Hooded Robin		R	
AVES	*Melithreptus brevirostris*	Brown-headed Honeyeater			
AVES	*Microcarbo melanoleucos melanoleucos*	Little Pied Cormorant			
AVES	*Microeca fascinans fascinans*	Jacky Winter			
AVES	*Myiagra cyanoleuca*	Satin Flycatcher		E	
AVES	*Myiagra inquieta*	Restless Flycatcher		R	
AVES	*Neophema elegans*	Elegant Parrot		R	
AVES	*Nesoptilotis leucotis*	White-eared Honeyeater			
AVES	*Ninox novaeseelandiae*	Southern Boobook			
AVES	*Nymphicus hollandicus*	Cockatiel			
AVES	*Ocyphaps lophotes*	Crested Pigeon			
AVES	*Pachycephala pectoralis*	Golden Whistler			
AVES	*Pachycephala rufiventris*	Rufous Whistler			
AVES	*Pardalotus punctatus*	Spotted Pardalote			
AVES	*Pardalotus striatus*	Striated Pardalote			
AVES	*Passer domesticus**	House Sparrow			
AVES	*Petrochelidon nigricans*	Tree Martin			
AVES	*Petroica goodenovii*	Red-capped Robin			
AVES	*Petroica phoenicea*	Flame Robin		V	
AVES	*Phalacrocorax varius*	Pied Cormorant			
AVES	*Phaps chalcoptera*	Common Bronzewing			
AVES	*Platycercus elegans*	Crimson Rosella			
AVES	*Platycercus eximius*	Eastern Rosella			
AVES	*Pomatostomus ruficeps^*	Chestnut-crowned Babbler			
AVES	*Pomatostomus superciliosus*	White-browed Babbler			
AVES	*Psephotellus varius^*	Mulga Parrot			
AVES	*Psephotus haematonotus*	Red-rumped Parrot			
AVES	*Ptilotula penicillata*	White-plumed Honeyeater			
AVES	*Pyrrholaemus brunneus*	Redthroat			
AVES	*Rhipidura albiscapa*	Grey Fantail			
AVES	*Rhipidura leucophrys*	Willie Wagtail			
AVES	*Smicrornis brevirostris*	Weebill			
AVES	*Stagonopleura guttata*	Diamond Firetail		V	
AVES	*Strepera versicolor*	Grey Currawong			
AVES	*Sturnus vulgaris**	Common Starling			
AVES	*Tadorna tadornoides*	Australian Shelduck			
AVES	*Turdus merula*	Common Blackbird*			
AVES	*Vanellus miles*	Masked Lapwing			
AVES	*Vanellus tricolor*	Banded Lapwing			
MAMMALS	*Austronomus australis*	White-striped Freetail Bat			
MAMMALS	*Bos taurus**	Cattle			Yes
MAMMALS	*Cervus dama**	Fallow Deer			
MAMMALS	*Chalinolobus gouldii*	Gould's Wattled Bat			
MAMMALS	*Chalinolobus morio*	Chocolate Wattled Bat			
MAMMALS	*Lasiorhinus latifrons*	Southern Hairy-nosed Wombat			Yes

CLASS	Scientific Name	Common Name	Status		Recorded during this survey
			EPBC Act	NPW Act	
MAMMALS	*Lepus europaeus**	European Hare			
MAMMALS	*Macropus fuliginosus*	Western Grey Kangaroo			Yes
MAMMALS	*Macropus robustus*	Euro			Yes
MAMMALS	*Macropus rufus*	Red Kangaroo			
MAMMALS	*Mormopterus planiceps*	Southern Freetail Bat			
MAMMALS	*Mormopterus sp.*				
MAMMALS	*Nyctophilus geoffroyi*	Lesser Long-eared Bat			
MAMMALS	*Oryctolagus cuniculus**	Rabbit (European Rabbit)			Yes
MAMMALS	*Ozimops sp.*	Free-tailed Bats			
MAMMALS	*Scotorepens balstoni*	Inland Broad-nosed Bat			
MAMMALS	*Tachyglossus aculeatus*	Short-beaked Echidna			
MAMMALS	*Vespadelus darlingtoni*	Large Forest Bat			
MAMMALS	*Vespadelus regulus*	Southern Forest Bat			
MAMMALS	*Vespadelus sp.*				
MAMMALS	*Vulpes vulpes**	Fox (Red Fox)			
REPTILES	*Ctenophorus decresii*	Tawny Dragon			
REPTILES	*Diplodactylus tessellatus*	Tessellated Gecko			
REPTILES	*Menetia greyii*	Common Dwarf Skink			
REPTILES	*Pseudonaja sp.*	Brown Snake			
REPTILES	*Tiliqua adelaidensis*	Pygmy Blue-tongue Lizard			
REPTILES	*Tiliqua rugosa*	Sleepy Lizard			Yes

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