Test of Significance

for

Proposed Solar Farm,
710 Murrumbidgee River Road, Hay, NSW 2711

Prepared for

Green Gold Energy

Version 1

Date: 30/4/2024

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Citation	S. Mendham, D. Wall, & B. Fisher 2024. Test of Significance Report for Proposed Solar Farm, 710 Murrumbidgee Road, Hay, NSW 2771. Report to Greater Hume Shire Council.
Study Area Address	710 Murrumbidgee Road, Hay, NSW 2771
Local Government Area	Hay Shire Council
Revision / Version #	V1, 30/4/2024
Primary Authors	Stuart Mendham, Damian Wall and Breanna Fisher.
Red-Gum Sign-off	

Executive Summary

Green Gold Energy are proposing a Solar Panel Farm development at 710 Murrumbidgee River Road, Hay, NSW 2711. These works will involve vegetation removal, earthworks (minor excavations) and construction, including the installation of panels and associated infrastructure, and new power connections (two new power poles) to the existing powerlines running parallel with the northern side of Murrumbidgee River Road.

Green Gold Energy has requested this assessment consider all the associated and/or anticipated impacts of these works in a Test of Significance (ToS). The 'Test of Significance' refers to the factors that must be considered by decision makers to assess whether a proposal is likely to have a significant effect on threatened biodiversity (also known as the "5 part test").

The solar farm will be installed with a two metre-high solar array system, where the arrays are spaced approximately 5-6 metres apart (to prevent shading at start and end of the day). The site access off Murrumbidgee River Road to the south will require removal of some low to moderate quality vegetation in private property and moderate to high quality grassland in the road reserve. There are no anticipated vegetation losses along proposed fences or for fire breaks, as the entire property will be under a grazing regime (not dissimilar to how the site is already being managed). As far as operational impacts, there will be some inter-row shading in the early morning and late afternoon, however, the 'agrivoltaics' industry is expanding worldwide based on the principles of integrating agriculture (grazing) and solar panel projects which, like this project, are essentially designed to take advantage of grazing opportunities from continued vegetation (grass) cover beneath the panels.

Where any significant native vegetation is being impacted, the vegetation consists of low chenopod shrubs such as salt bushes, native grasses and scattered herbaceous species. Small amounts of PCT 164 and PCT 46 are being lost where the access route and the two new power poles are intersecting these vegetated areas. No trees or significant shrubs are being impacted by the development. The main solar array area (main development footprint) is being placed in predominantly exotic pasture, with only occasional scattered natives remaining, which are resilient to cropping and cultivation. Within the exotic-dominated solar array area, the dominant species are sown pasture grasses such as Rye Grass (*Lolium* spp.), Barley Grass (*Hordeum* spp.) and Brome species (*Bromus* spp.), with only scattered natives including Prickly Saltwort (*Salsola tragus*) and Black Roly Poly (*Sclerolaena muricata*).

This assessment considers the associated and/or anticipated impacts of the proposed works in a Test of Significance (ToS). The 'Test of Significance' refers to the factors that must be considered by decision makers to assess whether a proposal is likely to have a significant effect on threatened biodiversity ("5-part test"). In total, surveys over three days were conducted during two site visits (9th October 2023, 30th October 2023 and 5th April 2024), with survey occurring during the day. Survey design was guided by the *'Field survey methods for environmental consultants and surveyors when assessing proposed development or other activities on sites containing threatened species*' (OEH 2018). Online tools including the Commonwealth Protected Matters Online Search Tool and NSW BioNet interactive map were consulted prior to entering the field.

Specific species considered in the factors for consideration (EP&A and BC Act) included the Mossgiel Daisy, Chariot Wheels, Winged Peppercress & Slender Darling-pea (collectively considered "Native Grassland Forbs") and the Blue-winged Parrot, Diamond Firetail & Plains-wanderer (collectively considered "Native Grassland Aves". These species have been recorded in the DPE managed NSW Wildlife Atlas and under the EPBC Act within 5km of the site and their likelihood of using the site was rated as 'Potential' in Section 4. Where EPBC Act listed threatened species were considered possibly occurring on or near the site, Significant Impact Criteria (SIC) assessments were conducted for each respective species. No species were considered to have a risk of significant impacts from the proposed development.

No (zero) threatened species were identified on site and no (zero) Threatened Ecological Communities are likely to be impacted adversely by the proposed development. The development will result in the loss of a small area of native vegetation that is of relatively low habitat value and unlikely to support threatened species given the level of disturbance that has occurred in the area.

In my opinion, the vegetation on site is not any derivation of a Threatened Ecological Community and the anticipated works will not impact any 'Declared Area of Outstanding Biodiversity Value' or any area of 'Biodiversity Value', as mapped by the NSW Department of Planning & Environment (NSW DP&E). After consideration of the potential physical, chemical and biological impacts of the proposed construction design and methodology, and as a result of efforts to relocate the main development area (solar arrays) further north into exotic dominated areas, I am of the opinion that the activities as proposed, will not have a significant effect on threatened species and ecological communities and their conservation.

After consideration of the potential physical, chemical and biological impacts of the proposed construction design and methodology, I am of the opinion that the development activities, as proposed, will not have a significant effect on threatened species or ecological communities and their conservation.

Mr Damian Wall
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BscAppSc, MEnvMgt, MAACAI

30/4/2024

Glossary & Acronyms

ACRONYM	DESCRIPTION
BAM	Biodiversity Assessment Methodology
BC Act	NSW *Biodiversity Conservation Act 2017*
BC Reg	NSW *Biodiversity Conservation Regulation 2017*
BDAR	Biodiversity Development Assessment Report
BCF	Biodiversity Conservation Fund
BCT	Biodiversity Conservation Trust
DA	Development Application
DoEE	Commonwealth Department of the Environment and Energy
BCD-DPIE	Biodiversity Conservation Division of Department of Planning, Industry and Environment
EEC	Endangered Ecological Community
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
GDE	Groundwater Dependent Ecosystem
ha	Hectare(s)
IBRA	Interim Bioregionalisation of Australia
km	kilometre
LGA	Local Government Area
masl	Metres above sea level
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
PCT	Plant Community Type
PEA	Preliminary Environmental Assessment
SEARs	Secretary's Environmental Assessment Requirements
SSD	State Significant Development
Subject land	72 Walbundrie Road, Culcairn, NSW 2660
*	Denotes exotic species
®	Denotes revegetation
DPIE	New South Wales Department of Planning, Industry and Environment

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1 Introduction

Green Gold Energy are proposing a solar farm development at 710 Murrumbidgee River Road, Hay, NSW 2711. These works will involve some vegetation removal, earthworks (minor excavations) and construction including the installation of panels and associated infrastructure, and new power connections (two new power poles) to the existing powerlines running parallel with the northern side of Murrumbidgee River Road (**Figure 1**).

The proposed works will cover approximately 14.6 hectares of the 15 hectare lot and will result in the removal of 0.19 hectares of native vegetation, which is predominantly being impacted by the access road and the installation of the new power poles to connect the plant to the existing powerline in the road reserve of Murrumbidgee River Road.

After alterations to initial designs to minimise impacts to native vegetation, the main solar farm footprint is now placed in a heavily cultivated area to the north that is dominated by exotic pasture species, and possesses native vegetation cover well under the 15 % total cover threshold. As such, that area does not meet the NSW definition of a native patch, and there are no quantifiable vegetation impacts for the main solar array area. Vegetation losses are confined to the PCT areas that are being intersected by the access route, and the two new power poles.

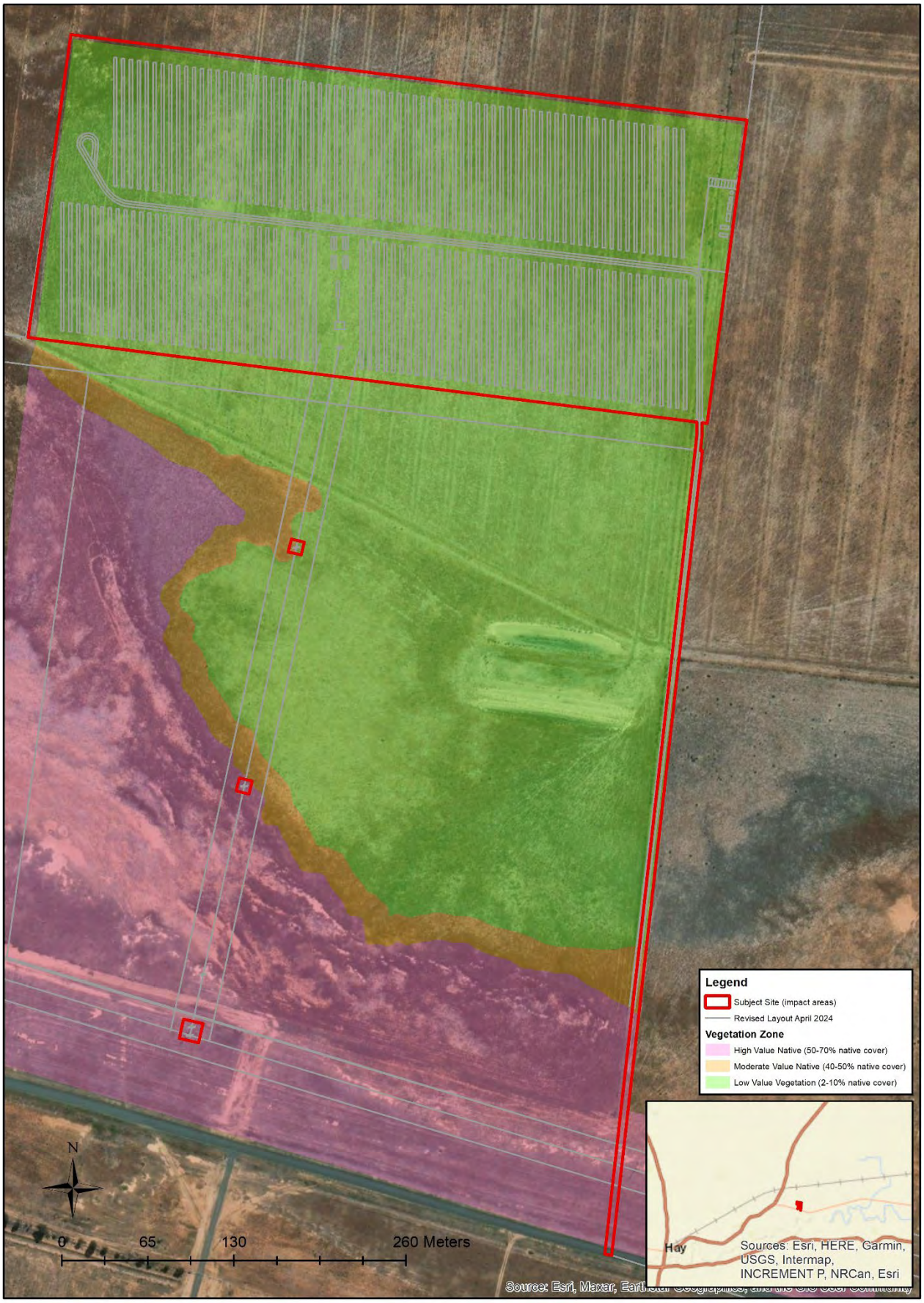

Figure 1: Subject Site location, 710 Murrumbidgee River Road, Hay. Scale: 1:9,000.

1.1 Purpose

The 'Test of Significance' (ToS) refers to the factors that must be considered by decision makers to assess whether a proposal is likely to have a significant effect on threatened biodiversity (also known as the "5-part test") as per section 7.3 of the *Biodiversity Conservation Act 2016* (BC Act). The threatened species Test of Significance is used to determine if a development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. It is applied as part of the Biodiversity Offsets Scheme (BOS) entry requirements and for Part 4 activities under the *Environmental Planning and Assessment Act 1979* (EP&A Act)(OEH, 2018). It is important to note that the ToS will **ONLY** need to be applied where the proposal:

1. Does **NOT** significantly affect threatened species or ecological communities or their habitats; or
2. Is **NOT** affecting a declared area of outstanding biodiversity value; or
3. Is **NOT** affecting as area on the *Biodiversity Values Map* (**Section 1.3**); or
4. Does **NOT** exceed the biodiversity offsets scheme (BOS) clearing threshold for the sites 'minimum lot size'.

Where the development **IS** determined to be likely have a significant impact on threatened species, ecological communities or their habitats, **OR** is within a declared area of outstanding biodiversity value or any area on the Biodiversity Values Map, **OR** exceeds the BOS threshold**, then a biodiversity development assessment report (BDAR) is required**.

In addition to determining whether a BDAR is likely to be required for a development, the aim of undertaking a ToS is to improve the standard of consideration and protection afforded to threatened biodiversity in planning and decision-making processes (DECCW, 2004). *The outcome of any threatened biodiversity assessment should be that developments, activities and actions are undertaken in an environmentally sensitive manner and that appropriate measures are adopted to avoid or minimise adverse effects on threatened biodiversity (DECCW, 2004).* The following sections address 2 of the 3 triggers for entry into the BOS scheme (via a BDAR).

1.2 Declared Areas of Outstanding Biodiversity Value

Section 7.2 of the BC Act provides that development under the EP&A Act is likely to significantly affect threatened species if:

(c) it is carried out in a declared *area of outstanding biodiversity value*.

*For this project (activity under Part 4), the project site is **NOT** located within a 'declared area of outstanding biodiversity value'. See **Figure 3**.*

1.3 Biodiversity Values Map and Threshold (BMAT) Tool

The Biodiversity Offsets Scheme Threshold (BOSET) is a test used to determine when it is necessary to engage an accredited assessor to apply the Biodiversity Assessment Method (the BAM) under the BOS to assess the impacts of a proposal. It is most commonly used for local developments (development applications submitted to councils) and clearing that does NOT require development consent in urban areas and areas zoned for environmental conservation (under the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017).

