

Coleambally Solar Farm Flora and Fauna Assessment Report

Lot 135 DP 750903, Coleambally NSW 2707

NCA21R124675

30 April 2021



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Lot 135 DP 750903, Coleambally NSW 2707

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Kleinfelder Project: 20220265

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Prepared	Reviewed	Endorsed
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1 INTRODUCTION

1.1 PROJECT BACKGROUND

Kleinfelder was engaged by ACEnergy Pty Ltd to prepare a Flora and Fauna Assessment Report (FFAR) for a proposed Solar Farm development within Lot 135 DP 750903, Coleambally NSW 2707 (**Figure 1**). The project will be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The following terms are used throughout this report to describe geographical areas (**Figure 2**):

- Study Area – Lot boundaries that pertain to the development.
- Subject Site (development footprint) – areas of the Study Area proposed for development, including access tracks.
- Locality – land within a 5 km radius of the Study Area.

An assessment of the likely impacts on identified threatened species, habitat features, wildlife corridors and vegetation communities resulting from the proposed development is also undertaken.

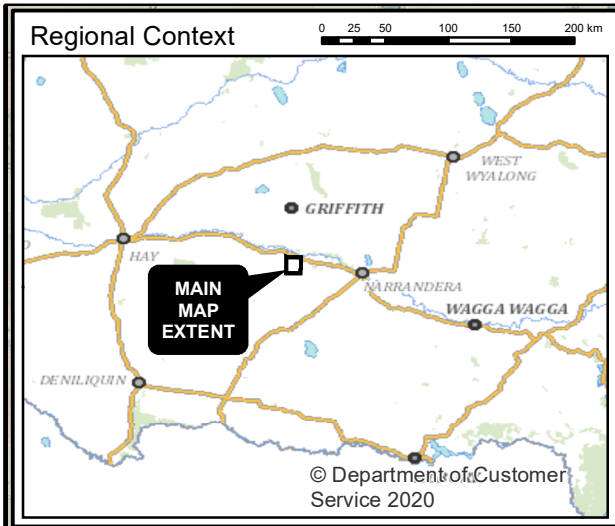
1.2 SITE DESCRIPTION

The Study Area is located northeast of the central business district of Coleambally, NSW and lies within the Murrumbidgee Council Local Government Area (LGA). The Subject Site is based within Lot 135 DP 750903 and is zoned 'RU1 – Primary Production' under the Murrumbidgee Local Environmental Plan 2013.

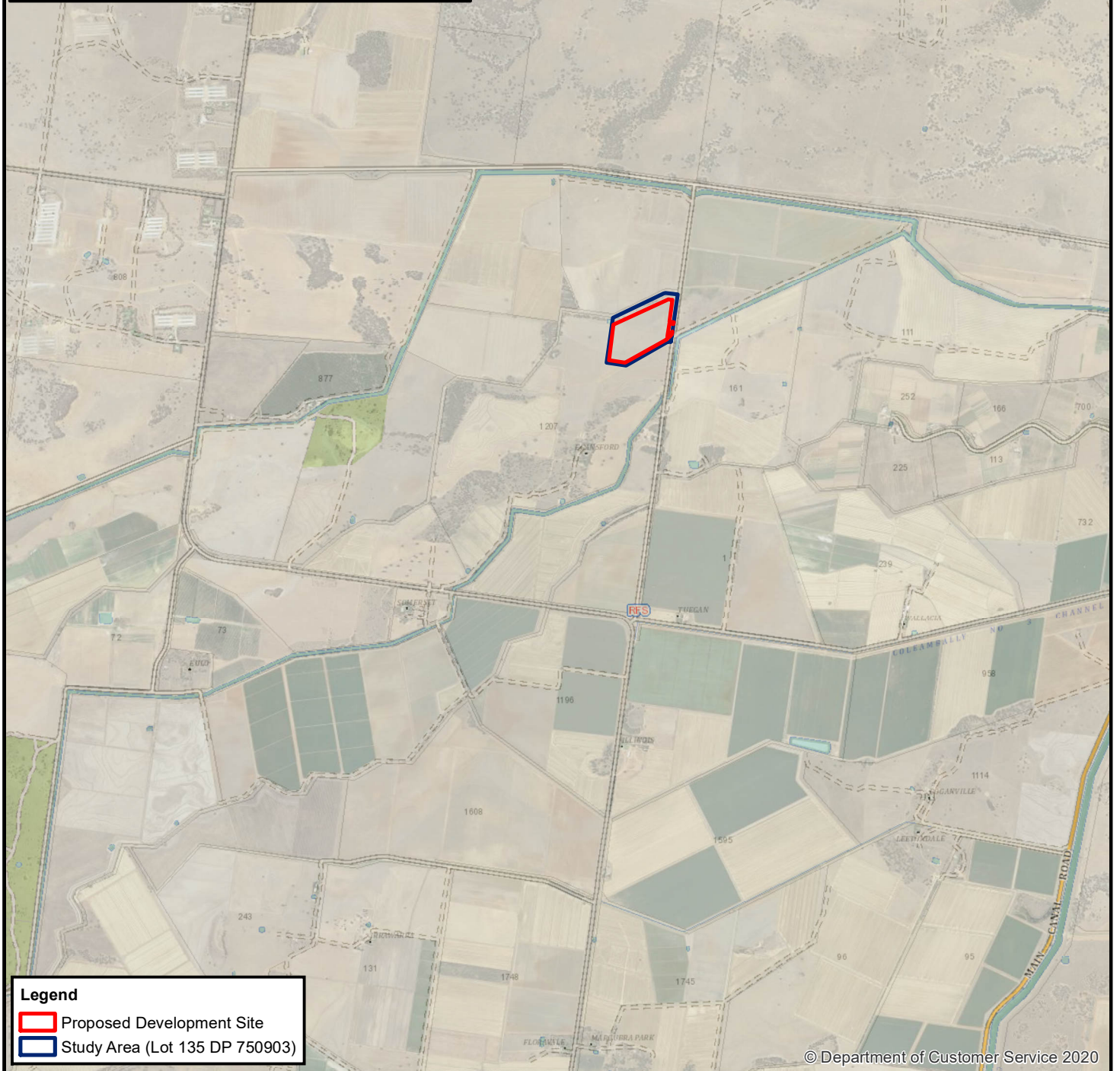
The Study Area is approximately 24.80ha in size and is located directly to the west of Cockys Lane. The majority of the site is comprised of managed agricultural land with small areas of native woodland vegetation near the northern and eastern boundaries (**Figure 2**). The topography of the Study Area is generally flat, with no defined gullies or low-lying areas. An artificial drainage channel occurs adjacent to Cockys Lane. This channel has little associated emergent or riparian vegetation.

The Subject Site is located within the northern, cleared section of the Study Area. The Subject Site has recently undergone cropping followed by the grazing of cattle. Access to the site is provided through Cockys Lane.

Site photographs are provided in **Appendix A**.

