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Flora and Fauna Assessment Report

KDC Pty LTD

Gunnedah Solar Farm

262 Hunts Road, Gunnedah, NSW, 2713
(Part Lot 2 DP 814689)

8 September 2020

Flora and Fauna Assessment Report

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Project No: 20203963

Prepared for:

KDC PTY LTD

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1. INTRODUCTION

1.1 PROJECT BACKGROUND

Kleinfelder was engaged by KDC Pty Ltd (KDC) on behalf of Providence Asset Group (PAG) to prepare a Flora and Fauna Assessment Report for the Gunnedah Solar Farm Project. The project will be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Additionally, *State Environmental Planning Policy (Infrastructure) 2007*, Division 4, Clause 35 identifies "Electricity Generating Works" as permitted with consent as the RU4 zone is identified as a "prescribed rural zone". The development is therefore considered to be Local Development and Council will be the consent authority for the project.

The following terms are used throughout this report to describe the areas that pertain to the current assessment:

- Study area – defined as Part Lot 2 DP 814689.
- Subject site (Proposed Development Area) – areas of the study area proposed for development.
- Locality – land within a 5-kilometre radius of the study area.

This report identifies the flora, fauna and threatened species and ecological communities present, or likely to occur within the study area based on species and/or habitats detected during field surveys. Threatened flora and fauna records from the locality have been considered to determine the "likelihood of occurrence" of these species. An assessment of the likely impacts on threatened species, habitat features, wildlife corridors and vegetation communities as a result of the proposed development is undertaken.

1.2 SITE DESCRIPTION

The study area is located approximately 3 km southwest of the township of Gunnedah within the Gunnedah Shire Council Local Government Area (LGA) (**Figure 1**). The study area and surrounds lie within the North West Slopes region of NSW.

The subject site is zoned 'RU4 – Primary Production Small Lots' under the Gunnedah Local Environmental Plan (Gunnedah LEP, 2012).

The western boundary of the study area is bordered by Black Jack Road. The southern boundary is bordered by Bushs Lane and the western boundary is bordered by Hunts Road. The northern boundary adjoins an adjacent property, which is comprised of cleared lands and bushland to the north. The predominant land use within the locality is large lot residential, low-density residential, and primary production (agricultural development).

The subject site consists of an area of land approximately 12 hectares (ha) in the western portion of the study area. The majority of the subject site had been cleared of native vegetation at the time of the assessment. Discussions with the landowner and review of satellite imagery indicate that this occurred around mid-2017 (however, recent evidence of clearing and tilling of the soil was noted during field surveys). Note that although the aerial imagery presented in this report shows large areas of native forest and isolated trees within the subject site (**Figure 2**), these areas have been predominantly cleared of native vegetation.

1.3 PROPOSED DEVELOPMENT

The Gunnedah Solar Farm project includes a maximum 5MW grid-connected solar PV installation. Once established, the solar farm will be connected to the Essential Energy network via 22 kV power lines originating from the Gunnedah Zone Substation, which is located approximately 2.4km north-east. It is noted that a separate application process is being undertaken with Essential Energy for this connection.

The proposed development aims to erect an estimated 14,196 solar PV panels producing 425W. The layout of the proposed development is shown on **Figure 3**. Other electrical generation infrastructure is proposed on the site including a skid-mounted MV Power Station consisting of inverters, transformer and switchgear.

The PV arrangement will consist of 196 ground mounted single axis trackers. The PV arrays will have a clearance above the existing ground surface and extend to approximately 2.7m at maximum tilt. The PV mounting structure would comprise steel posts driven to approximately 1.5m below ground using a small pile driver. Additional support structures will be attached to the piles, which would then support the PV panels.

A 4m wide access road is proposed connecting the solar farm to Bushs Lane at the south eastern corner of the lot. Access to the site during construction will also be provided off Black Jack Road. The solar farm will be fully fenced with 2.2m security fencing including barbed wire

at the top. Gate access is provided in the south east corner of the site. Additionally, there will be a clearance of panels around the perimeter of the solar farm, to allow for vehicle access including fire trucks.