The *Biodiversity Conservation Regulation 2017* sets out threshold levels for when the Biodiversity Offsets Scheme will be triggered. The threshold has two (2) elements:

1. Whether the amount of native vegetation being cleared exceeds a threshold area (**Figure 2**), or;
2. Whether the impacts occur on an area mapped on the *Biodiversity Values map* published by the Chief Executive of the NSW Office of Environment and Heritage (DPIE) (**Figure 3**).

If clearing and other impacts exceeds either trigger, the Biodiversity Offset Scheme (BOS) applies to the proposed development, including biodiversity impacts prescribed by clause 6.1 of the Biodiversity Regulation 2017. The area threshold applies to all proposed native vegetation clearing associated with a proposal, regardless of whether this clearing is across multiple lots.

If the land on which the proposed development is located has different minimum lot sizes the smaller or smallest of those minimum lot sizes is used to determine the area clearing threshold. If the BOS is not triggered, the Test of Significance must be used to determine whether a local development is likely to significantly affect threatened species or communities.

The area threshold varies depending on the minimum lot size (shown in the Lot Size Maps made under the relevant Local Environmental Plan (LEP)) or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP) according to the table below:

Minimum lot size associated with the property	Threshold for clearing, above which the BAM and offsets scheme apply
Less than 1 ha	0.25 ha or more
1 ha to less than 40 ha	0.5 ha or more
40 ha to less than 1000 ha	1 ha or more
1,000 ha or more	2 ha or more

Figure 2: Minimum lot size and clearing threshold applicable to the site.

The proposed subdivision occurs on an allotment with a minimum lot size of 90 hectares, falling within the '40ha to less than 1000 ha' category, meaning that the maximum threshold for clearing in this case is 1 hectare (**Figure 4**).

The native vegetation loss value for the site was calculated by mapping around the proposed impact areas in areas where these intersect with areas of native vegetation. It must be noted that the main footprint of the solar array is located (after alterations of the original design) in an area dominated by exotic pasture species and which does not meet the definition of native vegetation in NSW. In total 0.19 hectares of native vegetation will be removed/impacted by the development (**Figure 4**).

*The proposal does NOT impact on an area mapped on the Biodiversity Values map (**Figure 3**). In its current form and at the time this assessment was published, the on-ground native vegetation impacts associated with the proposal will NOT exceed the allowable 1 hectare clearing threshold.*

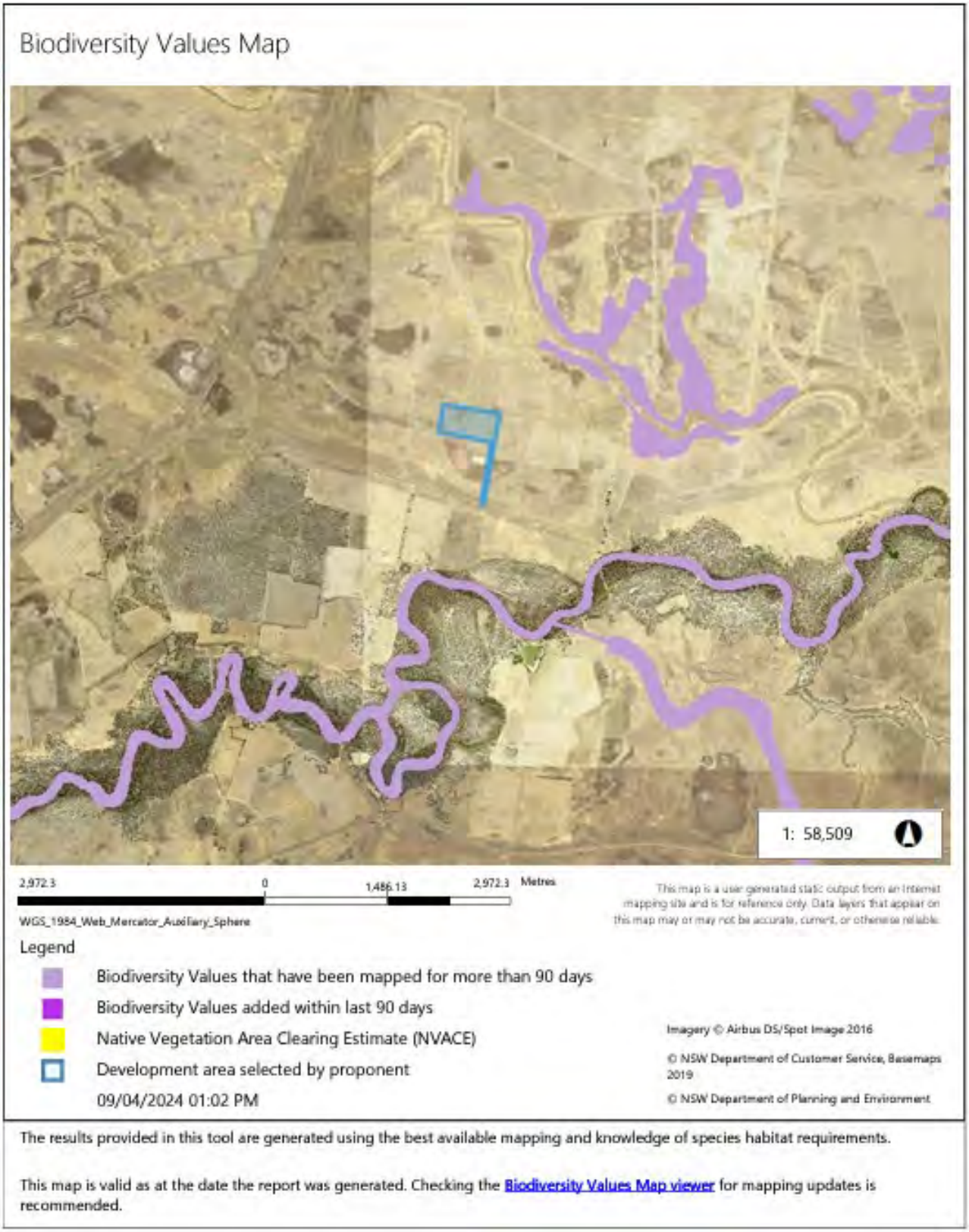

Figure 3: Biodiversity Offsets Scheme Threshold Tool results. Source: BOSET 2023

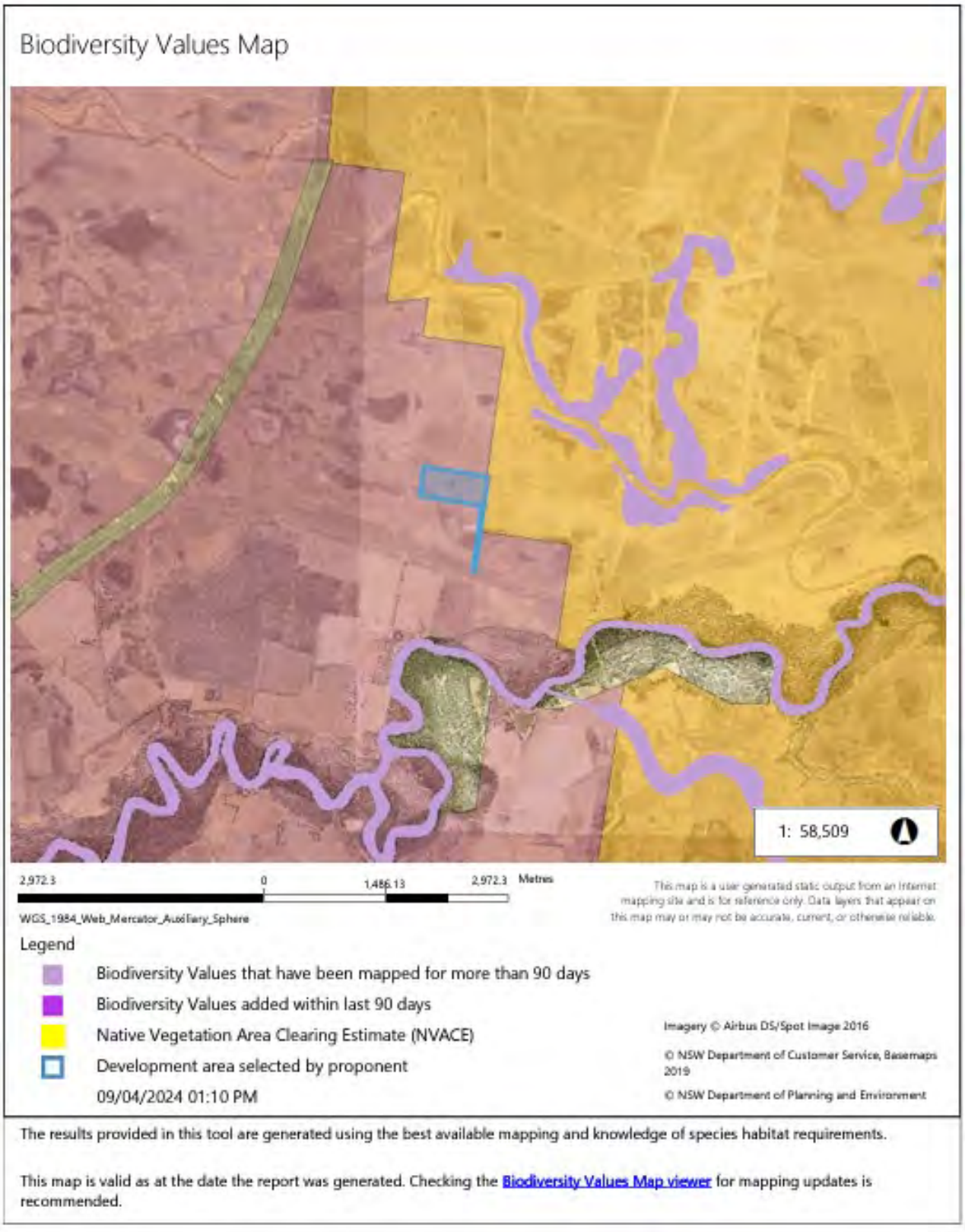

Figure 4: Minimum lot sizes and areas of native vegetation to be cleared. Source: Biodiversity Value Map, 2023.

2 Construction Method

Red-Gum has been engaged to assess the likely ecological impacts to the receiving environment assuming the construction of a solar farm at the listed address near Hay, NSW. Red-Gum has assumed that all impacts associated with the works are confined to the development boundary. This assessment herein is a desk-top assessment of the likely environs at site and also documents the actual condition of the site at the time of the site inspections (09/10/23, 30/10/23, and 05/04/24).

The construction involves installation of 10,530 solar panels in three arrays, with 27 panels per string. Other works include storage batteries to be centrally located near the array set-up, an inverter station, as well as a switchboard and power connections. Temporary works include a car park, laydown area and internal road, all of which are within the exotic dominated areas and will be reinstated after construction is complete. An approximately 630 metre-long access road is being constructed along the eastern edge of the Subject Site, avoiding the higher quality vegetation that is located further west in the road reserve and the southern part of the private property. The solar array area is to be fenced with a security fence to prevent unwanted access. To connect the solar array to the existing power grid, two new power poles are to be erected, each with a small impact area to allow for impacts during installation. These areas are included in the vegetation losses, however, the prospects of the areas regenerating after works is good.

Following review of the construction method (and consultation with the client) the construction footprint and associated losses were deduced acknowledging the following key points:

- The solar farm will be installed with a two metre-high array system, where the arrays are spaced approximately 5-6 metres apart (to prevent shading at start and end of day). The wide distance apart significantly reduces the amount of shade impacting the areas between the panels, optimising panel performance and allowing ground vegetation to be maintained.
- There are no anticipated vegetation losses along proposed fences or for fire breaks as the entire solar array footprint is in low quality vegetation (cultivated and cropped) and will continue to be under a grazing regime (not dis-similar to how the site is already being managed).
- Impacts to vegetation are limited to the native vegetation (medium and high quality areas) being intersected by the access road and the impact areas for the new power poles.

In summary, there will be some inter-row shading in the early morning and late afternoon, however, the ‘agrivoltaics’ industry is expanding worldwide based on the principles of integrating agriculture (grazing) and solar panel projects which, like this project, are essentially designed to take advantage of continued vegetation (grass) cover beneath the panels. The current low levels of native vegetation cover may persist at the same levels or are even likely to increase over time after construction is complete, as the site will be undergo the same grazing regime, but will no longer undergo cultivation (likely allowing native species to recolonise to some extent).

For this reason, total and complete loss of vegetation within the site bounds is not likely, rather, the anticipated losses have been minimised (by relocating the solar array into low quality areas of vegetation), and impacts will be limited to that in native vegetation areas which will be damaged during construction, for the access road and small areas around the two power pole installations.

3 Assessment Scope

The field work was conducted to assess whether or not threatened species, populations and ecological communities are likely to occur within the proposed development area (Subject Site) and any areas in close proximity to this development (Study Area).

"Subject Site" means the area directly affected by the proposal. "Study Area" means the subject site and any additional areas which are likely to be affected by the proposal, either directly or indirectly (OEH, 2018). To this end – this assessment has considered all site features and the surrounding land (in the same ownership)**.** In particular, the assessment considers:

1. The extent of ground disturbance works required to construct the proposal; and
2. The extent of likely impact(s) that the works will have on the movements of threatened species and threatened ecological communities across the project site, including potential foraging (fauna) in close proximity to the site.