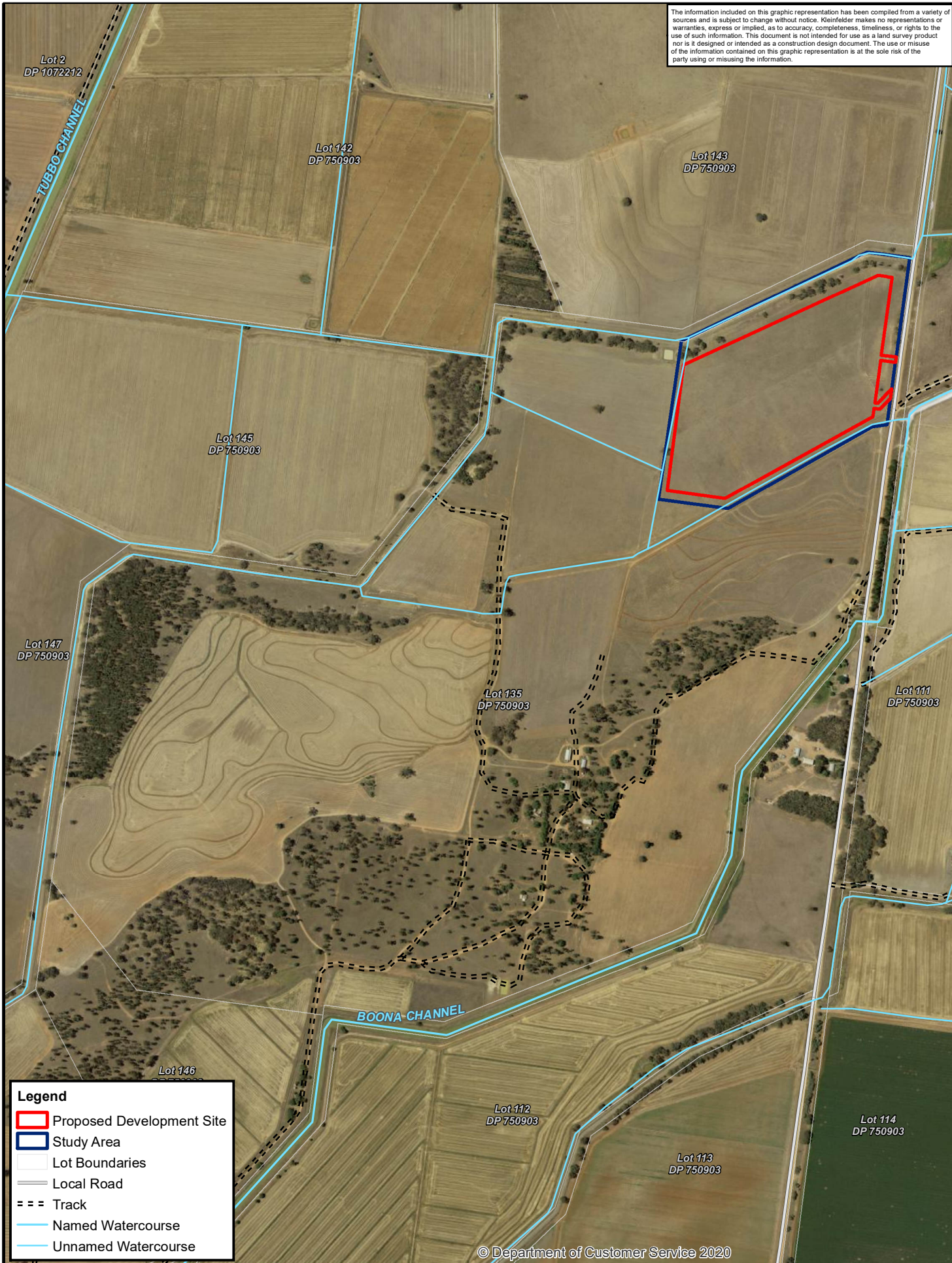


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1.3 PROPOSED DEVELOPMENT

The proposed development will include the installation of a grid-connected solar PV network that would occupy the north-eastern portion of the Subject Site. The proposed development footprint is roughly 18.12 hectares in area, excluding the existing access track

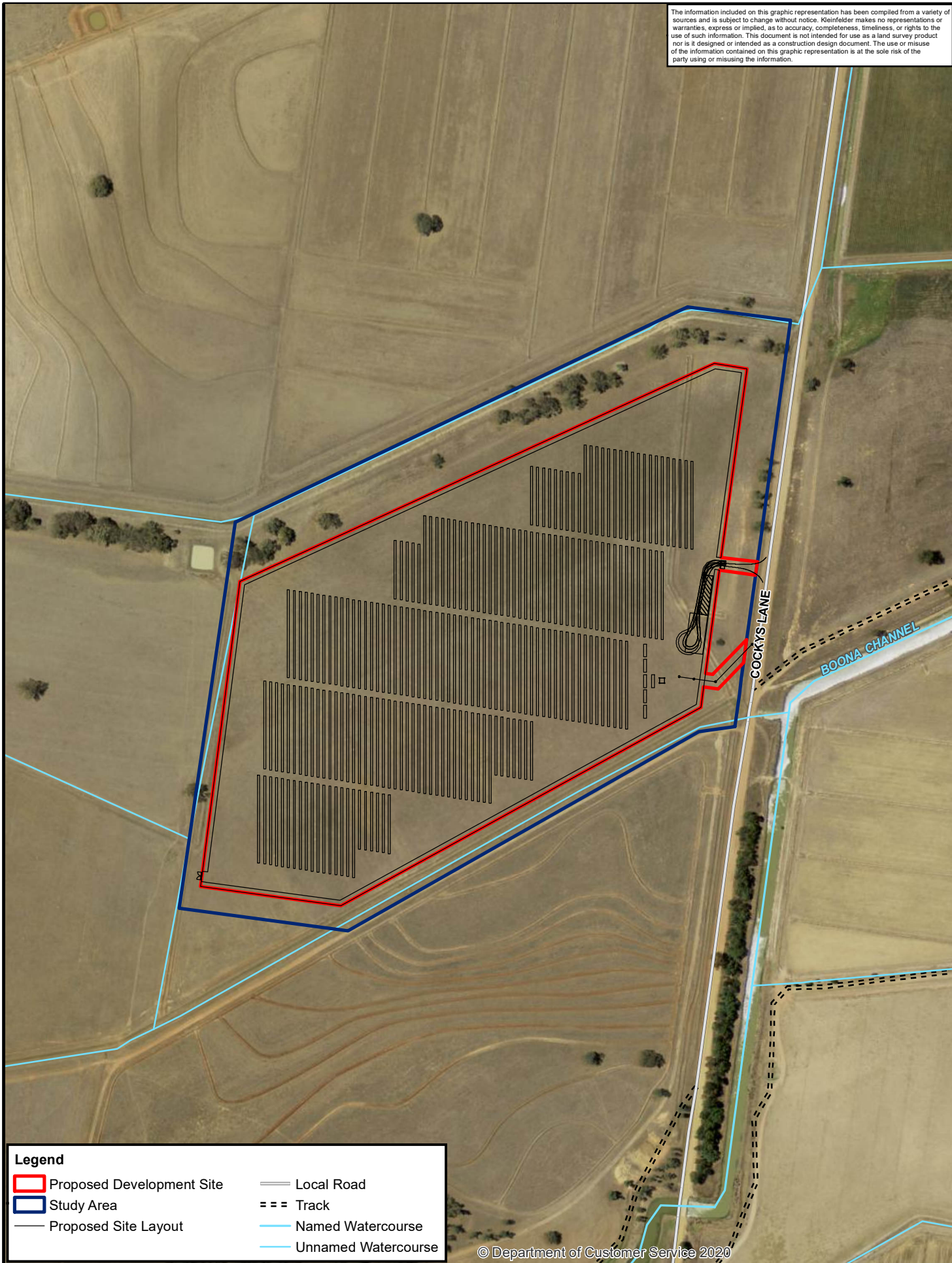
The proposed solar farm will require upgrading of electricity facilities on site, including new overhead powerlines and the installation of an electricity easement. Additionally, the proposed development will involve the construction of a 1.8-metre-high security fence around the perimeter and a temporary off-load zone to be utilised during the construction period. The proposed project layout is provided in **Figure 3**.

1.4 REPORT OBJECTIVES

The objectives of the FFAR are as follows:

- Complete a desktop assessment of relevant threatened biota and regional vegetation mapping.
- Describe the flora and fauna (and their habitats) present on or likely to occur on the Subject Site.
- Identification of native vegetation, noting the extent and condition of Plant Community Types (PCTs), and the presence, condition and extent of any Threatened Ecological Communities (TECs).
- Assess the relevance and value of the Subject Site for threatened species and ecological communities (and their habitats) listed under the NSW *Biodiversity Conservation Act 2016* (BC Act).
- Assess the potential impacts of the proposed development on threatened species and ecological communities, pursuant to Section 7.3 of the BC Act (5-part test).
- Comment on the likely occurrence and relevance of matters of national environmental significance listed under the Commonwealth *Environment Planning and Biodiversity Conservation Act 1999* (EPBC Act).
- Describe steps to avoid and mitigate any identified impacts on flora and fauna and to protect the natural environment of the Subject Site.

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Legend

- Proposed Development Site
- Study Area
- Proposed Site Layout
- Local Road
- Track
- Named Watercourse
- Unnamed Watercourse

0 25 50 100 150 200 250
Metres



PROJECT REFERENCE: 20220265

DATE DRAWN: 2021/04/26 15:11 Version 1

DRAWN BY: GJoyce

DATA SOURCE:
ACEnergy - 2021
NSW DFSI - 2020
NSW OEH - 2019

Proposed Site Layout

ACEnergy Pty Ltd
Flora & Fauna Assessment Report
Coleambally Solar Farm

FIGURE:

3



www.kleinfelder.com



2 LEGISLATIVE CONTEXT

2.1 COMMONWEALTH LEGISLATION

2.1.1 *Environment Protection & Biodiversity Conservation Act 1999*

The purpose of the EPBC Act is to ensure that actions likely to cause a significant impact on 'matters of national environmental significance' undergo an assessment and approval process. Under the EPBC Act, an action includes a proposal, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things. An action that 'has, will have or is likely to have a significant impact on a Matter of National Environmental Significance (MNES) is deemed to be a 'controlled action' and may not be undertaken without prior approval from the Australian Minister for the Environment.

The EPBC Act identifies nine MNES:

- World Heritage properties.
- National heritage places.
- Wetlands of international importance (Ramsar Wetlands).
- Threatened species and ecological communities.
- Migratory species.
- Commonwealth marine areas.
- The Great Barrier Reef Marine Park.
- Nuclear actions (including uranium mining).
- A water resource, concerning coal seam gas development and large coal mining development.