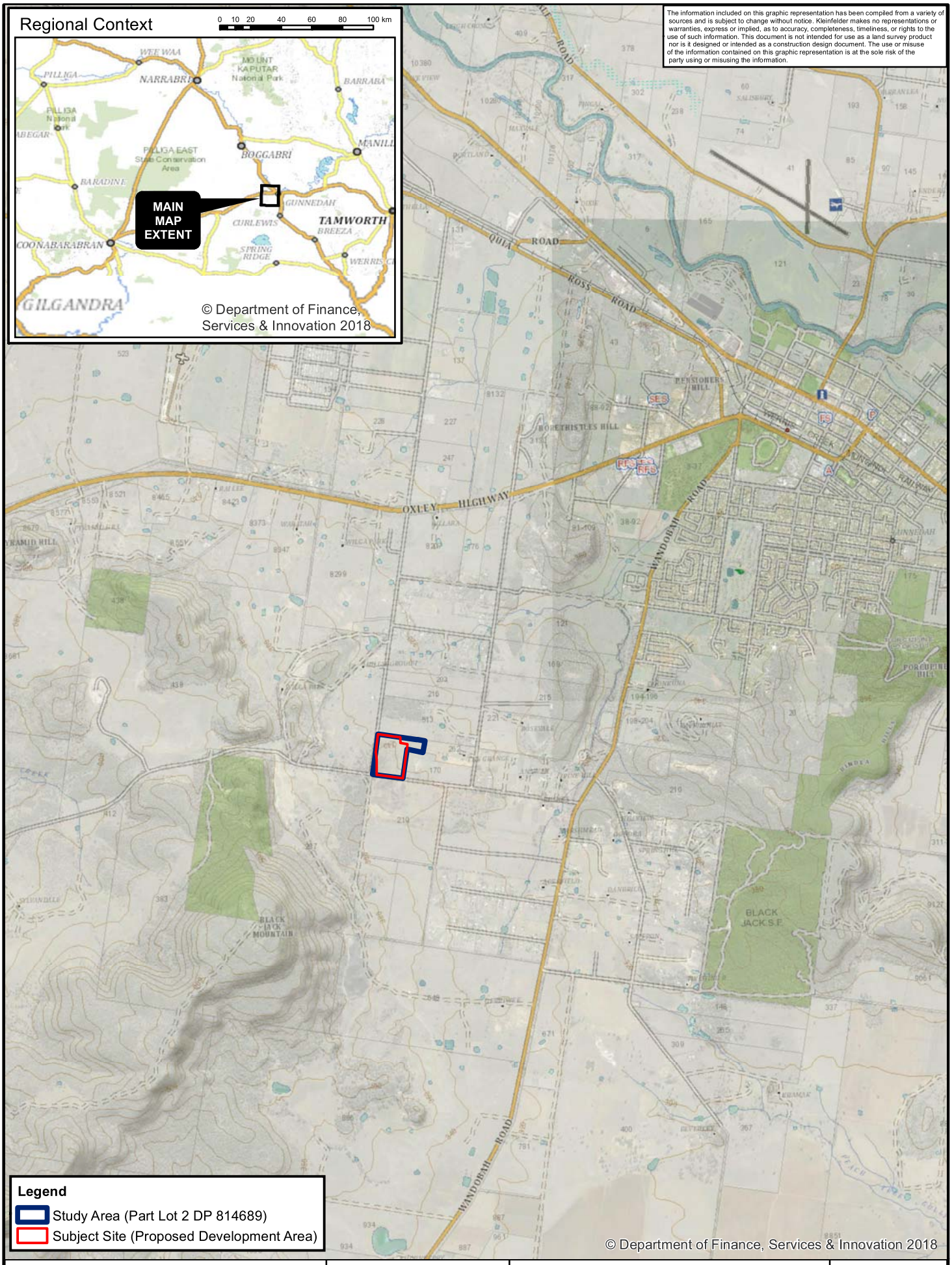
The solar PV farm would operate 24 hours a day, 7 days a week, with no permanent staff on site. Maintenance inspections will be undertaken daily or on an as needs basis. During the construction period there is estimated to be up to 30 personnel on site for up to 6 months.

The project layout has been designed to avoid impacting the majority of existing trees and native vegetation within the study area.