3.1 Methodology

The review of the site and proposal has been guided by the BC Act (OEH, 2018) and follows the objectives of section 7.3 of this Act. The Test of Significance ("5 part test") under section 7.3 (2) of the BC Act follows the 'Threatened Species Test of Significance Guidelines' (OEH 2018).

The review of the site and proposal has been guided by the field survey methods referred to in 'Field survey methods for environmental consultants and surveyors when assessing proposed development or other activities on sites containing threatened species' a '4 step approach' (OEH 2018).

Steps 1 - 2 were conducted and managed by the proponent in preparation for this report. Steps 3 - 4 were used to guide the assessment overall and the final commentary under each of the headings mentioned by the assessment scope.

4 The Existing Environment

4.1 Meteorological Data

The climate is characterized as warm to hot summers and cool winters. The prevailing winds are from the north-west in the summer months and south-south east in autumn and winter. The area has a temperate climate and is historically a semi-arid climate. The average rainfall is 360 millimetres per year as recorded at station number 075019 (Hay Air Port) by the Bureau of Meteorology.

4.2 Landform and Geology

The site is situated within the Riverina Bioregion and sits above the Murrumbidgee River floodplain. This area forms part of the basin supporting western NSW, a major fault sequence extending from central NSW south through Victoria and Tasmania. The geology of the area is largely granite, volcanic or metamorphosed sediments as base rock, with some areas of clay and silt in lower lying areas. The soils are deeper sandy clay loams, which form under the influence of deposition from the surrounding landscape. The site has an elevation of 12 metres and is flat with very slight undulations throughout. The site is poorly drained and receives some resting stormwater from any heavy rains received in the area.

4.3 Soil Types and Properties

Soils in this bioregion are typically red-brown earths on undulating plains and more extensive grey clays on alluvium (NPW 2003). Extensive agricultural practices throughout the region, especially clearing and cultivation, have modified the soil profile to varying extents.

4.4 Vegetation Pattern & Bioregion

4.4.1 IBRA Bioregions and IBRA Subregions

Interim Biogeographic Regionalisation of Australia (IBRA) regions represent a landscape-based approach to classifying the land surface, including attributes of climate, geomorphology, landform, lithology, and the characteristic flora and fauna species present. The subject land is located entirely within the Riverina subregion of the NSW Hay Plains IBRA region (version 7).

4.4.2 NSW Landscape Regions (Mitchell Landscapes)

The subject site occurs in the NSW Mitchell Landscape of '*Murrumbidgee scalded Plains*' (Mbd) (Mitchell Landscapes V3) (**Figure 5**). The Murrumbidgee Scalded Plains landscape consists of quaternary alluvial plains, with a general elevation of 17 metres. Grey-brown-red texture-contrast soils in the area have been extensively cleared and cropped.

4.4.3 Plant Community Types (PCTs)

The State Vegetation Type Map: Riverina Region (Version v1.2 - VIS_ID 4469) provided by OEH indicates that the most likely vegetation community type in the main solar array is exotic (no PCT). In the southern areas where the access road and new power poles are intersecting, the mapped PCTs include **PCT 164** - Cotton Bush Open Shrubland of the Semi-arid (Warm) Zone, **PCT 46** - Curly Windmill Grass – Speargrass – Wallaby Grass Grassland on Alluvial Clay and Loan on the Hay Plain, **PCT 160** - Nitre Goosefoot Shrubland Wetland on Clays of the Inland Floodplains, and **PCT 70** - White Cypress Pine Woodland on sandy Loams in Central NSW Wheatbelt (**Figure 6**). Given the history of clearing, burning and grazing in the region, all remaining areas of intact remnant native vegetation are not considered significant when compared to pre-1750 vegetative coverage. It was for this reason that significant efforts were made to alter the initial designs to avoid as much native vegetation impacts as possible.

4.5 Surrounding Land Uses

The major land uses of the surrounding areas outside the Hay township include livestock grazing, cropping, particularly cotton along the river edge, and other irrigation practices. The site is quite far east of the town, being 16 kilometres from the center of Hay. An additional benefit of pushing the solar array footprint further north to avoid biodiversity impacts, is that the solar farm will have low impacts for local aesthetic values and minimal impacts upon surrounding agricultural land uses.

Figure 5: Mitchell Landscapes occurring within the vicinity of the site. (Source: Mitchell Landscapes V3).

Figure 6: Plant Community Types around the site. Scale: 1:5000.

4.6 Known Threatened Species, Populations, or Ecological Communities.

4.6.1 Commonwealth Listed Threatened Flora – Protected Matters Online Search

Consultation with the EPBC Protected Matters Online search Tool for the specified geographic region (5 kilometre buffer of the site) returned three (3) Endangered and zero (0) Critically Endangered Communities. Six (6) threatened flora species were identified as having habitat which may occur within the specified geographic range, being five (5) Vulnerable and one (1) Endangered species. **Table 1** considers their likelihood of occurring in the proposed site.

Five (5) categories for the 'likelihood of occurrence' of species has been used. The categories are based on recorded sightings listed in credible databases, the presence or absence of suitable habitat, other features of the site, results of the field survey and professional judgement. The 5 categories are:

[1] **'Yes'** The species/community was or has been observed on the site.
'Likely' A medium to High probability that a species uses the site
'Potential' A suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as 'likely' or 'unlikely' to occur.
'Unlikely' A Very Low to Low probability that a species uses the site.
'No' Habitat on the site and in the vicinity in unsuitable for the species.

Table 1: EPBC Protected Matters Database results - Flora

Species	Preferred Habitat	EPBC Act Status	Likelihood[1]
Threatened Ecological Communities			
Buloke woodlands of the Riverina and Murray-Darling Depression Bioregions		Endangered	**No**. Indicator species not present.
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia		Endangered	**No**. Indicator species not present.
Weeping Myall Woodlands		Endangered	**No**. Indicator species not present.
Flora			
Solanum karsense- Menindee Nightshade	Endemic to NSW, restricted to the far south-western plains, extending up the Darling River to the Menindee and Wilcannia districts	Vulnerable	**Unlikely**. No recent records in the area. A conspicuous species that was not detected despite multiple site visits.
Eleocharis obicis- Spike rush	Wet prairies, vernal pools, wet meadows, ditches, fields, and pastures	Vulnerable	**Unlikely**. Not suitable habitat and no rushed or sedges identified on subject site.
Brachyscome papillosa - Mossgiel Daisy	Clay soils common to the Riverina. Low story shrubbery	Vulnerable	**Potential**. A 2000 record ~4km north, numerous records further west. See **Appendix B** for SIC assessment.
Maireana cheelii - Chariot Wheels	Usually found on floodplains in chenopod shrubland and grassland communities on heavy clay soils	Vulnerable	**Potential**. Some recent records in similar habitat to the southwest. See **Appendix B** for SIC assessment.

Species	Preferred Habitat	EPBC Act Status	Likelihood[1]
Threatened Ecological Communities			
Lepidium monoplocoides - Winged Peppercress	Semi-arid western plains region of NSW. Occurs on seasonally moist to waterlogged sites, usually in open woodland dominated by Bulloak, Black Box or Poplar Box.	Endangered	**Potential**. Some recent records in similar habitat to the southwest. See **Appendix B** for SIC assessment.
Swainsona murrayana - Slender Darling-pea	Grows in heavy soils, especially depressions, and is also found on grey and red to brown clay and clay-loam soils. Grows with bladder saltbush, black box and grassland communities on level plains and floodplains.	Vulnerable	**Potential**. There is a record from 2001 ~1.5 km east, and two others from a similar date further to the east of the subject site. Not found, despite adequate survey effort, but may be present (seasonal absence). See **Appendix B** for SIC assessment.

4.6.2 NSW Listed Threatened Flora - NSW BioNET Search

Consultation with NSW BioNet, the website for the Atlas of NSW Wildlife returned 1 flora species records, one (1) Vulnerable species previously recorded within a 5km buffer of the site. **Table 2** considers their likelihood of occurring at the site.

Table 2: BioNet Atlas of NSW Wildlife – Flora

Species	Preferred Habitat	NSW Status	Likelihood[1]
Swainsona murrayana - Slender Darling Pea	Grows in heavy soils, especially depressions, and is also found on grey and red to brown clay and clay-loam soils. Grows with bladder saltbush, black box and grassland communities on level plains and floodplains.	Vulnerable	**Potential**. There is a record from 2001 ~1.5 km east, and two others from a similar date further to the east of the subject site. Not found, despite adequate survey effort, but may be present (seasonal absence). See **Appendix B** for SIC assessment.

4.6.3 Commonwealth Listed Threatened Fauna – Protected Matters Online Search

Consultation with the EPBC Protected Matters Online Search Tool for the specified geographic region (10km buffer) returned eight (8) Migratory, twenty-one (21) Vulnerable, fourteen (14) Endangered and six (6) Critically Endangered *fauna* species whose habitat may occur within that specified geographic range. **Table 2** considers their likelihood of occurring in the proposed site based on the results of the desk-top assessment.

Table 3: EPBC Protected Matters Database results - Fauna

Species	Preferred Habitat	EPBC Act Status	Likelihood[1]
Birds			
Grantiella picta - Painted Honeyeater	Boree/Weeping Myall, Brigalow and Box-Gum Woodlands and Box-Ironbark Forest.	Vulnerable	No – Treeless and not suitable habitat.

Species	Preferred Habitat	EPBC Act Status	Likelihood[1]
Falco hypoleucos - Grey Falcon	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions.	Vulnerable	Unlikely. Some local records but no important habitat on site. At best a very rare visitor to the airspace over the site.
Lathamus discolor - Swift Parrot	Forests and woodlands dominated by winter flowering eucalypts	Critically Endangered	No – Treeless and not suitable habitat.
Melanodryas cucullate cucullate - Hooded Robin (South-eastern form)	Lightly wooded country, open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas.	Endangered	Unlikely – No suitable medium shrub layer present.
Botaurus poiciloptilus - Australasian Bittern	Favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes.	Endangered	No – Not suitable habitat.
Calidris ferruginea - Curlew Sandpiper	Intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons and also around non-tidal swamps.	Critically Endangered	No – Not suitable habitat.
Aphelocephala leucopsis - Southern Whiteface	Dry open forests and woodland and inland scrubs of mallee, mulga and saltbush.	Vulnerable	No – No suitable tree or shrub layer.
Neophema chrysostoma - Blue-winged Parrot	Prefer grasslands and grassy woodlands. Found near wetlands near coast and semi-arid zones.	Vulnerable	Potential – Some suitable grassland habitat. See **Appendix B** for SIC assessment.
Polytelis swainsonii - Superb Parrot	Forests and woodlands dominated by hollow bearing eucalypts.	Vulnerable	No – Not suitable habitat.
Rostratula australis – *Australian Painted Snipe*	shallow, brackish or freshwater terrestrial wetlands, especially temporary ones which have muddy margins	Endangered	No – Not suitable habitat.
Tringa nebularia – Common Greenshank, Greenshank	Inland wetlands and sheltered coastal habitats of varying salinity.	Endangered	No – Not suitable habitat.
Lophochroa leadbeateri leadbeateri - Major Mitchell's Cockatoo	Close proximity to water, semi-arid or arid scrubland or wooded grasslands	Endangered	No – Treeless and not suitable habitat.
Gallinago hardwickii - Latham's Snipe	Permanent and ephemeral wetlands, freshwater with low dense vegetation	Vulnerable	Unlikely
Calidris acuminata - Sharp-tailed Sandpiper	Shallow inland freshwater wetlands, mudflats, saltmarshes, and mangroves	Vulnerable	No – Not suitable habitat.
Climacteris picumnus victoriae - Brown Treecreeper (south-eastern)	Eucalypt woodlands and dry open forest of the inland slopes and plains inland of the Great Diving Range.	Vulnerable	No – Treeless and not suitable habitat.
Stagonopleura guttata - Diamond Firetail	Found in open grassy woodland, heath and farmland or grassland	Vulnerable	**Potential.** May frequent the site on occasion to feed in grassland. See **Appendix B** for SIC assessment.
Pedionomus torquatus - Plains-wanderer	Semi-arid, lowland native grasslands that typically occur on hard red-brown soils.	Critically Endangered	**Potential**. One recent record (2015) ~15km northeast. See **Appendix B** for SIC assessment.