As part of the current assessment, MNES that are predicted to occur within the locality (applying a 10 km buffer) were obtained from the online Protected Matters Search Tool (DoEE 2021a). These records are discussed in **Section 4**. The EPBC Act has been further addressed in this assessment through:

- Field surveys for EPBC Act listed threatened biota and migratory species.
- Assessment of potential impacts on EPBC Act listed threatened species and migratory biota.
- Identification of suitable impact mitigation and environmental management measures for EPBC Act listed threatened species and migratory biota.

2.2 STATE LEGISLATION

2.2.1 *Environmental Planning and Assessment Act 1979*

The EP&A Act forms the legal and policy platform for proposal assessment and approval in NSW and aims to 'encourage the proper management, development and conservation of natural and artificial resources'. All development in NSW is assessed in accordance with the provisions of the EP&A Act and the EP&A Regulation 2000.

Development activities that require consent are assessed and determined in accordance with Part 4 of the EP&A Act. The determining authority for the project is Murrumbidgee Local Council.



2.2.2 Biodiversity Conservation Act 2016

The NSW BC Act, the NSW *Biodiversity Conservation Regulation 2017* (NSW BC Regulation) and amendments to the NSW *Local Land Services Act 2013* (LLS Act) commenced on the 25th of August 2017. The legislation aims to deliver "a strategic approach to conservation in NSW whilst supporting improved farm productivity and sustainable development". The NSW BC Act repeals several pre-existing Acts, most notably the NSW *Threatened Species Conservation Act 1995*, the NSW *Nature Conservation Trust Act 2001* and the NSW *Native Vegetation Act 2003*.

In accordance with the NSW BC Act, entry into the Biodiversity Offsets Scheme (BOS) is not required for the proposed development due to the following:

- The proposed development is not deemed to be 'State Significant' under the NSW EP&A Act.
- The proposed development will not impact an Area of Outstanding Biodiversity Value (AOBV) as listed under Part 3 of the NSW BC Act.
- The proposed development is unlikely to cause a significant impact on a threatened species, population or ecological community, as listed under Schedules 1 and 2 of the NSW BC Act, as determined by the application of a five-part-test of significance under Section 7.3 of the NSW BC Act.
- The proposed development will not impact areas mapped as having 'high biodiversity value' as indicated by the NSW Biodiversity Values Map (BV Map). Reviewed on 22/03/2021.
- The proposed development not involve clearing of native vegetation that exceeds the BOS threshold for the site (1 ha) as determined by the NSW *Biodiversity Conservation Regulation 2017*.

In consideration of the criteria listed above, a Biodiversity Development Assessment Report (BDAR) is not required for the proposed development.

As part of the current assessment, threatened species and ecological communities as listed under the NSW BC Act that have previously been recorded within the locality (applying a 5 km radius buffer) were obtained from the online BioNet Atlas of NSW Wildlife (DPIE, 2020a). These records are discussed in **Section 4** of this report. The NSW BC Act has been further addressed in this assessment through:

- Field surveys to assess the presence of threatened species, populations and ecological communities, as listed under Schedules 1 and 2 of the NSW BC Act.
- Assessment of potential impacts threatened species, populations and ecological communities as determined by the application of a five-part-test of significance under Section 7.3 of the NSW BC Act.
- Identification of suitable impact mitigation and environmental management measures.

2.2.3 Biosecurity Act 2015

The NSW Biosecurity Act 2015 provides a streamlined statutory framework to protect the NSW economy, environment and community from the negative impact of pests, diseases and weeds. The primary objective of the Act is to provide a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, dealing with biosecurity matter, carriers and potential carriers, and other activities that involve biosecurity matter, carriers or potential carriers.



In NSW, all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

Weed species recorded within the Subject Site during the current investigation are discussed in **Section 4**.

2.2.4 National Parks and Wildlife Act 1974

The NSW National Parks and Wildlife Act 1979 (NPWS Act) aims to conserve nature, objects, places or features (including biological diversity) of cultural value within the landscape. The Act also aims to foster public appreciation, understanding and enjoyment of nature and cultural heritage. It provides for the preservation and management of national parks, historic sites and certain other areas identified under the Act.

No areas of National Park estate occur within or adjacent to the Subject Site.

2.2.5 Water Management Act 2000

Controlled activities carried out in, on or under waterfront land are regulated by the NSW *Water Management Act 2000* (WM Act). The NSW Natural Resource Asset Regulator (NRAR) administers the WM Act and is required to assess the impact of any proposed controlled activity to ensure that no more than minimal harm will be done to 'waterfront land' as a consequence of carrying out the controlled activity. Waterfront land includes the bed and bank of any river, lake or estuary and all land within 40 m of the highest bank of the river, lake or estuary (NRAR, 2018).

No natural watercourses occur within the Subject Site (**Figure 2**); therefore, the WM Act does not apply to the proposed development. An assessment of the indirect impacts of the proposed development on aquatic habitat and downstream aquatic habitats is provided in **Section 5.1.5**.

2.2.6 State Environmental Planning Policy (Koala Habitat Protection) 2021

State Environmental Planning Policy (Koala Habitat Protection) 2021 aims to encourage the conservation and management of areas of natural vegetation that provide habitat for Koalas. This aims to support permanent free-living populations over their present range and reverse the current trend of Koala population decline.

The Koala Habitat Protection SEPP applies to Part 4 developments where no specific Koala Plan of Management (KPoM) is in place. A KPoM has not been developed for the Murrumbidgee Local Government Area; therefore, the Koala SEPP applies.

See **Section 4.8** for a consideration of the direct and indirect impacts of the proposed development on Koala habitat.

2.3 LOCAL PLANNING INSTRUMENTS

2.3.1 Murrumbidgee Council Local Environmental Plan 2013

The Study Area is located within the Murrumbidgee Council LGA. The Murrumbidgee Council Local Environmental Plan 2013 (Murrumbidgee LEP) controls development within the Study Area through zoning and development controls.



3 MATERIALS AND METHODS

3.1 DESKTOP ASSESSMENT

Existing information on flora and fauna within the Subject Site and the locality, including relevant threatened biota, was obtained from:

- Regional vegetation mapping: State Vegetation Type Map: Riverina Region Version v1.2 - VIS_ID 4469 (DPIE, 2016).
- The BioNet Atlas of NSW Wildlife (DPIE, 2020a) for previous records of threatened species, populations and ecological communities (as listed under the BC Act) within a 5 km radius of the Subject Site (data retrieved 19/04/2021).
- The Department of the Environment and Energy (DoEE 2021a) Protected Matters Search Tool, which involved a search for matters of national environmental significance within a 10 km radius of the Subject Site (conducted on 19/04/2021).
- Relevant published literature on threatened biota (see References).

The results of the database searches were used to compile a list of threatened species, populations and communities, as listed under the BC Act and EPBC Act that could potentially occur on the Subject Site and their likelihood of occurrence (**Appendix B**).

3.2 FIELD SURVEY

3.2.1 Vegetation Assessment

A diurnal inspection of the Subject Site and surrounds was undertaken on the 20th of April 2021 to provide specific observations for this report. Native vegetation types were identified based on dominant flora species present within each structural layer (i.e., shrub and ground layers). Exotic or highly modified native vegetation was defined based on structure and species composition. Boundaries of vegetation types and communities were marked with a handheld GPS and mapped using geographical information system (GIS) software.

Vegetation types were assessed against identification criteria for State, and Commonwealth listed threatened ecological communities (DoEE 2021b; DPIE 2021d). Vegetation and habitats were compared with the BioNet Vegetation Classification descriptions to identify Plant Community Types (PCTs).

A single 400 m² floristic plot/transect was sampled in accordance with **Section 5.3.4** of the NSW Biodiversity Assessment Method (BAM) (DPIE, 2020). Percentage cover and relative abundance were recorded for all plant species within each plot/transect. Plot/ transects were positioned to sample areas that were most representative of the floristic characteristics of each PCT.

A general walkover was carried out in the Study Area to identify plant species in remnant bushland outside the Subject Site. A comprehensive list of flora was collated from this walkover.

Plant identification and nomenclature were based on species descriptions presented within The Flora of New South Wales Volumes 1 to 4 (Harden, 1993) and with reference to taxonomic updates in PlantNET - The Plant



Information Network System of Botanic Gardens Trust, Sydney, Australia (Botanic Gardens Trust, 2020). The locations of the floristic plot/ transect and survey tracks are presented in **Figure 4**.

3.2.2 *Fauna Habitat Assessment*

The locations of any important habitat features, such as microbat roosting habitat, hollow-bearing trees, terrestrial refugia and nests/burrows, were captured with a handheld Trimble GPS and photographed where appropriate.