Species	Preferred Habitat	EPBC Act Status	Likelihood[1]
Rostratula australis - Australian Painted Snipe	Occurs on the fringes of swamps, dams and marshy areas, where grasses, low scrub or open timber is present.	Endangered	No – Not suitable habitat.
Fish			
Maccullochella macquariensis - Trout Cod	Main habitats were the larger upland rivers and creeks of NSW.	Endangered	No. No suitable aquatic habitat.
Galaxias rostratus - Flathead Galaxias	Billabongs, lakes, swamps and rivers, in still or slow flowing waters.	Critically Endangered	No. No suitable aquatic habitat.
Maccullochella peelii peelii - Murray Cod	Slow flowing turbid rivers and billabongs.	Vulnerable	No. No suitable aquatic habitat.
Macquaria australasica - Macquarie Perch	Upper catchment tributaries of the Murray-Darling river system in Victoria and NSW.	Endangered	No. No suitable aquatic habitat.
Craterocephalus fluviatilis - Murray Hardyhead	Prefers slow flowing or still waters, with dense aquatic vegetation.	Endangered	No. No suitable aquatic habitat.
Bidyanus bidyanus - Silver Perch	Faster-flowing water including rapids and races and more open sections of river.	Critically Endangered	No. No suitable aquatic habitat.
Frogs			
Litoria raniformius - Growling Grass Frog	Still or slow-flowing water bodies such as lagoons, amongst emergent vegetation.	Vulnerable	No. No suitable vegetated aquatic habitats.
Crinia sloanei - Sloane's Froglet	Periodically inundated areas in grassland, woodland and disturbed habitats.	Endangered	Unlikely. Not suitable regularly inundated habitat.
Mammals			
Dasyurus maculatus - Spotted-tailed Quoll	Occurs in a range of habitat types, that possess hollow-bearing trees, fallen logs, other animal burrows or caves and rock outcrops for den sites	Endangered	No. Not suitable habitat.
Nyctophilus corbeni - Corben's Long-eared Bat	Box/ironbark/cypress-pine vegetation along the western slopes and plains of NSW and southern Queensland.	Vulnerable	Unlikely. Not suitable habitat. At best may hunt prey on rare occasion in airspace above site.
Phascolarctos cinereus - Koala	Inhabit eucalypt woodlands and forests.	Endangered	No. Treeless and not suitable habitat.
Reptiles			
Aprasia parapulchella - Pink-tailed Legless Lizard	Open woodland with ground layer dominated by native grasses and rocky outcrops.	Vulnerable	No. Not suitable habitat.
Hemiaspis damelii - Grey Snake	Woodland areas, heavier cracking clay soils in association with water bodies or gulleys and ditches	Endangered	No. Not suitable habitat.
Listed Migratory Birds			
Apus pacificus - Fork-tailed Swift	Spend most their life airborne. Build their nests on cliffs.	Migratory	Unlikely. Not suitable habitat. At best may hunt prey on rare occasion in airspace above site.
Motacilla flava - Yellow Wagtail	Found in short grass, bare ground, coastal swamp margins	Migratory	Unlikely. Not preferred habitat and no records from the broader region.
Myiagra cyanoleuca - Satin Flycatcher	Tall wet eucalypt forests of SE Australia.	Migratory	No. Not suitable habitat.

Species	Preferred Habitat	EPBC Act Status	Likelihood[1]
Calidris ferruginea - Curlew Sandpiper	Occur on intertidal mudflats in sheltered coastal areas.	Critically Endangered	No. Not suitable habitat.
Tringa nebularia – Common Greenshank	Inland wetlands and sheltered coastal habitats of varying salinity	endangered	No. Not suitable habitat.
Gallinago hardwickii - Latham's Snipe	Freshwater swamps and marshes as well as salt marshes and mud flats	Migratory	No. Not suitable habitat.
Actitis hypoleucos - Common Sandpiper	Found in coastal or inland wetlands, both saline or fresh.	Migratory	No. Not suitable habitat.
Calidris acuminata - Sharp-tailed Sandpiper	Prefers the grassy edges of shallow inland freshwater wetlands.	Migratory	No. Not suitable habitat.
Calidris melanotos - Pectoral Sandpiper	Prefers the shallow grassy edges of shallow inland freshwater wetlands.	Migratory	No. Not suitable habitat.

4.6.4 Threatened Fauna - NSW BioNET Search

Consultation with NSW BioNet: The website for the Atlas of NSW Wildlife returned three (3) Vulnerable, one (1) Endangered and zero (0) Critically Endangered fauna species previously recorded within a 5km buffer of the site (**Figure 7**), with the closest being a Spotted Harrier record, approximately 837 metres in a wooded area to the south-west (**Figure 8**). **Table 4** their likelihood of occurring at the site based on the desk-top assessment.

Table 4: BioNet Atlas of NSW Wildlife – Fauna

Species	Preferred Habitat	NSW Status	Likelihood[1]
Birds			
Circus assimilis - Spotted Harrier	Grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe.	Vulnerable	Unlikely. At best would be a very infrequent visitor to the area when hunting prey. Does not contain important habitat and much more likely to hunt in local woodland remnants.
Pedionomus torquatus – Plains-wanderer	Sparse, treeless, lowland native grasslands that occur on hard red-brown soils.	Endangered	**Potential**. One recent record (2015) ~15km northeast. See **Appendix B** for SIC assessment.
Anseranas semipalmata – Magpie Goose	Open wetland areas such as swamps and floodplains, found close to rivers and nests in trees.	Vulnerable	No. No suitable habitat.
Mammals			
Dasyrurus maculatus – Spotted-tailed Quoll	Forests, woodlands, rainforest. Occasionally seen in open county or on grazed areas or rocky outcrops	Vulnerable	Unlikely. No suitable habitat. One local record from 2010 associated with woodlands of the Murrumbidgee River.

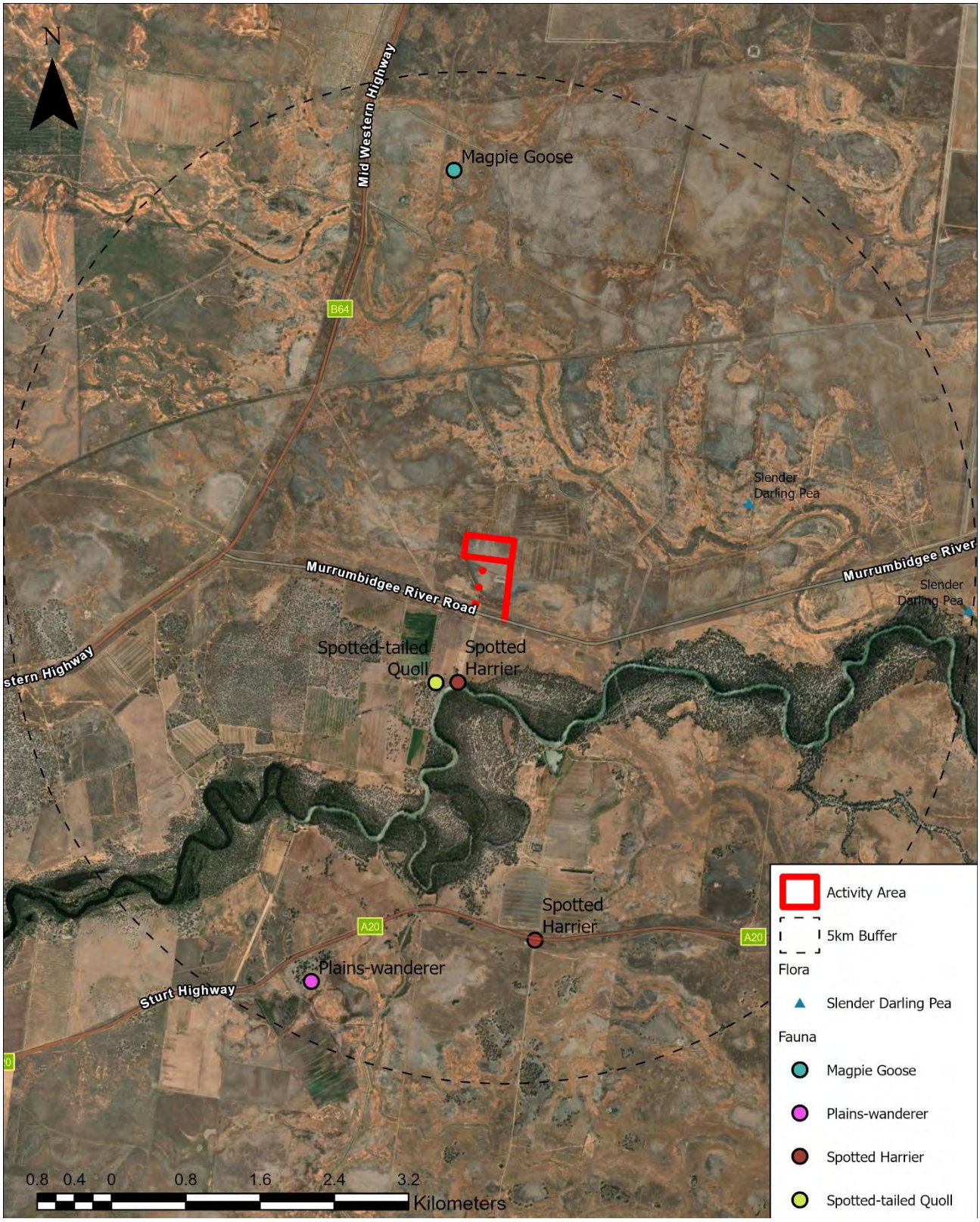

Figure 7: Recorded threatened species within 10km of site. Scale: 1:110,000. NSW BioNet, 2023.

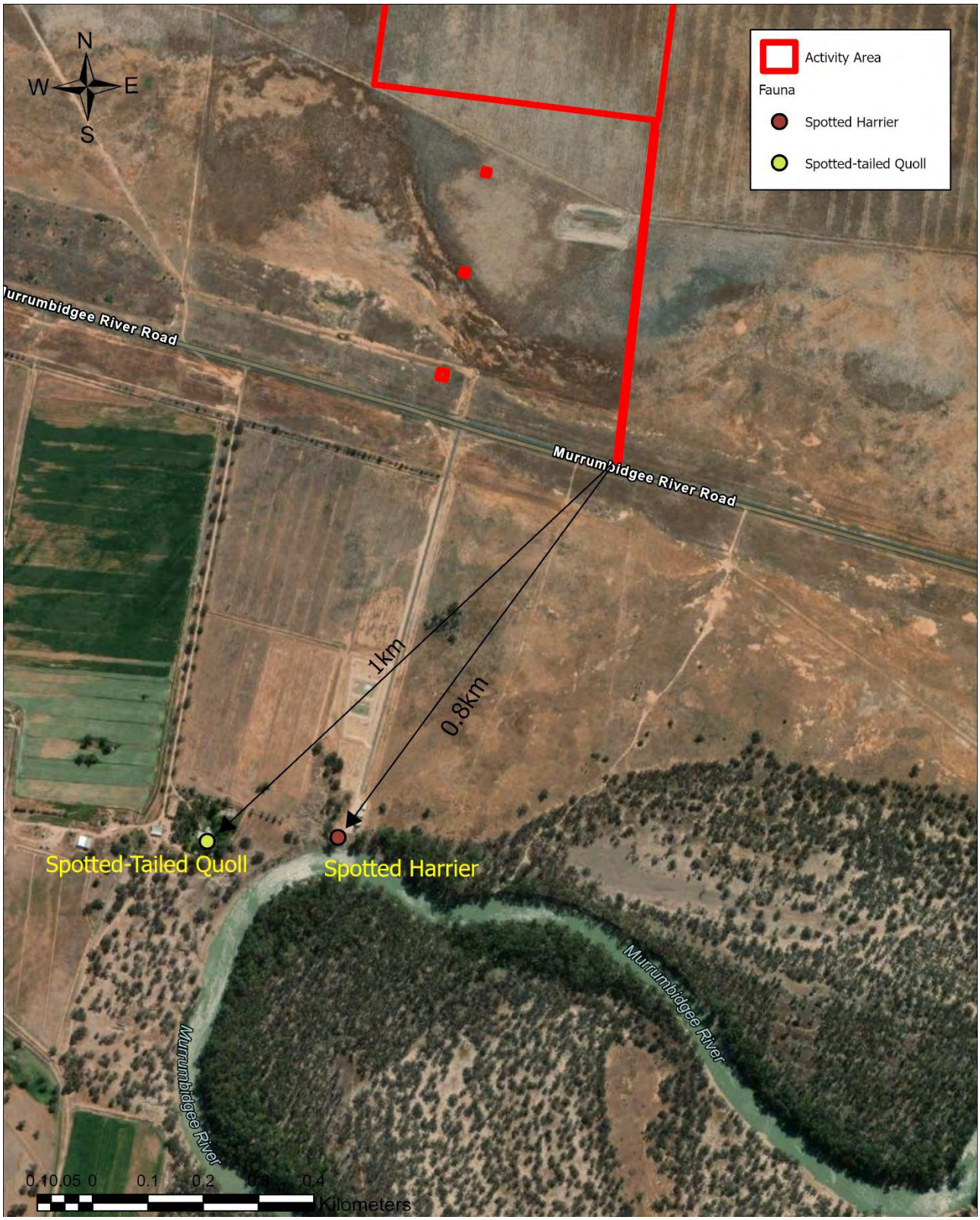

Figure 8: Closest BioNet records. Scale: 1:8,300. NSW BioNet, 2024

5 Threatened Species, Populations and Ecological Communities.

The content of this section is guided by step 3 and 4 in the field survey methods document (OEH 2018) and intends to determine the likelihood of the study area and subject site supporting threatened species.

5.1 Field Assessment - Flora

Despite historic disturbance associated with road construction, installation of overhead powerlines, historic cultivation and ongoing grazing impacts, the road reserve along the northern side of Murrumbidgee Road consists of relatively high quality vegetation with relatively low weed levels. The vegetation is made up of mostly PCT 164 – Cotton Bush Open Shrubland of the Semi-arid, with very small areas of PCT 46 – Curly Windmill Grass – Speargrass – Wallaby Grass Grassland on Alluvial Clay and Loam on the Hay Plain, Riverina Bioregion, along the interface with the private land north of the road reserve (see further below for species description for this PCT).

The area of PCT 164 in the road reserve is dominated by native grasses consisting of Rough Spear-grass (*Austrostipa scabra*), Bottlewasher Grass (*Enneapogon* p.), Curly Windmill Grass (*Enteropogon ramosus*), Brown-back Wallaby Grass (*Rytidosperma duttonianum*), Brush Wire-grass (*Aristida behriana*) and Umbrella Grass (*Digitaria divaricatissima*). Saltbush shrubs were the next most dominant type of plant, and included Grey Copperburr (*Scleroleana diacantha*), Black Roly Poly (*Sclerolaena muricata*) and Sago Bush (*Maireana pyramidata*). Native herbs were relatively sparse, and those present included Tah-vine (*Boerhavia dominii*), Variable Sida (*Sida corrugata*), New Holland Daisy (*Vittadinia gracilis*), Fuzzweed (*Vittadinia pterochaeta*), Tall Sida (*Sida intricata*), Quena (*Solanum esuriale*) and Purslane (*Portulacca oleracea*).

Just north of the road reserve, the private land is dominated by moderate to high quality PCT 46, then the quality drops away as the distance increases from the road reserve. This higher quality southern area of PCT 46 is also dominated by native grasses, including Rough Spear-grass (*Austrostipa scabra*), White-top Wallaby Grass (*Rytidosperma caespitosum*), Curly Windmill Grass (*Enteropogon ramosus*), Brown-back Wallaby Grass (*Rytidosperma duttonianum*), Windmill Grass (*Chloris truncata*), and Native Panic (*Panicum effusum*). Saltbush were the next most dominant, consisting of Grey Copperburr (*Scleroleana diacantha*), Black Roly Poly (*Sclerolaena muricata*), Saltwort (*Salsola tragus*), and several Bluebush species (*Maireana* spp.). Native herbs were widespread, and included Quena (*Solanum esuriale*), Tah-vine (*Boerhavia dominii*), Variable Sida (*Sida corrugata*), Caustic Weed (*Euphorbia drummondii*), Bindweed (Convolvulus sp.), New Holland Daisy (*Vittadinia gracilis*), Fuzzweed (*Vittadinia pterochaeta*) and Tall Sida (*Sida intricata*).

As distance increases from the boundary of the private and road reserve, species diversity and abundance drops off, with increasing cover of pasture grass weeds and other herbaceous weed species. Weed cover is dominated Rye Grasses (*Lolium* spp.), Barley Grasses (*Hordeum* spp.), Rat's Tail Fescue (*Vulpia myuros*), Horehound (*Marubium vulgare*), Paterson's Curse (*Echium plantagineum*), Common Heliotrope (*Heliotropum europaeum*), Peppercress (*Lepidium africanum*), Wild Oats (*Avena* spp.), Crane's Bill (*Erodium* sp.) and Sow Thistles (*Sonchus* spp.). Many of these weed species were scattered throughout the various PCT areas, but were much sparser on the roadside and southern part of the private property area.

Other areas of vegetation (PCTs) being intersected by the four-meter-wide access route area include PCT 164 (see above) and PCT 160 – Nitre Goosefoot Shrubland Wetland on Clays of the Inland Floodplains. However, where these PCTs formerly existed, these areas are now highly disturbed from past and ongoing agricultural activities such as cropping, cultivation, slashing and grazing, and are no longer representative of the respective PCTs. As a result of these historical and ongoing impacts, these areas contain less than 15% cover of native vegetation, and therefore the BAM does not apply.

These PCT areas described above will be impacted by the narrow, approximately 4-meter-wide access road to allow access to the main solar farm footprint further north. There will also be minor impacts associated with installation of two new power poles connecting the solar farm in the north to the existing overhead powerlines that run parallel with the northern road reserve of Murrumbidgee Road.

Table 5: Observed Flora – 27 November & 28 November 2024

Scientific Name	Common Name		Scientific Name	Common Name
Native Vegetation				
Aristida behriana	Brush Wire-grass		*Boerhavia dominii*	Tah-vine
Alternanthera angustifolia	Joyweed		*Bromus arenarius*	Sand Brome
Atriplex leptocarpa	Slender-fruit Saltbush		*Panicum effusum*	Hairy Panic
Atriplex semibaccata	Berry (Creeping) Saltbush		*Chenopodium nitrariaceum*	Nitre Goosefoot
Austrostipa nodosa	Knotty Spear Grass		*Chloris truncata*	Windmill grass
Austrostipa scabra	Rough Spear-grass		*Convolvulus clementii*	Desert Bindweed
Cotula coronopifolia	Water Buttons		*Enchylaena tomentosa var. tomentosa*	Ruby Saltbush
Dicanthium sericeum	Silky Blue-grass		*Enneapogon nigricans*	Nine-awn Grass (Bottlewashers)
Digitaria diverticatissima	Cotton Umbrella Grass		*Enteropogon acicularis*	Spider Grass
Einadia nutans	Nodding Saltbush		*Eriochloa pseudoacrotricha*	Early Spring Grass
Euphorbia drummondii	Flat Spurge		*Malva pressiana*	Native Hollyhock
Goodenia sp.	Goodenia		*Leiocarpa leptolepis*	Pale Plover Daisy
Juncus sp.	Rush		*Marseilia hirsuta*	Small-leaf Nardoo
Lythrum hyssopifolia	Small Loosestrife		*Oxalis perennans*	Grassland Wood-sorrel
Mairean enchylaenoides	Wingless Bluebush		*Portulaca oleracea*	Purslane / Pigweed
Maireana aphylla	Leafless Bluebush		*Rhodanthe corymbiflora*	Grey Sunray
Maireana appressa	Silky Bluebush		*Rumex brownii*	Slender Dock
Maireana cilitata	Hairy Fissure Weed		*Rytidosperma caespitosum*	Common Wallaby-grass
Maireana decalvens	Black Cotton-bush		*Rytidosperma duttonianum*	Brown-back Wallaby-grass
Maireana pentagona	Hairy Bluebush		*Rytidosperma setaceum*	Bristly Wallaby-grass
Maireana pyramidata	Black Bluebush		*Salsola tragus*	Saltwort
Sclerolaena bicornis	Goathead Burr		*Sida intricata*	Twiggy Sida
Sclerolaena diacantha	Grey Copperburr		*Sida trichopoda*	Narrow-leaf Sida
Sclerolaena divericata	Tangled Copperburr		*Solanum esuriale*	Quena
Sclerolaena lanicuspis	Woolly Copperburr		*Unidentified*	Strap-leaf (spathulate) forb
Sclerolaena muricata	Black Roly-poly		*Vittadinia cuneata*	Fuzzweed
Sclerolaena muricata var. villosa	Grey Roly-poly		*Vittadinia gracilis*	New Holland Daisy
Sclerolaena obliquicuspis	Limestone Copperburr		*Walwhalleya proluta*	Rigid Panic
Sida corrugata	Variable Sida		*Sida fibulifera*	Pin Sida
Exotic Vegetation				
Aira sp.	Air Grass		*Avena fatua*	Wild Oats
Cirsium vulgare	Spear Thistle		*Chondrilla juncea*	Skeleton Weed
Erigeron bonariensis	Flax-leaf Fleabane		*Echium plantagineum*	Paterson's Curse
Erigeron bonariensis	Flax leaf Fleabane		*Erodium moschatum*	Musky Heron's-bill
Heliotropum europaeum	Common Heliotrope		*Hordeum marinum*	Sea Barley-grass
Lamarckia aurea	Golden Top		*Lepidium africanum*	Common Peppercress
Lolium perenne	Perennial Rye-grass		*Lycium ferocissimum*	African Boxthorn
Heracleum sp.	Hogweed		*Bromus diandrus*	Great Brome

Scientific Name	Common Name		Scientific Name	Common Name
Marrubium vulgare	Horehound		*Medicago polymorpha*	Burr Medic
Proboscidea lutea	Devil's Claw		*Sonchus asper s.l.*	Rough Sow-thistle
Sonchus oleraceus	Common Sowthistle		*Tribulus terrestris*	Caltrop
Vulpia bromoides	Silver Grass		*Xanthium spinosum*	Bathurst Burr

5.2 Field Assessment - Fauna

A variety of methods were employed during the field assessment stage. However, the nature of the proposal and construction methodology meant that some investigations were not warranted. **Table 6** provides a summary of methodologies used, those that were not and the reasons for both. **Table 7** shows the results of that survey.

Table 6: Field assessment methods employed.

Intended Target	Methodology	Survey Period Notes
Diurnal Birds	Area search, where the observer walked the length of the site twice in its entirety.	Conditions on November 27th 2023, 26°C, still and clear. Conditions on November 28th 2023, 28°C, light wind & partly cloudy. Conditions on April 5th 2024, 20°C, cloudy and intermittently raining in the area.
	Point Count method, where observations were made from 2 points for 20 minutes each.	No nesting activity observed.
Nocturnal Birds	Day habitat search. Search habitat for pellets, and likely hollows.	No likely habitat found.
	Stag-watching. Observing potential roost hollows for 30mins prior to sunset and 60mins following sunset.	Nothing observed. No trees or substantial shrubs present.
Flying Mammals	Spotlighting on foot	Habitat was observed during the day.
	Stag-watching. Observing potential roost hollows for 30mins prior to sunset and 60mins following sunset.	Nothing found.
Non-Flying Mammals	Search for scats and signs - 30 minutes searching relevant habitat, including trees for scratch marks.	None found or collected.
Reptiles	Day habitat search.	Shingle-Back Lizard was located during site inspection. Was not hidden but was in plain site above ground.

Table 7: Observed Fauna – 27/11/2023, 28/11/2023, 05/04/2024

Scientific Name	Common Name
Malurus leucopterus	White-winged Fairy Wren
Falco berigora	Brown Falcon
Eolophus roseicapilla	Galah
Cacatua sanguinea	Little Corella
Grallina cyanoleuca	Magpie Lark
Falco cenchroids	Nankeen Kestrel
Coturnix sp.	Quail (Stubble or Brown)
Tiliqua rugosa	Shingle-back Lizard

6 Physical and Chemical Impacts

6.1 Is The Proposal Likely To Impact On Soil Quality Or Land Stability?

Soil Quality – No. The impacts to soil from the low impact development are expected to be minimal.
Land Stability - Yes. There is likely to be mobilisation of a small amount of soil given the nature of the proposal (construction). Mitigation measures are to extend (but not be limited to) the following:

- An Erosion and Sedimentation Control Plan (ESCP) developed and progressively implemented.
- Vehicle movements around the site will be restricted to clear areas and away from any existing native vegetation areas, and flagging exclusion fencing to be installed around these no-go zones.
- When rain is predicted, an assessment will be made prior to works beginning. If heavy rain is predicted, work will not commence.
- No stockpiles will be established upon native vegetation in any area on site or within the study area.
- Maintenance and checking of the erosion and sedimentation controls will need to be undertaken on a regular basis. Sediment will be cleared from behind barriers on a regular basis and all controls will be managed in order to work effectively at all times.
- Rehabilitation of any disturbed areas should be completed as soon as possible after completion of works, where practical to do so.

6.2 Is The Activity Likely To Affect A Waterbody, Watercourse Or Wetland Or Natural Drainage System?

No. The proposed works will not affect any waterbodies, watercourses, wetlands or natural drainage systems as there are none present on site.

6.3 Is The Activity Likely To Change Flood Or Tidal Regimes, Or Be Affected By Flooding?

No. The activity is unlikely to change flood or tidal regimes, and as it is approximately 900 metres from the nearest river, the Murrumbidgee River, it is highly unlikely that it will be affected by flooding.

6.4 Does The Proposal Involve The Use, Storage Or Transport Of Hazardous Substances Or The Use Or Generation Of Chemicals Which May Build Up Residues In The Environment?

No. Some diesel will potentially be stored in ‘slip-on’ tanks in the back of utility vehicles, and they will not be left on-site outside of working hours.

6.5 Does The Activity Involve The Generation Or Disposal Of Gaseous, Liquid Or Solid Wastes Or Emissions?

Yes. However only the operation of machinery should produce emissions, no further disposal of liquids, gases or solid wastes is expected.

6.6 Will The Activity Involve The Emission Of Dust, Odours, Noise, Vibration, Or Radiation In The Proximity Of Residential/Urban Areas Or Other Sensitive Locations?

Yes. The project will emit some dust and noise, and due to the size of proposed development, the potential need for imported fill for leveling purposes, and the need to construct a retention basin and a swale drain the emission of dust and noise may be moderate to substantial and over an extended time period. Given the current level of disturbance and set-back distance, and providing the recommendations contained within this report are adhered to, it is unlikely that the proposal will result in extensive or harmful outcomes regarding these activities.

7 Biological Impacts

7.1 Is Any Vegetation To Be Cleared Or Modified?

Yes. Works for the solar array will not interfere with any high level native species and will not require the removal of any trees or PCTs from the site. There will be small impacts associated with the access road and new power poles, and these have been factored into the assessment. Significant efforts have been made to redesign the project (shift the project further north onto cultivated land) to avoid the higher quality native vegetation in the road reserve and southern part of the private land.

7.2 Is The Activity Likely To Have A Significant Effect On Threatened Flora Or Fauna Species, Populations, Or Their Habitats, Or Critical Habitat; Or An Endangered Ecological Community Or Its Habitat?

Endangered Ecological Community

No. The development will not impact any 'Declared Area of Outstanding Biodiversity Value' on the DPIE mapping system, and no endangered ecological communities will be impacted by the development. Based on the finding from field assessments, and given the avoidance measures already taken by the proponent, the project is highly unlikely to displace any rare or threatened flora species.

Threatened Fauna

The project requires some removal of native vegetation, but the majority of impacts from the development are occurring in areas dominated by cultivated land and exotic species (after relocating the development into this area from the higher quality vegetation areas to the south). The nearest Mossgiel Daisy recording was 7 km from site and the nearest Chariot Wheels was recorded 4 km south-east. The possibility of the two flora species occurring on site is highly unlikely due to the site being highly modified and consists of largely introduced pasture grasses with little shrub layer.

7.3 Does The Activity Have The Potential To Endanger, Displace Or Disturb Fauna (Including Fauna Of Conservation Significance) Or Create A Barrier To Their Movement?

Endanger – No.