Searches for potential habitat for threatened fauna species included but were not limited to:

- Koala feed trees.
- Foraging trees for threatened birds.
- Hollow-bearing trees.
- Potential roosts for microbats.
- Vegetated ponds, riparian vegetation and drainage lines for frogs and waterbirds.
- Woody debris, leaf litter and bush rock.

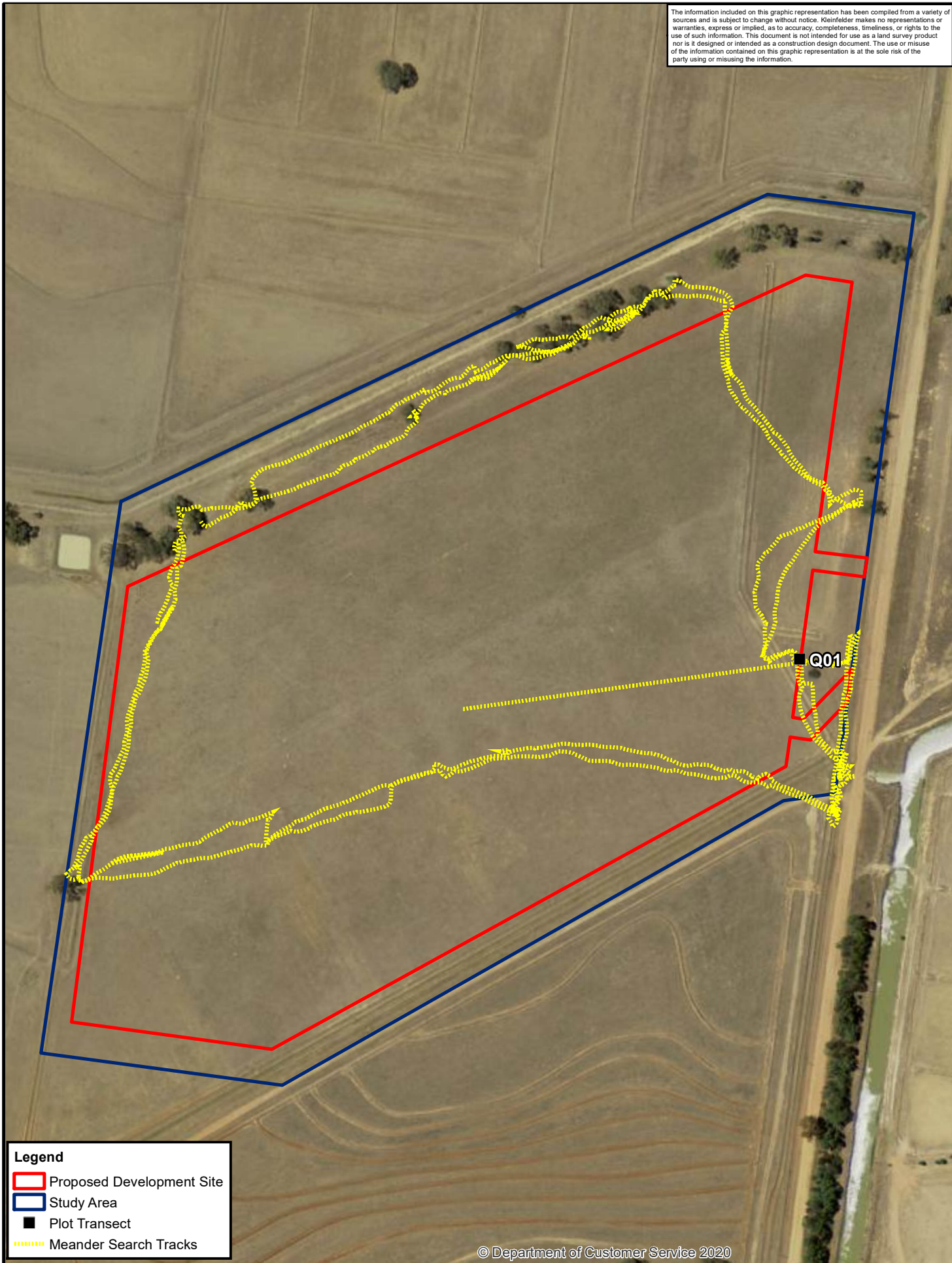
Diurnal opportunistic and incidental observations of fauna species were recorded during field surveys. These included opportunistic observation of fauna activity such as scats, tracks, burrows or other traces.

3.3 SURVEY LIMITATIONS

The survey techniques and survey effort applied for this study were commensurate with the nature and condition of the Subject Site. Due to these limitations, priority was given to habitat assessment for relevant threatened biota. A 'likelihood of occurrence' assessment was applied to all species previously recorded or predicted to occur within the locality based on State and Commonwealth information sources.

Two ecologists undertook the field survey. While a moderate diversity of native and exotic flora species was recorded, a longer survey duration or multiple seasonal surveys would likely result in the detection of a greater diversity of species. The Subject Site is considered unsuitable for most threatened plant species known to occur in the locality; therefore, the survey effort recommended in The NSW Guide to Surveying Threatened Plants (OEH, 2016) is not considered to be applicable.

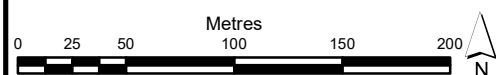
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Legend

- Proposed Development Site
- Study Area
- Plot Transect
- Meander Search Tracks



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DATE DRAWN: 2021/04/26 15:12 Version 1
DRAWN BY: GJoyce

DATA SOURCE:
ACEnergy - 2021
NSW DFSI - 2020
NSW OEH - 2019

Survey Effort

ACEnergy Pty Ltd
Flora & Fauna Assessment Report
Coleambally Solar Farm

FIGURE:

4



4 RESULTS

4.1 PLANT DIVERSITY

A total of 33 plant species were identified during the assessment. Of these, nine were found in the Subject Site. The most dominant species were *Triticum aestivum* (Common Wheat) and *Eragrostis cilianensis* (Stinkgrass). The majority of the exotic plant species were annual herbs and grasses that had established between crop rows. Native plant species were mainly comprised of grasses and low-lying shrubs. Native trees were exclusively found in woodland areas outside the development footprint.

A complete list of flora species is presented in **Appendix C**.

4.2 WEEDS

No priority weed species for the Riverina Local Land Services Region nor Weeds of National Significance (DoEE, 2021c) were identified within the Subject Site (DPI, 2021). Non-priority exotic species included the following species:

- *Lepidium africanum*
- *Citrullus amarus* (Wild Melon)
- *Echium plantagineum* (Paterson's Curse)

A more diverse assemblage of exotic species was identified outside the Subject Site along the boundary. Despite being outside the footprint of the proposal, several of these species may have occurred within the Subject Site prior to crop harvesting. As such, these species may re-establish within the Subject Site in the absence of agricultural land management. None of these plants are listed as Weeds of National Significance (DoEE, 2021c) or priority weeds within the Riverina Region (DPI, 2021). These species are outlined in **Appendix C**. Mitigation measures to prevent the spread of weeds are presented in **Section 5.2.2**.

4.3 PLANT COMMUNITY TYPES

The Subject Site is mainly free of vegetation due to previous land management practices. The remaining vegetation is either dead or dying and is dominated by exotic plant species. As such, no Plant Community Type could be reasonably assigned for this area.

The Regional vegetation mapping for the study area identifies several remnant vegetation communities within the Study Area. The closest of these mapped communities to the Subject Site is recognised as *PCT 16: Black Box grassy open woodland wetland of rarely flooded depressions in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion, under the State Vegetation Type Map (DPIE, 2016)*. PCT 16 is dominated by Black Box, *Eucalyptus largiflorens*. It is known for having an open understory with a diverse assemblage of chenopods, forbs and grasses. It is possible that the Subject Site contained this community before being developed for agriculture. The tree species within the remnant community, adjacent to the development footprint, are consistent with this PCT's floristic assemblage.