Displace – No. The vegetation on site is not highly suitable for birds or other species. Efforts have been made to move the impact footprint into highly degraded areas, and the small impact from the four metre-wide access track and power poles, where these intersect PCTs, are highly unlikely to displace any fauna.

Disturb – No. As above. The vegetation on site that is being impacted is not considered important for fauna and the small area being impacted is unlikely to cause any significant disturbance to fauna which may be present in the site or the local area.

7.4 Is The Activity Likely To Impact On An Ecological Community Of Conservation Significance?

No. There are no ecological communities of conservation significance present on site.

7.5 Is The Activity Likely To Cause A Threat To The Biological Diversity Or Ecological Integrity Of An Ecological Community?

No. The vegetation being removed is predominantly exotic pasture species in the main solar array area, and a thin strip of chenopod grassland with exotic ground covers for the access and power connection. The removal of these species will not cause a threat to the biological diversity or ecological integrity of an ecological community. It is unlikely that the community will suffer, due to the impacts or condition changes of the vegetation on site.

7.6 Is The Activity Likely To Introduce Noxious Weeds, Vermin, Feral Species Or Genetically Modified Organisms Into An Area?

Vermin – No.

Feral Species – No.

Genetically Modified Organisms – No.

Noxious Weeds - Possible.

The movement of vehicles, plant, equipment and people on and off the subject site has the potential to introduce noxious weeds to the area. The area is also impacted by several exotic herbaceous and grass weed species. Wherever possible, removal of weeds should be undertaken prior to seed developing, which for most species occurs during the warmer months (i.e. late spring and summer). Additionally, the following strategies are to apply to weed management within the site:

- Minimal impact techniques are to be used, ensuring no native species are damaged during weed control activities.
- Soil disturbance by vehicle and pedestrian access is to be kept to a minimum outside the construction footprint.
- Herbicide application is to be administered by authorised personnel only (e.g. ChemCert Accreditation– AQF 3), in accordance with the directions on the container label (application rates, MSDS requirements) and any applicable Workcover requirements.
- All earthmoving plant used within the site is to be thoroughly cleaned prior to the commencement of the construction.
- Any weeds removed (particularly those bearing seeds) are to be disposed of appropriately by burning, deep burying, or depositing at the nearest waste management facility.
- If required, only topsoil from areas with no noxious or highly invasive weed species should be re-used in rehabilitation (it is generally assumed that if there is no evidence of noxious or invasive weeds in an area, the topsoil in this area is not contaminated with the seeds of such weeds).

8 Test of Significance

The following section assesses whether the proposal (as discussed and reviewed in this assessment) is likely to have a significant effect on threatened biodiversity[1] by addressing the Parts (a), (b) and (c) of the Test of Significance applied to species and ecological communities listed in Schedules 1 and 2 to the BC Act and under s.111 of the EP&A Act.

It is important to note that under the BC Act and the EP&A Act s. 111; the factors to be considered when determining whether an action, development or activity is likely to significantly affect threatened species, populations or ecological communities, or their habitats (known previously as the '7-part test'), have been revised under the BC Act.

The revised factors maintain the same intent under the new ('5 part test) but better focus consideration of likely impacts in the context of the local rather than the regional environment as the long-term loss of biodiversity at all levels arises primarily from the accumulation of losses and depletions of populations at a local level. It also requires the identification of the potential impacts to/or on any areas declared to be of outstanding biodiversity value under Part 3 of the BC Act.

When applying each factor, the following sections have considered all perceived likely direct and indirect impacts of the development proposal as outlined by previous sections of this document.

- *Direct impacts* are those that directly affect the habitat of species and ecological communities and of individuals using the study area. They include, but are not limited to, death through predation, trampling, poisoning of the animal/plant itself and the removal of suitable habitat. When applying each factor, consideration must be given to all of the likely direct impacts of the proposed activity or development. When applying each factor, both long-term and short-term impacts are to be considered
- *Indirect impacts* occur when project-related activities affect species or ecological communities in a manner other than direct loss within the subject site. Indirect impacts may sterilise or reduce the habitability of adjacent or connected habitats. Indirect impacts can include loss of individuals through starvation, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, reduction in viability of adjacent habitat due to edge effects, deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, noise, light spill, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas. As with direct impacts, consideration must be given, when applying each factor, to all of the likely indirect impacts of the proposed activity or development. When applying each factor, both long-term and short-term impacts are to be considered.

[1] Specific species considered in the factors for consideration (EP&A and BC Act) included the Mossgiel Daisy, Chariot Wheels, Winged Peppercress & Slender Darling-pea (collectively considered "Native Grassland Forbs") and the Blue-winged Parrot, Diamond Firetail & Plains-wanderer (collectively considered "Native Grassland Aves". These species have been recorded in the DPE managed NSW Wildlife Atlas and under the EPBC Act within 5km of the site and their likelihood of using the site was rated as 'Potential' in Section 4.

8.1 Factors for Consideration - Test of Significance ("5 part test") BC Act Sections 7 (1) (a),(b),(c), (d)&(e) and under s.111 of the EP&A Act.

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Native Grassland Forbs

No. The project requires some removal of native vegetation, but the majority of impacts from the development are occurring in areas dominated by cultivated land and exotic species (after relocating the development into this area from the higher quality vegetation areas to the south). The nearest Mossgiel Daisy recording was 7 kilometres from site and the nearest Chariot Wheels was recorded 4 kilometres south-east. The possibility of the two flora species occurring on site is highly unlikely due to the site being highly modified and consists of largely introduced pasture grasses with little shrub layer.

Native Grassland Aves

No. Blue-winged Parrot and Diamond Firetail are highly mobile species that are more likely to be located in the riverine zone to the immediate south of the site. Plains wanderer inhabits areas with a low shrub/grassland complex with large areas of open scalds. Neither of these landscape features are present in the solar farm area. The impacts associated with the development (after re-siting) are very low and these threatened species (and other species in the area) are highly unlikely to be placed at risk of extinction as a result of the development.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:
(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

The development will not impact any 'Declared Area of Outstanding Biodiversity Value' or 'Biodiversity Value' as mapped by OEH. There are no threatened or endangered ecological communities present on the subject land or in areas surrounding the proposed development. Due to the majority of vegetation at the site being exotic, and only small impacts being made to areas that contain native vegetation, the development will not cause any fauna or flora species or populations to be at risk of extinction or adversely modify the composition of an ecological community.

(c) in relation to the habitat of a threatened species or ecological community:
(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and
(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and
(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

Ecological Communities

No. See (b) above. No TECs or EECs present. No impact to 'Declared Area of Outstanding Biodiversity Value' or 'Biodiversity Value' mapped area.

Threatened Species

Due to the condition, location and vegetation on site, no significant fragmentation will occur as a result of vegetation removal from the site. There are no mapped or recorded sightings of threatened species from on or very close to the subject site. No important threatened species habitat is being removed as part of the development.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

No. The development will not impact a 'Declared Area of Outstanding Biodiversity Value' or 'Biodiversity Value' mapped area to a degree that the project can be considered to have 'adverse affects' ecologically.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

A threatening process is something that adversely affects threatened species, populations of a species, ecological communities or could cause species, populations of a species or ecological communities to become threatened. A threat can be listed under Schedule 4 of the BC Act as a 'Key Threatening Process' if it adversely affects threatened species, populations or ecological communities or if it could cause species, populations or ecological communities that are not threatened to become threatened. There are currently 38 listed threatening processes recognised by the BC Act, and a further 19 by the EPBC Act.

No key threatening processes from the EPBC Act (Federal) are considered to be relevant to the proposal. Also, the following key threatening processes from the BC Act (NSW) are considered relevant.

Key Threatening Process	**Is the proposal of a class of activity that is recognised as a threatening process?**		
	Likely	**Possible**	**Unlikely**
Clearing of native vegetation	✓		
Invasion of native plant communities by exotic perennial grasses		✓	

The proposal will require the removal of some native species and exotic grasses, however after re-design of the proposal footprint, a very low native vegetation impact will now be caused by the construction and ongoing operations of the solar farm. The development will not impact a 'Declared Area of Outstanding Biodiversity Value' or 'Biodiversity Value' mapped area. Providing suitable mitigation measures are in place to ensure the management of onsite weeds and exclusion areas are installed surrounding remnant vegetation during construction, these efforts will ensure the proposal is not likely to be part of or become part of (or increase the impact of) a key threatening process.

9 Conclusion

As a result of the redesign effort to avoid higher value vegetation to the south, the vegetation on site is highly modified, consisting of no overstory, no mid-story and very sparse native understory for the majority of the development footprint. The vegetation on the main footprint of the site is dominated by exotic pasture grasses, that have been periodically cultivated, cropped, grazed and slashed. Ground structure (i.e. logs and shrub layer) is minimal with no logs. There are some higher quality native vegetation areas to the south which are undergoing minimal impacts from the access road (four metres wide) and the installation of two power poles. The impacts associated with the loss of these areas is highly unlikely to impact upon threatened species, populations or threatened ecological communities.

In total 0.19 hectares of native vegetation will be considered lost as a result of construction impacts, which is under the 1 hectare clearing threshold associated with the minimum lot size for the site. The project area falls within the Riverina Bioregion of NSW. Given the history of cultivation, burning, grazing, irrigation and development in the region, all remaining areas of intact remnant native vegetation are now considered significant when compared to pre-1750 vegetative coverage. It was for this reason substantial efforts were made after the initial site assessment to relocate the solar array footprint further north, into an area that does not contain any significant native vegetation.

During the visits to the study sites, no mammals or amphibians were observed. A total of nine (9) bird species were recorded. A total of one (1) reptile was observed on site, being a Shingle-back Lizard.

There is potential for some threatened birds or other migratory birds to be passing near the area. However, given the location of the site, being in an area surrounded by farmland, and being approximately 900 metres north of the Murrumbidgee River vegetation corridor, it is unlikely that these species would be breeding in the local vegetation, and they would only be using it periodically for opportunistic foraging. Habitat is unlikely to be disturbed and foraging resources will not be diminished to the extent that discernable impacts are anticipated because of the proposed works.

No (zero) threatened fauna, flora or Threatened Ecological Communities (TEC) are likely to be impacted adversely by the proposed development. The small areas of lost vegetation may offer some opportunistic feeding for highly mobile woodland birds and mammals and the site is not, in my opinion, any derivation of an EEC or TEC. The development will also not impact any 'Declared Area of Outstanding Biodiversity Value' or 'Biodiversity Value' as mapped by the Office of Environmental and Heritage (OEH).

Specific species considered in the factors for consideration (EP&A and BC Act) included the Mossgiel Daisy, Chariot Wheels, Winged Peppercress & Slender Darling-pea (collectively considered "Native Grassland Forbs") and the Blue-winged Parrot, Diamond Firetail & Plains-wanderer (collectively considered "Native Grassland Aves". These species have been recorded in the DPE managed NSW Wildlife Atlas and under the EPBC Act within 5km of the site and their likelihood of using the site was rated as 'Potential' in Section 4.

After consideration of the potential physical, chemical and biological impacts of the proposed construction design and methodology, I am of the opinion that the activities, as proposed, will not have a significant effect on threatened species and ecological communities and their conservation.

I am of the opinion that the activities as proposed will not have a significant effect on any of the identified threatened species and ecological communities and their conservation, as noted within this report.

10 References

Australian Government: Department of Climate Change, Energy, the Environment and Water (nd). *Protected Matters Search Tool*. https://pmst.awe.gov.au/#/map?lng=131.52832031250003&lat=-28.6905876542507&zoom=5&baseLayers=Imagery,ImageryLabels

Bureau of Meteorology (2022). *Climate Data Online*. Accessed November 2023. http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=139&p_display_type=dataFile&p_startYear=&p_c=&p_stn_num=074188

Department of Planning and Environment (nd). *Biodiversity Value Map and Threshold Tool*. https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap

Department of Planning and Environment (nd). *NSW BioNet Atlas Search Tool*. https://www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_/AtlasSearch.aspx

Department of the Environment, Water, Heritage and the Arts (2010). *Survey guidelines for Australia's threatened birds.*

Mitchell, P (2002). *Descriptions for NSW (Mitchell) Landscapes Version 2 (2002)* https://www.environment.nsw.gov.au/resources/conservation/landscapesdescriptions.pdf

Office of Environment and Heritage (2018). *Threatened Species Test of Significance Guidelines*. https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/threatened-species-test-significance-guidelines-170634.pdf

Office of Environment and Heritage (nd). *Threatened biodiversity profile search*. https://www.environment.nsw.gov.au/threatenedSpeciesApp/

11 Appendix

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Appendix A: Site Photos

Photo 1: Power-Pole nearest the roadside and its surrounding native grasses. Photo: D. Wall, 2024.

Photo 2: Large amounts of exposed brown-grey cracking clay within the Solar Panel site. South-East orientation. Photo: D. Wall, 2024

Photo 3: Existing dam south east corner of the Solar farm site. West orientation. Photo: D. Wall, 2024.

Photo 4: Previous Irrigation channel used on the property. Photo: D. Wall, 2024.

Photo 5: High-value native grassland in the road reserve. Photo: D. Wall, 2024.

Photo 6: South-Eastern corner of the property and proposed access entry point. West orientation. Photo: D. Wall, 2024.

Photo 7: Non-native millet within the Solar farm footprint, centre site, north orientation. Photo: D. Wall, 2024.

Appendix B: Significant Impact Criteria Assessments (SIC)

Pedionomus torquatus - Plains-wanderer (EPBC Act Critically Endangered)

EPBC Significant Impact Criteria	Significant impact likely?	Justification of decision
Lead to a long-term decrease in the size of a population.	Highly unlikely	This species was not detected during field assessments, although may frequent the grasslands within the study area on occasion, as there is a recent record a short distance away to the north. The low impact nature of the project construction and low impact ongoing maintenance associated with the project, however, will be highly unlikely to impact on the extent of the species or the size of a population. Efforts have been made to tailor the designs to avoid as much higher quality vegetation as possible, with the project avoiding higher quality areas of grassland to the south. As a result, the impacts on the species will be very low to negligible.
Reduce the area of occupancy of the species.	Highly unlikely	As above. The project study area is in the species' area of habitation, but is not significantly impacting areas of preferred habitat, as the majority of the footprint is being placed in cropped areas. Efforts are being taken to avoid higher quality native vegetation, where possible, meaning there will be minimal impacts to the species' feeding areas and no impacts to breeding habitat. Given the narrow footprint and the very small scale of disturbance involved with the creation of the solar array area, the project will be unlikely to cause any reduction to the area of occupancy for the species.
Fragment an existing population into two or more populations.	Highly unlikely	As above. The project is avoiding impacts to higher quality native vegetation and where possible the project is designed to avoid higher quality vegetation by moving the impact footprint further north, and following existing disturbed or lower quality areas for the majority of the access route. The narrow linear impacts from the project and short-term construction processes will not fragment any populations of the species into two or more populations.
Adversely affect habitat critical to the survival of a species.	Highly unlikely	As above. The project is not impacting areas that are considered core habitat for the species. Lack of tree impacts and avoidance of higher quality areas, where possible, will mean habitat impacts will be minimal to negligible. The project is therefore not expected to affect any habitat that is critical to the survival of the species.
Disrupt the breeding cycle of a population.	Unlikely	As above. The impacts of the project upon the receiving environment are low, and no impact is expected to occur for native vegetation that provides breeding habitat. No impacts to breeding habitat is expected and therefore no change to the species' ability to complete its breeding cycle are expected to result from the project. The project CEMP will also ensure that if Plains-wanderer are identified within the study area during construction, all construction within 200 metres of the birds will be halted until the birds move on from the area, or if breeding, construction to halt until fledglings leave the nest.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Highly unlikely	As above. The low impact nature of the construction and low impact maintenance associated with the project will be highly unlikely to impact on the extent of the species habitat, or the quality of habitat to the extent that the species would decline or be at risk of decline. Efforts are being made to tailor the designs to avoid higher quality native vegetation and, given the project is avoiding higher quality grasslands, the impacts on the species' habitat will be very low to negligible.

EPBC Significant Impact Criteria	Significant impact likely?	Justification of decision
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat.	Highly unlikely	Through a project CEMP, controls will be in place during construction, rehabilitation and maintenance phases to ensure no invasive species are introduced by project equipment or machinery, and that monitoring will take place to ensure any accidental introductions are adequately eradicated from the project area. Controls will also be put in place to ensure no pollutants are introduced or spilled during all stages of the project, and that ongoing maintenance of the area will utilise the lowest impact methods for pest control that are available to do the job successfully.
Introduce disease that may cause the species to decline.	Highly unlikely	Through a project CEMP, controls will be in place during construction, rehabilitation and maintenance phases to ensure all machinery and equipment arrives clean on site, and that any machinery or equipment previously working in a disease risk zone are appropriately decontaminated in a specific manner that will treat the disease being dealt with. Therefore, no diseases are likely to be introduced by project equipment or machinery and the species will not be at risk of decline from introduced diseases.
Interfere with the recovery of the species.	Highly unlikely	As above. The project study area is in the known area of habitation. However, efforts are being taken to avoid tree impacts and avoid higher quality native vegetation areas, where possible, meaning there will be minimal to no impacts to the species' feeding or breeding habitat. Given the narrow footprint and the very small scale of disturbance involved with the creation of the development, the project will be unlikely to interfere with the recovery of the species.
Summary of Plains-wanderer Significant Impact Assessment		
The project is occurring within a suitable area of habitat; however, the majority of impacts are occurring on non-preferred habitat, in a disturbed (cleared and cropped) part of the species' known range. The development will have minimal direct or indirect impacts for the species or its habitat. The works associated with the project construction will be completed with low impact techniques and will not impact on any significant areas of habitat. Minimal linear impacts are occurring to quality grassland habitats, meaning roosting and breeding will not be significantly impacted. If Plains-wanderer are identified within the study area during construction, all construction within 200 metres of the birds will be halted until the birds move on from the area. If breeding, construction will halt until fledglings leave the nest. There will be a project CEMP put in place to help minimise noise and vibration issues and other measures to minimise environmental disturbance. As a result of the above measures, it is highly unlikely that a significant impact to the Plains-wanderer will occur from the development.		

Swainsona murrayana - Slender Darling Pea (EPBC Act Vulnerable)

EPBC Significant Impact Criteria (for Vulnerable species)	Significant impact likely?	Justification of decision
Lead to a long-term decrease in the size of an important population of a species.	Highly unlikely	This species was not detected during field assessments, although may be present in the higher quality roadside or southern parts of the private property, when seasonal conditions are favourable. The low impact nature of the project construction and low impact ongoing maintenance associated with the project will be highly unlikely to impact on the extent of the species or the size of a population, if it is present. Efforts have been made to tailor the designs to avoid as much higher quality vegetation as possible, with the project avoiding higher quality areas of grassland to the south. As a result, the impacts on the species will be very low to negligible.
Reduce the area of occupancy of an important population.	Unlikely	As above. The project study area is in the species' area of habitation, but is not significantly impacting preferred habitat, as the species tends to occupy higher quality long ungrazed native grasslands and grassy woodlands, rather than cropped areas. Efforts are being taken to avoid higher quality native vegetation, where possible, meaning there will be minimal impacts to the species' habitat. Given the narrow footprint and the very small scale of disturbance involved with the creation of the solar array area, the project will be unlikely to cause any reduction to the area of occupancy for the species.
Fragment an existing important population into two or more populations.	Unlikely	As above. The project is avoiding impacts to higher quality native vegetation and where possible the project is designed to avoid higher quality vegetation by moving the impact footprint further north, and following existing disturbed or lower quality areas for the majority of the access route. The narrow linear impacts from the project and short-term construction processes will not fragment any populations of the species into two or more populations.
Adversely affect habitat critical to the survival of a species.	Highly unlikely	As above. The project is not impacting areas that are considered core habitat for the species. Avoidance of higher quality areas, where possible, will mean habitat impacts will be minimal to negligible. The project is therefore not expected to affect any habitat that is critical to the survival of the species.
Disrupt the breeding cycle of an important population.	Highly unlikely	As above. The impacts of the project upon the receiving environment are low, and no impact is expected to occur for native vegetation that provides important habitat. The development will not impact on the species' ability to complete its breeding cycle.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	Highly unlikely	As above. The low impact nature of the construction and low impact maintenance associated with the project will be highly unlikely to impact on the extent of the species habitat, or the quality of habitat to the extent that the species would decline or be at risk of decline. Efforts are being made to tailor the designs to avoid higher quality native vegetation and, given the project is not removing large areas of native vegetation, the impacts on the species habitat will be very low to negligible.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable specie's habitat.	Unlikely	Through a project CEMP, controls will be in place during construction, rehabilitation and maintenance phases to ensure no invasive species are introduced by project equipment or machinery, and that monitoring will take place to ensure any accidental introductions are adequately eradicated from the project area. Controls will also be put in place to ensure no pollutants are introduced or spilled during all stages of the project, and that ongoing maintenance of the area will utilise the lowest impact methods for pest control that are available to do the job successfully.
Introduce disease that may cause the species to decline.	Unlikely	Through a project CEMP, controls will be in place during construction, rehabilitation and maintenance phases to ensure all machinery and equipment arrives clean on site, and that any machinery or equipment previously working in a disease risk zone are appropriately decontaminated in a specific manner that will treat the disease being dealt with. Therefore, no diseases are likely to be introduced by project equipment or machinery and the species will not be at risk of decline from introduced diseases.

EPBC Significant Impact Criteria (for Vulnerable species)	Significant impact likely?	Justification of decision
Interfere substantially with the recovery of the species.	Unlikely	As above. The project study area is in the known area of habitation. However, efforts are being taken to avoid tree impacts and avoid higher quality native vegetation areas, where possible, meaning there will be minimal to no impacts to the species' habitat. Given the narrow footprint and the very small scale of disturbance involved with the creation of the development, the project will be unlikely to interfere with the recovery of the species.
Summary of Slender Darling Pea Significant Impact Assessment		
The project is occurring within a suitable area of habitat, however as a result of a redesign and change of impact footprint location, the majority of impacts are occurring on non-preferred habitat, in a disturbed (cleared and cropped) part of the species' known range. The development will have minimal direct or indirect impacts for the species or its habitat. The works associated with the project construction will be completed with low impact techniques and will not impact on any significant areas of habitat. The breeding cycle of the species will not be significantly impacted. As a result of the above measures, it is highly unlikely that a significant impact to the Slender Darling Pea will occur from the development.		

Brachyscome papillosa - Mossgiel Daisy (EPBC Act Vulnerable)

EPBC Significant Impact Criteria (for Vulnerable species)	Significant impact likely?	Justification of decision
Lead to a long-term decrease in the size of an important population of a species.	Highly unlikely	This species was not detected during field assessments, although may be present in the higher quality roadside or southern parts of the private property, when seasonal conditions are favourable. The low impact nature of the project construction and low impact ongoing maintenance associated with the project will be highly unlikely to impact on the extent of the species or the size of a population, if it is present. Efforts have been made to tailor the designs to avoid as much higher quality vegetation as possible, with the project avoiding higher quality areas of grassland to the south. As a result, the impacts on the species will be very low to negligible.
Reduce the area of occupancy of an important population.	Unlikely	As above. The project study area is in the species' area of habitation, but is not significantly impacting preferred habitat, as the species tends to occupy higher quality native grasslands and grassy woodlands, rather than cropped areas. Efforts are being taken to avoid higher quality native vegetation, where possible, meaning there will be minimal impacts to the species' habitat. Given the narrow footprint and the very small scale of disturbance involved with the creation of the solar array area, the project will be unlikely to cause any reduction to the area of occupancy for the species.
Fragment an existing important population into two or more populations.	Unlikely	As above. The project is avoiding impacts to higher quality native vegetation and where possible the project is designed to avoid higher quality vegetation by moving the impact footprint further north, and following existing disturbed or lower quality areas for the majority of the access route. The narrow linear impacts from the project and short-term construction processes will not fragment any populations of the species into two or more populations.
Adversely affect habitat critical to the survival of a species.	Highly unlikely	As above. The project is not impacting areas that are considered core habitat for the species. Avoidance of higher quality areas, where possible, will mean habitat impacts will be minimal to negligible. The project is therefore not expected to affect any habitat that is critical to the survival of the species.
Disrupt the breeding cycle of an important population.	Highly unlikely	As above. The impacts of the project upon the receiving environment are low, and no impact is expected to occur for native vegetation that provides important habitat. The development will not impact on the species' ability to complete its breeding cycle.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	Highly unlikely	As above. The low impact nature of the construction and low impact maintenance associated with the project will be highly unlikely to impact on the extent of the species habitat, or the quality of habitat to the extent that the species would decline or be at risk of decline. Efforts are being made to tailor the designs to avoid higher quality native vegetation and, given the project is not removing large areas of native vegetation, the impacts on the species habitat will be very low to negligible.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable specie's habitat.	Unlikely	Through a project CEMP, controls will be in place during construction, rehabilitation and maintenance phases to ensure no invasive species are introduced by project equipment or machinery, and that monitoring will take place to ensure any accidental introductions are adequately eradicated from the project area. Controls will also be put in place to ensure no pollutants are introduced or spilled during all stages of the project, and that ongoing maintenance of the area will utilise the lowest impact methods for pest control that are available to do the job successfully.

EPBC Significant Impact Criteria (for Vulnerable species)	Significant impact likely?	Justification of decision
Introduce disease that may cause the species to decline.	Unlikely	Through a project CEMP, controls will be in place during construction, rehabilitation and maintenance phases to ensure all machinery and equipment arrives clean on site, and that any machinery or equipment previously working in a disease risk zone are appropriately decontaminated in a specific manner that will treat the disease being dealt with. Therefore, no diseases are likely to be introduced by project equipment or machinery and the species will not be at risk of decline from introduced diseases.
Interfere substantially with the recovery of the species.	Unlikely	As above. The project study area is in the known area of habitation. However, efforts are being taken to avoid tree impacts and avoid higher quality native vegetation areas, where possible, meaning there will be minimal to no impacts to the species' habitat. Given the narrow footprint and the very small scale of disturbance involved with the creation of the development, the project will be unlikely to interfere with the recovery of the species.
Summary of Mossgiel Daisy Significant Impact Assessment		
The project is occurring within a suitable area of habitat, however as a result of a redesign and change of impact footprint location, the majority of impacts are occurring on non-preferred habitat, in a disturbed (cleared and cropped) part of the species' known range. The development will have minimal direct or indirect impacts for the species or its habitat. The works associated with the project construction will be completed with low impact techniques and will not impact on any significant areas of habitat. The breeding cycle of the species will not be significantly impacted. As a result of the above measures, it is highly unlikely that a significant impact to the Mossgiel Daisy will occur from the development.		