Plate 1 Low-condition agricultural land dominated by exotic plant species

Subject Site Vegetation - Low-condition agricultural land dominated by exotic plant species	
Vegetation Formation and Class	N/A
Area within Subject Site	18.12ha
Survey Effort	Conducted: 1 plot/transect.
Floristic description	<p>The vegetation within this zone is primarily exotic in origin. No upper-story or mid-story plant species remain.</p> <p>The ground cover is dominated by the species that was likely cultivated on the site previously, <i>Triticum aestivum</i> (Common Wheat). Other exotic grasses found within the Subject Site include <i>Panicum capillare</i> var. <i>capillare</i> (Witch Panic Grass) and <i>Eragrostis cilianensis</i> (Stinkgrass).</p> <p>Two native species were identified the Subject Site, <i>Salsola australis</i> and <i>Einadia nutans</i> (Cheeseweed)</p>
Condition within Development Site	<p>The vegetation within this zone is of low condition, with most vegetation dying back or dead and exotic in origin. The dieback is likely due to disturbance from agricultural practices such as crop harvesting and cattle grazing.</p> <p>The upper layer of the soil was ploughed to accommodate harvestable crop species, which has allowed for the establishment of opportunistic exotic plants.</p> <p>No canopy trees remain within the development footprint, nor fallen logs or stags, leaving little habitat opportunities for native fauna. As such, the condition within the Subject Site is considered low.</p>



Subject Site Vegetation - Low-condition agricultural land dominated by exotic plant species	
Justification for PCT selection	<p>No PCT was selected for the Subject Site due to the previous management of the area resulting in a lack of native vegetation and vegetation strata.</p> <p>Whilst no PCT was located within the Subject Site, PCT 16 was deemed the most suitable community for the vegetation north of the Subject Site.</p> <p>This PCT is dominated by <i>Eucalyptus largiflorens</i> (Black Box) which was the only tree species found within the surveyed area north of the Subject Site. Additionally, many of the ground cover species found here aligned with PCT 16, such as <i>Enchylaena tomentosa</i> (Ruby Saltbush), <i>Sclerolaena muricata</i> (Black Rolypoly) and <i>Solanum esuriale</i> (Quena). This PCT is common within the Riverina region and occurs on heavy clay soils similar to what was present within the Study Area.</p> <p>Additionally, State vegetation mapping has identified this PCT within the Study Area (DPIE, 2016).</p>
Status	BC Act: N/A
	EPBC Act: N/A
SAIL	No
PCT % Cleared	N/A

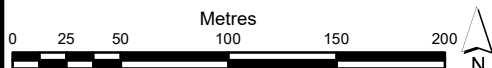
Legend

- Proposed Development Site
- Study Area
- Named Watercourse
- Unnamed Watercourse
- Plot Transect

- Hollow-bearing Tree
- Nest Tree

Plant Community Types

- PCT 16: Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion) - low condition
- Exotic



PROJECT REFERENCE: 20220265
 DATE DRAWN: 2021/04/26 16:20 Version 1
 DRAWN BY: GJoyce

DATA SOURCE:
 ACenergy - 2021
 NSW DFSI - 2020
 NSW OEH - 2019

Vegetation Communities, Plot Transects and Habitat Features

ACenergy Pty Ltd
 Flora & Fauna Assessment Report
 Coleambally Solar Farm

FIGURE:

5



4.4 THREATENED ECOLOGICAL COMMUNITIES

The agricultural land within the Subject Site does not represent any TECs listed under either the NSW BC Act or the Commonwealth EPBC Act.

4.5 THREATENED FLORA SPECIES

No threatened flora species were identified within the Subject Site during the assessment. A search of the BioNet Atlas of NSW Wildlife (DPIE, 2021a) returned no records of threatened plant species within a 5 km radius of the Study Area. An EPBC Protected Matters Search returned a list of four threatened plant species predicted to occur within the locality of the Subject Site. A 'likelihood of occurrence' assessment determined that the Subject Site is unlikely to constitute suitable habitat for any threatened plant species predicted or recorded within the locality (**Appendix B**).

4.6 FAUNA HABITAT

The Subject Site is characterised by flat land that is largely free of native vegetation. The site also lacks key habitat features such as habitat trees, rocks, logs or stag trees. As such, habitat for most local flora and fauna species is largely absent.

4.7 FAUNA SPECIES

A total of 4 fauna species were identified during the assessment. Most of these were bird species flying over the Subject Site. The most common was the Red-Rumped Parrot (*Psephotus haematonotus*). It was seen flying in small groups within the Subject Site as well as within trees in the nearby woodland community. Other species seen flying over the Subject Site included the Australian Magpie (*Cracticus tribicen*) and the Willie Wagtail (*Rhipidura leucophrys*). A single mammalian species was observed in the Study Area, the European Hare (*Lepus europaeus*). A complete list of fauna species is presented in **Appendix C**.

No threatened fauna species were detected within the Subject Site. A search of the BioNet Atlas of NSW Wildlife (DPIE, 2021a) returned a list of 4 threatened fauna species that have previously been recorded within a 5 km radius of the Subject Site: An EPBC Protected Matters Search returned 13 threatened fauna species predicted to occur within the locality of the Subject Site. A "likelihood of occurrence" assessment (see **Appendix B**) determined a low likelihood of occurrence for these fauna species within the Subject Site. No fauna species were considered to have a moderate or high likelihood of occurrence.

4.8 KOALA HABITAT

The Subject Site is free of canopy tree species; therefore, the site does not represent Potential or Core Koala Habitat in accordance with the Koala SEPP and is unlikely to represent critical habitat for this species.

4.9 EPBC PROTECTED MATTERS

A 'likelihood of occurrence' assessment was conducted for all threatened species and migratory species returned by the EPBC Protected Matters Search (**Appendix B**). The current conditions present within the Subject Site



were considered unsuitable for most species except *Falco hypoleucos* (Grey Falcon). This species has a moderate probability of occurring on-site.

The Subject Site may provide marginal foraging habitat for the Grey Falcon as it is known for foraging aerially over an extensive range of habitats, including vegetated and non-vegetated areas. The proposed development will not remove habitat features considered important to this species. The extent of foraging habitat is likely to be unaffected. The Subject Site does not have habitat features associated with breeding habitat for the Grey Falcon. The species is known for utilising large eucalypts for nesting, none of which are present within the Subject Site.



5 DISCUSSION

5.1 IMPACT ASSESSMENT

5.1.1 Impacts to Native Vegetation

The proposed development will involve impacts to 18.12 ha of exotic vegetation within the Subject Site (**Figure 5**), including:

Solar Farm Facility (Development) (18.12 ha total area)

- **18.12 ha of Vegetation Zone 1** - Low-condition agricultural land dominated by exotic plant species

Potential indirect impacts of the proposed development to native vegetation include the following:

- Weed incursions as a result of the clearing and maintenance of the proposed development

Mitigation measures to minimise the potential for disturbance of native vegetation within the Subject Site are presented in **Section 5.2.2**.

5.1.2 Impacts to Fauna

The Black Box-dominated community adjacent to the Subject Site retains habitat value for arboreal fauna such as native bat and bird species. Several of these trees have hollows suitable for nesting or roosting.

Direct impacts of the proposed development on fauna habitat include the following:

- The disturbance of soil and removal of vegetation during construction, potentially displacing ground-dwelling fauna such as amphibians and reptiles.

Potential indirect impacts of the proposed development on resident fauna populations include the following:

- Noise and lighting during the construction phase may cause minor disturbance to resident fauna within the locality and disrupt their natural behaviour
- Pollution such as chemical spills from construction machinery may have adverse effects on biota in downstream aquatic environments.
- Ground disturbance by machinery during the construction phase may create dust and facilitate the movement of sediment.

Management measures are presented in **Section 5.2.2** to reduce the potential for these impacts.

5.1.3 Impacts to Threatened Species

No threatened species were identified within the Subject Site during the assessment. The impacts from the proposed development on threatened species that occasionally utilise the Study Area are likely to be negligible given that no key habitat features for such species occur.

5.1.4 Impacts to Threatened Ecological Communities

No TECs were identified within the Subject Site.

5.1.5 Impacts to Aquatic Habitat

There are no natural watercourses within the Subject Site; however, there is a constructed drainage channel near the eastern boundary. No direct impacts to this waterway will occur from the proposed development. Potential indirect impacts include the following:



- The excavation of soil within the Subject Site during the construction phase has the potential to facilitate erosion and sediment movement. Run-off from the Subject Site has the potential to introduce nutrients and other toxins to downstream aquatic habitats.
- The introduction of chemicals such as fuels for vehicles and machinery during the construction phase has the potential to cause pollution to downstream aquatic habitat.
- The potential spread of exotic plant species to the edge of the drainage line from disturbed soil in the Subject Site.

Recommendations to reduce the potential for adverse environmental impacts to aquatic habitat are presented in **Section 5.2.2**.

5.1.6 Cumulative Impacts

Cumulative impacts arise from the interaction of individual elements associated with the proposed development and the additive effects of other external projects. No other known projects within the locality are known to have relevance to this project that could exacerbate cumulative impacts.

5.2 IMPACT AMELIORATION

5.2.1 Avoidance Measures

Impacts on biodiversity values have been addressed through an iterative design process to avoid areas of higher biodiversity value within the Study Area. The design and positioning of the solar panel array have prevented the further removal of native vegetation, including mature trees, within the Study Area.

The mitigation measures below aim to reduce indirect impacts on the remnant communities within the surrounding area of the development footprint.

5.2.2 Mitigation Measures

5.2.2.1 Vegetation Protection

Care should be taken in avoiding indirect impacts on the adjacent native vegetation and hollow-bearing trees that have the potential to house native arboreal species. It is recommended that areas of native vegetation to be retained outside the development site are clearly demarcated with high visibility tape and identified as “no go” zones prior and during the construction period to prevent accidental impacts.

5.2.2.2 Erosion Control

Mitigation measures to reduce soil erosion and pollutant run-off during construction activities should include:

- Installation of erosion and sediment control structures within 40 m of development site prior to any construction works and in accordance with Managing Urban Stormwater: Soils and Construction (Landcom, 2004).
- Regular inspection of erosion and sediment control measures, particularly following rainfall events, to ensure their ongoing functionality.
- The prompt removal of any excavated material offsite.



- The utilisation of the proposed off-load zone for material stockpiling. Its proposed location is within an area that is already cleared/ disturbed and is distant from native vegetation.
- Undertake maintenance of silt fences and other mitigation measures to isolate run-off.

5.2.2.3 Dust Control

Specific measures to minimise the generation of dust and associated impacts on adjacent natural environments should include:

- Setting maximum speed limits for all traffic within the Subject Site to limit dust generation.
- Use of a water tanker to spray unpaved access tracks during the construction phase where required.
- Application of dust suppressants or covers on soil stockpiles.

5.2.2.4 Chemical Spills

Specific measures to minimise the potential for chemical spills and associated impacts on adjacent natural environments should include the following:

- All chemicals must be kept in clearly marked bunded areas.
- Regularly inspect vehicles and mechanical plant for leakage of fuel or oil.
- No re-fuelling, washing or maintenance of vehicles and plant to be undertaken within 20 m of natural drainage lines.

5.2.2.5 Management of Weeds

Six exotic species were recorded within the Subject Site during the site assessment. Weed management should be implemented regularly post-construction to minimise weed incursions into surrounding intact native vegetation.

Additionally, the following recommendations are to be implemented during construction and operation to minimise the impact of weeds within the Subject Site:

- All vehicles should be cleaned before entering the site to prevent the introduction of new weed species.
- The site should be monitored for exotic plant species during and after construction. Particular care should be taken to ensure that Priority Weeds for the Riverina Region and Weeds of National Significance do not establish within and around the Subject Site.



6 CONCLUSION

The proposed development will require the clearing of 18.02ha of low-condition agricultural land dominated by exotic plant species. The habitat is considered to be generally unsuitable habitat for threatened species; therefore, the proposed development is unlikely to cause a significant impact to any threatened species, populations or ecological communities listed under the NSW BC Act. Entry into the NSW BOS is not triggered by the proposed development as the removal of native vegetation is below the relevant clearance threshold.

No EPBC listed species, ecological communities, migratory species or important habitat for such entities was identified within the Subject Site. The assessment determined that impacts to MNES are unlikely; therefore, an EPBC referral to the Commonwealth Minister for the Environment is not recommended.

Avoidance and mitigation measures have been presented to reduce potential impacts to biodiversity values within the Subject Site and the environment.



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APPENDIX A – SITE PHOTOGRAPHS





Picture 1: Cleared land within the northern sector of the Subject Site, adjoining onto remnant low-moderate PCT 16: Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion).



Picture 2: Westerly view of the Subject Site with visible crop rows from the previous harvest.



APPENDIX B – THREATENED SPECIES' LIKELIHOOD OF OCCURRENCE'





THREATENED SPECIES' LIKELIHOOD OF OCCURRENCE'

A list of threatened species, populations and ecological communities that have been reported or modelled to occur from within a five-kilometre radius of the Study Area was obtained from the following databases:

- NSW Office of Environment and Heritage (OEH) BioNet Atlas: (<http://www.bionet.nsw.gov.au/>); and
- Department of Environment and Energy (DoTEE) Protected Matters search tool: (www.environment.gov.au/erin/ert/epbc/index.html).

An assessment was then made of the likelihood of the threatened species, populations, and ecological communities reported or modelled to occur in the locality occurring within the Study Area or using the habitat within the Study Area as an essential part of a foraging range.

The table below summarises the likelihood of threatened species and EPBC Act listed migratory species occurring within the Study Area based on the habitat requirements of each species. A brief definition of the likelihood of occurrence criteria is provided below:

- Known – species identified within the site during surveys;
- High – species known from the area (OEH Wildlife Atlas records), suitable habitat (such as roosting and foraging habitat) present within the site;
- Moderate – species may be known from the area, potential habitat is present within the site;
- Low – species not known from the area and/or marginal habitat is present within the site; and
- Nil – habitat requirements not met for this species within the site



Table B1 – Likelihood of occurrence

	Species	Status*		Records**	Source***	Habitat	LoO
		BC	EPBC				
Flora							
1.	<i>Austrostipa wakoolica</i> A Spear Grass	E	E	-	PMST	It is confined to the floodplains of the Murray River tributaries of central-western and south-western NSW. It grows on floodplains of the Murray River tributaries, in open woodland on grey, silty clay or sandy loam soils; habitats include the edges of a lignum swamp with box and mallee; creek banks in grey, silty clay; mallee and lignum sandy-loam flat; open Cypress Pine forest on low sandy range; and a low, rocky rise.	Low
2.	<i>Brachyscome papillosa</i> Mossgiel Dairy	V	V	-	PMST	The Mossgiel Daisy is endemic to NSW and chiefly occurs within the Riverina Bioregion, from Mossgiel in the north, Murrumbidgee Valley (Yanga) National Park in the south west to Urana in the south east. It is primarily found in clay soils on Bladder Saltbush (<i>Atriplex vesicaria</i>) and Leafless Bluebush (<i>Maireana aphylla</i>) plains, but also in grassland and in Inland Grey Box (<i>Eucalyptus microcarpa</i>) - Cypress Pine (<i>Callitris</i> spp.) woodland.	Low
3.	<i>Lepidium monoplocoides</i> Winged Pepper-cress	E	E	-	PMST	Erect annual herb or perennial forb, 15-20 cm high the species is widespread in the semi-arid western plains regions of NSW. Occurs on seasonally moist to waterlogged sites, on heavy fertile soils, with a mean annual rainfall of around 300-500 mm. Predominant vegetation is usually an open woodland.	Low
4.	<i>Swainsona murrayana</i> Slender Darling Pea	V	V	-	PMST	The species has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams. It grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with <i>Maireana</i> species. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated.	Low



	Species	Status*		Records**	Source***	Habitat	LoO
		BC	EPBC				
Birds							
1.	<i>Botaurus poiciloptilus</i> Australasian Bittern	E	E	-	PMST	Australasian Bitterns are widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the State except for the far north-west. It favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (<i>Typha</i> spp.) and spikerushes (<i>Eleocharis</i> spp.).	Nil
2.	<i>Calidris ferruginea</i> Curlew Sandpiper	E	CE	-	PMST	The species occurs along the entire coast of NSW, particularly in the Hunter Estuary, and freshwater wetlands in the Murray-Darling Basin. Breeds in Siberia and migrates to Australia (as well as Africa and Asia) for the non-breeding period, arriving between August and November, and departing between March and mid-April. It generally occupies littoral and estuarine habitats, and in New South Wales can be found mainly in intertidal mudflats of sheltered coasts.	Nil
3.	<i>Daphoenositta chrysoptera</i> Varied Sittella	V	-	2	BioNet	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. It prefers eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Nil
4.	<i>Falco hypoleucos</i> Grey Falcon	E	V	-	PMST	Medium-sized, compact, pale falcon with a heavy, thick-set, deep-chested appearance. The species is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast.	Moderate
5.	<i>Grantiella picta</i> Painted Honeyeater	V	V	-	PMST	The species is nomadic, occurring in low densities across most of NSW. Highest concentrations and almost all breeding occur on inland slopes of the Great Dividing Range. Habitat for the species includes Boree, Brigalow and Box Gum woodlands and Box-Ironbark forests.	Nil