Maireana cheelii - Chariot Wheels (EPBC Act Vulnerable)

EPBC Significant Impact Criteria (for Vulnerable species)	Significant impact likely?	Justification of decision
Lead to a long-term decrease in the size of an important population of a species.	Highly unlikely	This species was not detected during field assessments, although may be present in the higher quality roadside or southern parts of the private property, when seasonal conditions are favourable. The low impact nature of the project construction and low impact ongoing maintenance associated with the project will be highly unlikely to impact on the extent of the species or the size of a population, if it is present. Efforts have been made to tailor the designs to avoid as much higher quality vegetation as possible, with the project avoiding higher quality areas of grassland to the south. As a result, the impacts on the species will be very low to negligible.
Reduce the area of occupancy of an important population.	Unlikely	As above. The project study area is in the species' area of habitation, but is not significantly impacting preferred habitat, as the species tends to occupy higher quality native grasslands and grassy woodlands, rather than cropped areas. Efforts are being taken to avoid higher quality native vegetation, where possible, meaning there will be minimal impacts to the species' habitat. Given the narrow footprint and the very small scale of disturbance involved with the creation of the solar array area, the project will be unlikely to cause any reduction to the area of occupancy for the species.
Fragment an existing important population into two or more populations.	Unlikely	As above. The project is avoiding impacts to higher quality native vegetation and where possible the project is designed to avoid higher quality vegetation by moving the impact footprint further north, and following existing disturbed or lower quality areas for the majority of the access route. The narrow linear impacts from the project and short-term construction processes will not fragment any populations of the species into two or more populations.
Adversely affect habitat critical to the survival of a species.	Highly unlikely	As above. The project is not impacting areas that are considered core habitat for the species. Avoidance of higher quality areas, where possible, will mean habitat impacts will be minimal to negligible. The project is therefore not expected to affect any habitat that is critical to the survival of the species.
Disrupt the breeding cycle of an important population.	Highly unlikely	As above. The impacts of the project upon the receiving environment are low, and no impact is expected to occur for native vegetation that provides important habitat. The development will not impact on the species' ability to complete its breeding cycle.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	Highly unlikely	As above. The low impact nature of the construction and low impact maintenance associated with the project will be highly unlikely to impact on the extent of the species habitat, or the quality of habitat to the extent that the species would decline or be at risk of decline. Efforts are being made to tailor the designs to avoid higher quality native vegetation and, given the project is not removing large areas of native vegetation, the impacts on the species habitat will be very low to negligible.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable specie's habitat.	Unlikely	Through a project CEMP, controls will be in place during construction, rehabilitation and maintenance phases to ensure no invasive species are introduced by project equipment or machinery, and that monitoring will take place to ensure any accidental introductions are adequately eradicated from the project area. Controls will also be put in place to ensure no pollutants are introduced or spilled during all stages of the project, and that ongoing maintenance of the area will utilise the lowest impact methods for pest control that are available to do the job successfully.
Introduce disease that may cause the species to decline.	Unlikely	Through a project CEMP, controls will be in place during construction, rehabilitation and maintenance phases to ensure all machinery and equipment arrives clean on site, and that any machinery or equipment previously working in a disease risk zone are appropriately decontaminated in a specific manner that will treat the disease being dealt with. Therefore, no diseases are likely to be introduced by project equipment or machinery and the species will not be at risk of decline from introduced diseases.

EPBC Significant Impact Criteria (for Vulnerable species)	Significant impact likely?	Justification of decision
Interfere substantially with the recovery of the species.	Unlikely	As above. The project study area is in the known area of habitation. However, efforts are being taken to avoid tree impacts and avoid higher quality native vegetation areas, where possible, meaning there will be minimal to no impacts to the species' habitat. Given the narrow footprint and the very small scale of disturbance involved with the creation of the development, the project will be unlikely to interfere with the recovery of the species.
Summary of Chariot Wheels Significant Impact Assessment		
The project is occurring within a suitable area of habitat, however as a result of a redesign and change of impact footprint location, the majority of impacts are occurring on non-preferred habitat, in a disturbed (cleared and cropped) part of the species' known range. The development will have minimal direct or indirect impacts for the species or its habitat. The works associated with the project construction will be completed with low impact techniques and will not impact on any significant areas of habitat. The breeding cycle of the species will not be significantly impacted. As a result of the above measures, it is highly unlikely that a significant impact to the Chariot Wheels will occur from the development.		

Neophema chrysostoma - Blue-winged Parrot (EPBC Act Vulnerable)

EPBC Significant Impact Criteria (for Vulnerable species)	Significant impact likely?	Justification of decision
Lead to a long-term decrease in the size of an important population of a species.	Highly unlikely	This species was not detected during field assessments, although may frequent the grasslands within the study area on occasion. The low impact nature of the project construction and low impact ongoing maintenance associated with the project will be highly unlikely to impact on the extent of the species or the size of a population. Efforts have been made to tailor the designs to avoid as much higher quality vegetation as possible, with the project avoiding higher quality areas of grassland to the south. As a result, the impacts on the species will be very low to negligible.
Reduce the area of occupancy of an important population.	Unlikely	As above. The project study area is in the species' area of habitation, but is not significantly impacting areas of preferred habitat, as the majority of the footprint is being placed in cropped areas. Efforts are being taken to avoid higher quality native vegetation, where possible, meaning there will be minimal impacts to the species' feeding areas and no impacts to breeding habitat. Given the narrow footprint and the very small scale of disturbance involved with the creation of the solar array area, the project will be unlikely to cause any reduction to the area of occupancy for the species.
Fragment an existing important population into two or more populations.	Unlikely	As above. The project is avoiding impacts to higher quality native vegetation and where possible the project is designed to avoid higher quality vegetation by moving the impact footprint further north, and following existing disturbed or lower quality areas for the majority of the access route. The narrow linear impacts from the project and short-term construction processes will not fragment any populations of the species into two or more populations.
Adversely affect habitat critical to the survival of a species.	Highly unlikely	As above. The project is not impacting areas that are considered core habitat for the species. Lack of tree impacts and avoidance of higher quality areas, where possible, will mean habitat impacts will be minimal to negligible. The project is therefore not expected to affect any habitat that is critical to the survival of the species.
Disrupt the breeding cycle of an important population.	Highly unlikely	As above. The impacts of the project upon the receiving environment are low, and no impact is expected to occur for native vegetation that provides breeding habitat. No impacts to large habitat trees is expected (no tree impacts for any trees) and therefore no change to the species ability to complete its breeding cycle are expected to result from the project. The project CEMP will also ensure that if Blue-winged Parrot are identified within the study area during construction, all construction within 200 metres of the birds will be halted until the birds move on from the area, or if breeding, construction to halt until fledglings leave the nest.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	Highly unlikely	As above. The low impact nature of the construction and low impact maintenance associated with the project will be highly unlikely to impact on the extent of the species habitat, or the quality of habitat to the extent that the species would decline or be at risk of decline. Efforts are being made to tailor the designs to avoid higher quality native vegetation and, given the project is not removing trees, the impacts on the species habitat will be very low to negligible.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable specie's habitat.	Unlikely	Through a project CEMP, controls will be in place during construction, rehabilitation and maintenance phases to ensure no invasive species are introduced by project equipment or machinery, and that monitoring will take place to ensure any accidental introductions are adequately eradicated from the project area. Controls will also be put in place to ensure no pollutants are introduced or spilled during all stages of the project, and that ongoing maintenance of the area will utilise the lowest impact methods for pest control that are available to do the job successfully.

EPBC Significant Impact Criteria (for Vulnerable species)	Significant impact likely?	Justification of decision
Introduce disease that may cause the species to decline.	Unlikely	Through a project CEMP, controls will be in place during construction, rehabilitation and maintenance phases to ensure all machinery and equipment arrives clean on site, and that any machinery or equipment previously working in a disease risk zone are appropriately decontaminated in a specific manner that will treat the disease being dealt with. Therefore, no diseases are likely to be introduced by project equipment or machinery and the species will not be at risk of decline from introduced diseases.
Interfere substantially with the recovery of the species.	Unlikely	As above. The project study area is in the known area of habitation. However, efforts are being taken to avoid tree impacts and avoid higher quality native vegetation areas, where possible, meaning there will be minimal to no impacts to the species' feeding or breeding habitat. Given the narrow footprint and the very small scale of disturbance involved with the creation of the development, the project will be unlikely to interfere with the recovery of the species.
Summary of Blue-winged Parrot Significant Impact Assessment		
The project is occurring within a suitable area of habitat; however the majority of impacts are occurring on non-preferred habitat, in a disturbed (cleared and cropped) part of the species' known range. The development will have minimal direct or indirect impacts for the species or its habitat. The works associated with the project construction will be completed with low impact techniques and will not impact on any significant areas of habitat. No impacts are occurring to trees, meaning roosting and breeding will not be significantly impacted. If Blue-winged Parrot are identified within the study area during construction, all construction within 200 metres of the birds will be halted until the birds move on from the area. If breeding, construction will halt until fledglings leave the nest. There will be a project CEMP put in place to help minimise noise and vibration issues and other measures to minimise environmental disturbance. As a result of the above measures, it is highly unlikely that a significant impact to the Blue-winged Parrot will occur from the development.		

Diamond Firetail - Stagonopleura guttata (EPBC Act Vulnerable)

EPBC Significant Impact Criteria (for Vulnerable species)	Significant impact likely?	Justification of decision
Lead to a long-term decrease in the size of an important population of a species.	Highly unlikely	This species was not detected during field assessments, although may frequent the grasslands within the study area on occasion. The low impact nature of the project construction and low impact ongoing maintenance associated with the project will be highly unlikely to impact on the extent of the species or the size of a population. Efforts have been made to tailor the designs to avoid as much higher quality vegetation as possible, with the project avoiding higher quality areas of grassland to the south. As a result, the impacts on the species will be very low to negligible.
Reduce the area of occupancy of an important population.	Unlikely	As above. The project study area is in the species' area of habitation, but is not significantly impacting preferred habitat, as the species tends to occupy native grasslands and grassy woodlands, rather than cropped areas. Efforts are being taken to avoid higher quality native vegetation, where possible, meaning there will be minimal impacts to the species' feeding areas and no impacts to breeding habitat. Given the narrow footprint and the very small scale of disturbance involved with the creation of the solar array area, the project will be unlikely to cause any reduction to the area of occupancy for the Diamond Firetail.
Fragment an existing important population into two or more populations.	Unlikely	As above. The project is avoiding impacts to higher quality native vegetation and where possible the project is designed to avoid higher quality vegetation by moving the impact footprint further north, and following existing disturbed or lower quality areas for the majority of the access route. The narrow linear impacts from the project and short-term construction processes will not fragment any populations of the species into two or more populations.
Adversely affect habitat critical to the survival of a species.	Highly unlikely	As above. The project is not impacting on areas that are considered core habitat for the species. Lack of tree impacts and avoidance of higher quality areas, where possible, will mean habitat impacts will be minimal to negligible. The project is therefore not expected to affect any habitat that is critical to the survival of the species.
Disrupt the breeding cycle of an important population.	Highly unlikely	As above. The impacts of the project upon the receiving environment are low, and no impact is expected to occur for native vegetation that provides breeding habitat. No impacts to large habitat trees is expected (no tree impacts for any trees) and therefore no change to the species ability to complete its breeding cycle are expected to result from the project. The project CEMP will also ensure that if Diamond Firetail are identified within the study area during construction, all construction within 200 metres of the birds will be halted until the birds move on from the area, or if breeding, construction to halt until fledglings leave the nest.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	Highly unlikely	As above. The low impact nature of the construction and low impact maintenance associated with the project will be highly unlikely to impact on the extent of the species habitat, or the quality of habitat to the extent that the species would decline or be at risk of decline. Efforts are being made to tailor the designs to avoid higher quality native vegetation and, given the project is not removing trees, the impacts on the species habitat will be very low to negligible.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable specie's habitat.	Unlikely	Through a project CEMP, controls will be in place during construction, rehabilitation and maintenance phases to ensure no invasive species are introduced by project equipment or machinery, and that monitoring will take place to ensure any accidental introductions are adequately eradicated from the project area. Controls will also be put in place to ensure no pollutants are introduced or spilled during all stages of the project, and that ongoing maintenance of the area will utilise the lowest impact methods for pest control that are available to do the job successfully.

EPBC Significant Impact Criteria (for Vulnerable species)	Significant impact likely?	Justification of decision
Introduce disease that may cause the species to decline.	Unlikely	Through a project CEMP, controls will be in place during construction, rehabilitation and maintenance phases to ensure all machinery and equipment arrives clean on site, and that any machinery or equipment previously working in a disease risk zone are appropriately decontaminated in a specific manner that will treat the disease being dealt with. Therefore, no diseases are likely to be introduced by project equipment or machinery and the species will not be at risk of decline from introduced diseases.
Interfere substantially with the recovery of the species.	Unlikely	As above. The project study area is in the known area of habitation. However, efforts are being taken to avoid tree impacts and avoid higher quality native vegetation areas, where possible, meaning there will be minimal to no impacts to the species' feeding or breeding habitat. Given the narrow footprint and the very small scale of disturbance involved with the creation of the development, the project will be unlikely to interfere with the recovery of the species.
Summary of Diamond Firetail Significant Impact Assessment		
The project is occurring within a suitable area of habitat; however the majority of impacts are occurring on non-preferred habitat, in a disturbed (cleared and cropped) part of the species' known range. The development will have minimal direct or indirect impacts for the species or its habitat. The works associated with the project construction will be completed with low impact techniques and will not impact on any significant areas of habitat. No impacts are occurring to trees, meaning roosting and breeding will not be significantly impacted. If Diamond Firetail are identified within the study area during construction, all construction within 200 metres of the birds will be halted until the birds move on from the area. If breeding, construction will halt until fledglings leave the nest. There will be a project CEMP put in place to help minimise noise and vibration issues and other measures to minimise environmental disturbance. As a result of the above measures, it is highly unlikely that a significant impact to the Diamond Firetail will occur from the development.		