	Species	Status*		Records**	Source***	Habitat	LoO
		BC	EPBC				
6.	<i>Leipoa ocellata</i> Malleefowl	E	V	-	PMST	The stronghold for this species in NSW is the mallee in the south west centred on Mallee Cliffs NP and extending east to near Balranald and scattered records as far north as Mungo NP. They predominantly inhabit mallee communities, preferring the tall, dense and floristically-rich mallee found in higher rainfall (300 - 450 mm mean annual rainfall) areas. Utilises mallee with a spinifex understorey, but usually at lower densities than in areas with a shrub understorey. Less frequently found in other eucalypt woodlands, such as Inland Grey Box, Ironbark or Bimble Box Woodlands with thick understorey, or in other woodlands such dominated by Mulga or native Cypress Pine species.	Nil
7.	<i>Pedionomus torquatus</i> Plains-wanderer	E	CE	-	PMST	The vast majority (>99%) of records of Plains-wanderers in NSW over the past 30 years come from an area of the western Riverina bounded by Hay and Narrandera on the Murrumbidgee River in the north, the Cobb Highway in the west, the Billabong Creek in the south, and Urana in the east. Plains-wanderers live in semi-arid, lowland native grasslands that typically occur on hard red-brown soils. These grasslands support a high diversity of plant species, including a number of state and nationally threatened species.	Nil
8.	<i>Polytelis swainsonii</i> Superb Parrot	V	V	5	BioNet, PMST	Slim medium-sized parrot (37 to 42 cm) with a long narrow tail and pointed backswept wings, the eastern subspecies is restricted to areas around the Murray River in South Australia, Victoria and NSW. The species nests within River Red Gum forests along the Murray, Wakool and lower Murrumbidgee Rivers. Principal foraging habitat is mallee woodlands, though foraging also occurs in riverine forests and woodlands	Low
9.	<i>Pomatostomus temporalis temporalis</i> Grey Crowned Babbler (Eastern Subspecies)	V	-	12	BioNet	The Grey-crowned Babbler has two distinctive subspecies that intergrade to the south of the Gulf of Carpentaria. It inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions.	Low
10.	<i>Rostratula australis</i> Australian Painted Snipe	E	E	-	PMST	Normally found in permanent or ephemeral shallow inland wetlands, either freshwater or brackish. The species nests on the ground amongst tall reed-like vegetation near water. Habitat for the species includes the fringes of swamps, dams and nearby marshy areas with cover of grasses, lignum, low scrub or open timber.	Nil



	Species	Status*		Records**	Source***	Habitat	LoO
		BC	EPBC				
Mammals							
1.	<i>Nyctophilus corbeni</i> Corben's Long-eared Bat	V	V	-	PMST	Inhabits a variety of vegetation types, including mallee, Bulloke <i>Allocasuarina leuhmanni</i> and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark.	Low
2.	<i>Phascolarctos cinereus</i> Koala	V,P	V	-	PMST	Fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. Inhabit eucalypt woodlands and forests feeding on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.	Nil
3.	<i>Pteropus poliocephalus</i> Grey-headed Flying-fox	V	V	-	PMST	Generally this species is found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. Inhabit subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	Low
Amphibians							
1.	<i>Litoria raniformis</i> Southern Bell Frog	E	V	1	BioNet, PMST	The species exists only in isolated populations in the Coleambally Irrigation Area. Habitat for the species is usually in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys.	Low



	Species	Status*		Records**	Source***	Habitat	LoO
		BC	EPBC				
Threatened Ecological Communities							
1.	Buloke Woodlands of the Riverina and Murray Darling Depression Bioregions	-	E	-	PMST	The Buloke Woodlands were once widespread in the broad riverine plains of the Murray Darling Depression and Riverina Bioregions. They occur in a mosaic pattern across the landscape, interspersed amongst grasslands and eucalypt woodlands. Buloke, and many of the other component species of Buloke Woodland, are curiously susceptible to high intensity fire. On the heavier loams of the riverine plains, Buloke was a common dominant and Buloke Woodlands was probably widespread when Europeans arrived and first settled. They prefer sites with heavier soils such as loamy-clays (OEH, 2011).	Nil
2.	Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia	-	E	-	PMST	It mostly occurs from central NSW, through northern/central Victoria into eastern South Australia. The ecological community occurs in two forms, a grassy woodland form and as a derived native grassland. The most common form is as grassy woodland comprising a tree layer and an understorey that must have native grasses but with a varying proportion of shrubs and herbs (DoSEWP, 2012).	Nil
3.	Poplar Box Grassy Woodland on Alluvial Plains.	-	E	-	PMST	The ecological community mostly now occurs as scattered remnant patches inland of the Great Dividing Range in New South Wales and Queensland, within the Brigalow Belt North, Brigalow Belt South, Cobar Peneplain, Darling Riverine Plains, NSW South Western Slopes and Riverina IBRA bioregions.	Nil
4.	Weeping Myall Woodland	-	CE	-	PMST	The Weeping Myall Woodlands occurs on the inland alluvial plains west of the Great Dividing Range in NSW and QLD. It occurs in the Riverina, NSW South Western Slopes, Darling Riverine Plains, Brigalow Belt South, Murray-Darling Depression, Nandewar and Cobar Peneplain Interim Biogeographic Regionalisation for Australia (IBRA) bioregions. The ecological community generally occurs on flat areas, shallow depressions or gilgais on raised alluvial plains.	Nil



	Species	Status*		Records**	Source***	Habitat	LoO
		BC	EPBC				
5.	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CE	CE	-	PMST	The community is characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakely's Red Gum and a generally grassy understorey. Box-Gum Woodland is found from the Queensland border in the north, to the Victorian border in the south. It occurs in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	Nil
Migratory Birds							
1.	<i>Motacilla flava</i> Yellow Wagtail	-	M	-	PMST	IUCN listed this species as least concern in the Red List of Threatened Species 2015.	Nil
2.	<i>Myiagra cyanoleuca</i> Satin Flycatcher	-	M	-	PMST	Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.	Nil

Note: Aquatic and wetland species were omitted from this appendix due to the lack of waterbodies within the Subject Site.



APPENDIX C – FLORA AND FAUNA SPECIES LIST





Table C1 - Flora Species List

No.	Family	Scientific Name	Common Name	Form/Origin*	Location**
1.	Poaceae	<i>Panicum capillare</i>	Witch Panic Grass	EX	SS
2.	Poaceae	<i>Triticum aestivum</i>	Common Wheat	EX	SS
3.	Poaceae	<i>Eleusine sp.</i>	-	-	SS
4.	Poaceae	<i>Eragrostis cilianensis</i>	Stinkgrass	EX	SS
5.	Malvaceae	<i>Malva parviflora</i>	Cheeseweed	-	SS
6.	Boraginaceae	<i>Echium plantagineum</i>	Paterson's Curse	EX	SS
7.	Brassicaceae	<i>Lepidium africanum</i>	-	EX	SS
8.	Cyperaceae	<i>Citrullus amarus</i>	Wild Melon	EX	SS
9.	Chenopodiaceae	<i>Salsola australis</i>	-	SG	SS
10.	Asteraceae	<i>Vittadinia cuneata</i>	Fuzzweed	FG	SA
11.	Juncaceae	<i>Juncus sp.</i>	-	-	SA
12.	Scrophulariaceae	<i>Myoporum sp.</i>	-	-	SA
13.	Cyperaceae	<i>Cyperus sp.</i>	-	-	SA
14.	Cupressaceae	<i>Callitris glaucophylla</i>	White Cypress Pine	TR	SA
15.	Myrtaceae	<i>Eucalyptus largiflorens</i>	Black Box	TR	SA
16.	Chenopodiaceae	<i>Einadia nutans.</i>	Climbing Saltbush	-	SA
17.	Zygophyllaceae	<i>Tribulus terrestris</i>	Calltrop	EX	SA
18.	Poaceae	<i>Austrostipa sp.</i>		-	SA
19.	Solanaceae	<i>Solanum esuriale</i>	Quena	FB	SA
20.	Solanaceae	<i>Solanum nigrum</i>	European Black Nightshade	EX	SA
21.	Fabaceae	<i>Trifolium arvense</i>	Haresfoot Clover	SG	SA
22.	Fabaceae (Faboideae)	<i>Medicago truncatula</i>	Barrel Medic	EX	SA
23.	Poaceae	<i>Enteropogon acicularis</i>	-	GG	SA
24.	Asteraceae	<i>Leiocarpa panaetioides</i>	Wooly Buttons	FG	SA
25.	Chenopodiaceae	<i>Sclerolaena muricata</i>	Black Rolypoly	SG	SA
26.	Chenopodiaceae	<i>Enchylaena tomentosa</i>	Ruby Saltbush	SG	SA
27.	Brassicaceae	<i>Brassica sp.</i>	New Zealand Spinach	FG	SA
28.	Chenopodiaceae	<i>Atriplex leptocarpa</i>	Slender-fruit Saltbush	SG	SA
29.	Boraginaceae	<i>Heliotropium europaeum</i>	Potato Weed	GG	SA
30.	Poaceae	<i>Astrelba lappacea</i>	Curly Mitchell Grass	GG	SA
31.	Polygonaceae	Polygonaceae sp.	-	-	SA



No.	Family	Scientific Name	Common Name	Form/Origin*	Location**
32.	Fabaceae	<i>Vicia sp.</i>	-	-	SA
33.	Poaceae	<i>Paspalum dilatatum</i>	Paspalum	HTW	SA

*Form/Origin: EX – Exotic, ** Location: SS – Subject Site, SA – Study Area



Table B2 Fauna Species List

No.	Scientific Name	Common Name	Status		Observation Type*	General Abundance within Subject Site**
			BC	EPBC		
1.	<i>Cracticus tribicen</i>	Australian Magpie	-	-	O	I
2.	<i>Rhipidura leucophrys</i>	Willie Wagtail	-	-	O	UC
3.	<i>Psephotus haematonotus</i>	Red-rumped Parrot	-	-	O	C
4.	<i>Lepus europaeus</i>	European Hare	-	-	O	I

*Observation Type: O (Visual Observation), H (Heard whilst on site), E (Evidence recorded inc scats, tracks or markings), R (Recorded through the use of call detectors [level of confidence C: Confident, Pr: Probable, Po: Possible]).

** General Abundance: I (Individual record), UC (Uncommon, 2-5 records), C(Common occurrence on site >5 records)



APPENDIX D – ASSESSMENT OF SIGNIFICANCE (PURSUANT TO SECTION 7.3 OF THE BC ACT & THE SIGNIFICANT IMPACT GUIDELINES PURSUANT TO EPBC ACT 1999)





D.1 FACTORS OF ASSESSMENT - BIODIVERSITY CONSERVATION ACT 2016

The five factors considered in the test of significance under s.7.3 of BC Act are shown in the table below. The tests of significance for all threatened species, populations and ecological communities considered likely to occur within the Study Area are provided in the proceeding sub-sections.

Table D1: Factors addressed in the assessment of significance

Factor	Species	Population	Ecological Community
(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.	-	-	-
(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			
(c) in relation to the habitat of a threatened species, population 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, population or ecological community in the locality			
(d) whether the proposed development or activity is likely to have an adverse effect any declared area of outstanding biodiversity value (either directly or indirectly).	-	-	-
(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.	Yes, Grey Falcon (<i>Falco hypoleucos</i>)	-	-



D.2 THREATENED SPECIES ASSESSMENT - BIODIVERSITY CONSERVATION ACT 2016

Table D2 Grey Falcon - *Falco hypoleucos*

Factor	Species
(a) Effect on life cycle of threatened species .	Nil
(b) (i) Effect on extent of EEC or CEEC .	Not Applicable
(b) (ii) Effect on composition of EEC or CEEC .	Not Applicable
(c) (i) Extent of habitat removal or modification for threatened species, population or ecological community	The proposed development will require the clearing of 18.12ha of exotic vegetation that constitutes foraging habitat for the Grey Falcon.
(c) (ii) Extent of fragmentation or isolation of habitat for threatened species, population or ecological community .	The Subject Site does not constitute roosting habitat for the Grey Falcon and therefore the development is unlikely to result in the displacing of individuals.
(c) (iii) The importance of habitat to threatened species, populations or ecological community .	The Subject Site represents marginal foraging habitat, likely used as part of a broader territory for the species across the vast areas of open forest and grasslands within the vicinity of the Subject Site.
(d) Area of Outstanding Biodiversity Value	Not Applicable
(e) Key Threatening Processes	Grazing and clearing of arid and semi-arid zone rangelands. Given the small scale of proposed clearing and that the vegetation is of low condition, the proposed development is likely to facilitate the above listed KTP to a minor extent. Impacts are likely to be negligible
Conclusion	The proposed development will only impact managed agricultural land that may be utilised as foraging habitat for the Grey Falcon; therefore it is considered unlikely to have a significant impact on this species in the locality.





APPENDIX E – STAFF CONTRIBUTIONS

The following staff were involved in the compilation of this report.

Name	Qualification	Title/Experience	Contribution
James Baldry	BBiod&Cons MConsBio	Ecologist	Field surveys, Flora and Fauna Assessment Report Author.
Ben Stewart	MMSc&Mgt	Ecologist (Botanist)	Field Surveys, Flora and Fauna Assessment Report Author.
Gayle Joyce	BSc Forestry (Hons)	GIS Specialist	GIS Data Management and Figure Preparation
Gilbert Whyte	BSc (Hons) PhD	Senior Ecologist	Report Review



APPENDIX F – LICENSE AND PERMITS

Kleinfelder employees involved in the current study are licensed or approved under the *Biodiversity Conservation Act 2016* (License Number: SL100730, Expiry: the 31st of March 2021) and the *Animal Research Act 1985* to harm/trap/release protected native fauna and to pick for identification purposes native flora and to undertake fauna surveys.



APPENDIX G – EPBC ACT PROTECTED MATTERS SEARCH



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

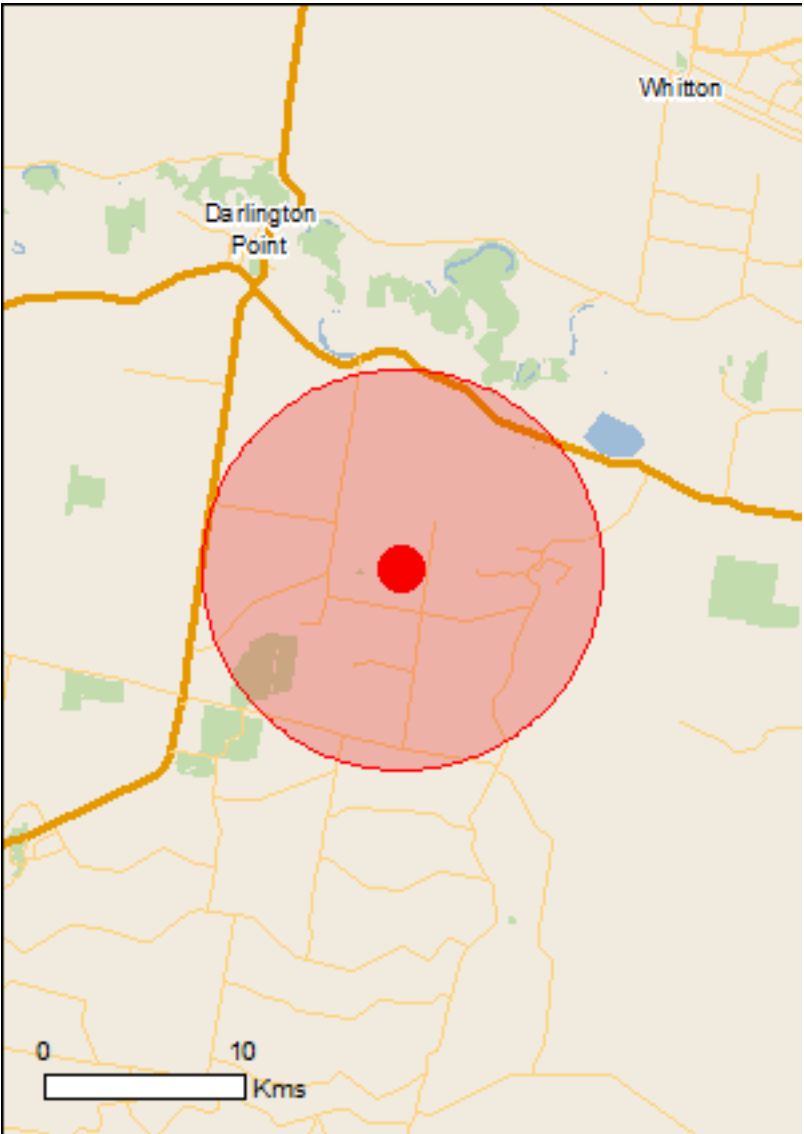
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 19/04/21 12:17:18

- [Summary](#)
- [Details](#)

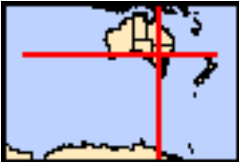
[Matters of NES](#)[Other Matters Protected by the EPBC Act](#)[Extra Information](#)
- [Caveat](#)
- [Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

[Coordinates](#)

Buffer: 10.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	21
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	15
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	22
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)		[Resource Information]
Name	Proximity	
Banrock station wetland complex	500 - 600km upstream	
Hattah-kulkyne lakes	300 - 400km upstream	
Riverland	400 - 500km upstream	
The coorong, and lakes alexandrina and albert wetland	500 - 600km upstream	

Listed Threatened Ecological Communities	[Resource Information]
------------------------------------------	--------------------------

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Community may occur within area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community may occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species	[Resource Information]
---------------------------	--------------------------

Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Fish		
Galaxias rostratus Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area
Maccullochella macquariensis Trout Cod [26171]	Endangered	Species or species habitat may occur within area
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Frogs		
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area
Mammals		
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
Austrostipa wakoolica [66623]	Endangered	Species or species habitat may occur within area
Brachyscome papillosa Mossgiel Daisy [6625]	Vulnerable	Species or species habitat may occur within area
Lepidium monoplacoides Winged Pepper-cress [9190]	Endangered	Species or species habitat likely to occur within area
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla flava Yellow Wagtail [644]		Species or species

Name	Threatened	Type of Presence
Myiagra cyanoleuca Satin Flycatcher [612]		habitat may occur within area Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land	[Resource Information]
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The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Australian Telecommunications Commission

Listed Marine Species	[Resource Information]
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* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within

Name	Threatened	Type of Presence
Calidris melanotos Pectoral Sandpiper [858]		area Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Murrumbidgee Valley	NSW

Invasive Species

[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-34.69662 146.0568

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

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