1.4 REPORT OBJECTIVES

The objectives of the Flora and Fauna Assessment Report are as follows:

- Describe the flora and fauna (and their habitats) present on, or likely to occur on the subject site.
- 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 taken 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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DATA SOURCE:
NSW DFSI - 2018
NSW OEH - 2019

Locality

KDC Pty Ltd
Flora & Fauna Assessment
Gunnedah Solar Farm

FIGURE:

1

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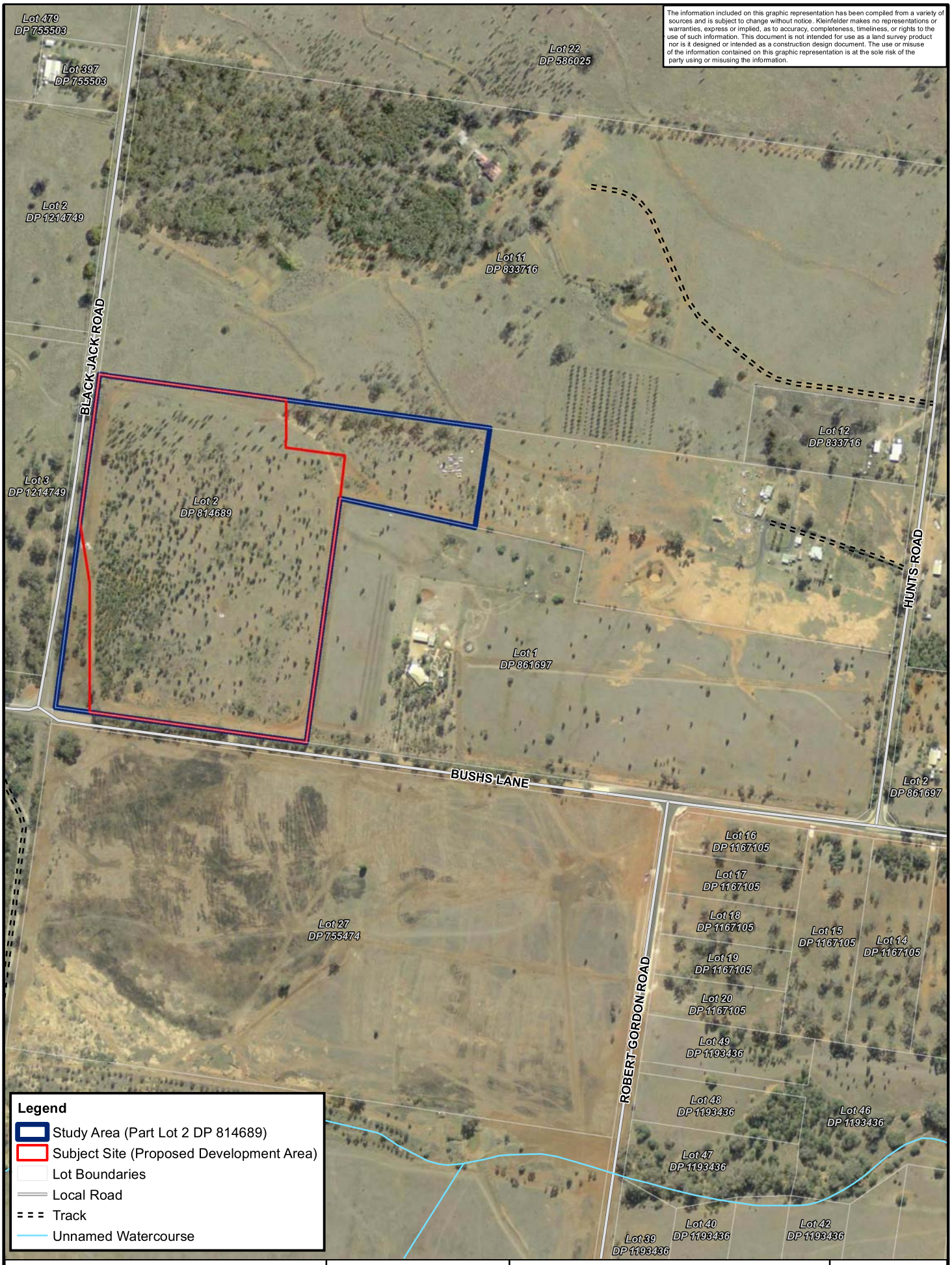

Metres
0 25 50 100 150 200 250

N

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DATA SOURCE:
NSW DFSI - 2018
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Study Area and Subject Site

KDC Pty Ltd
Flora & Fauna Assessment
Gunnedah Solar Farm

FIGURE:

2

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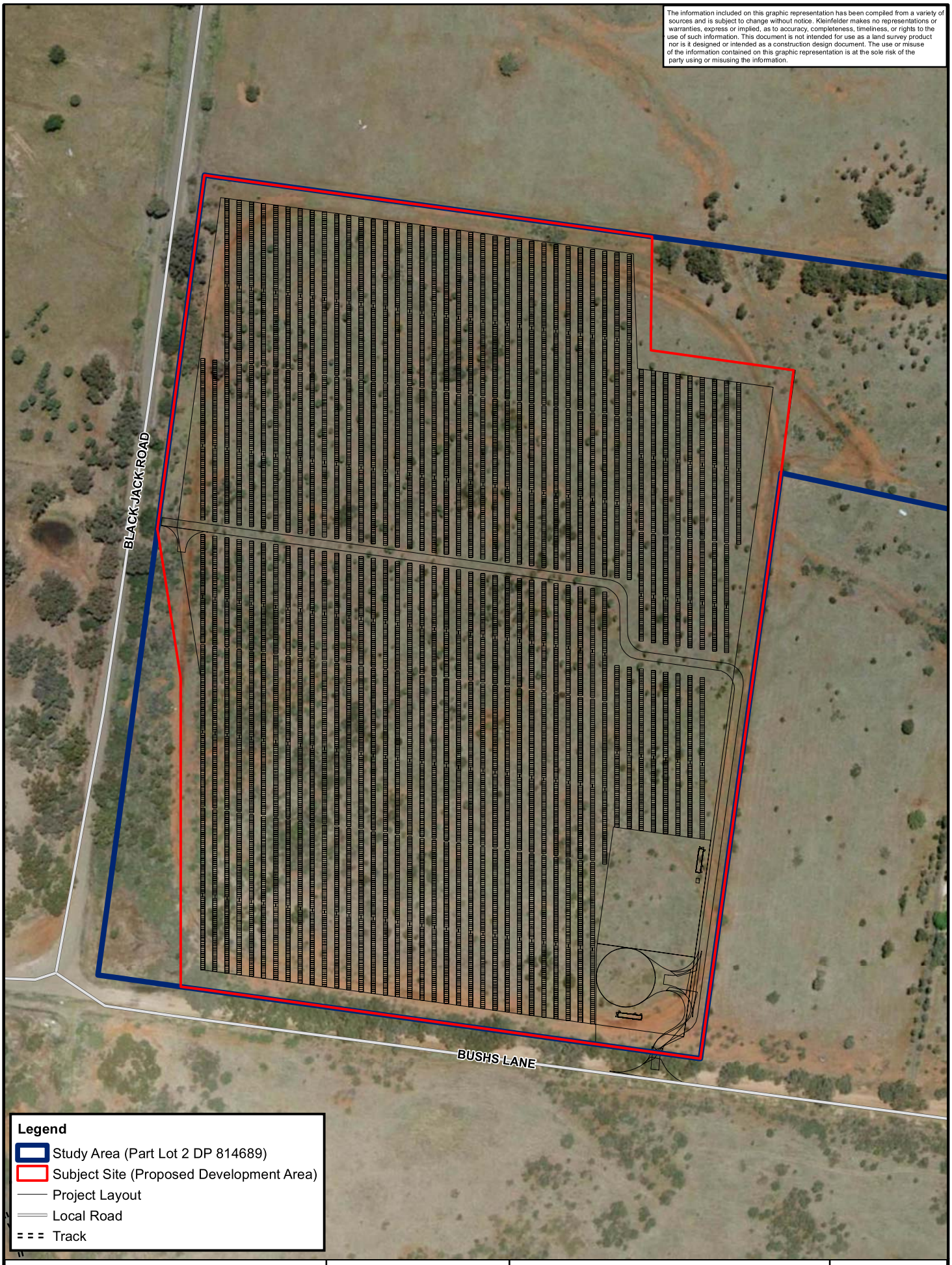

Legend

- Study Area (Part Lot 2 DP 814689)
- Subject Site (Proposed Development Area)
- Project Layout
- Local Road
- Track

Metres
0 10 20 40 60 80 100

N

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DATA SOURCE:
NSW DFSI - 2018
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Proposed Site Layout

KDC Pty Ltd
Flora & Fauna Assessment
Gunnedah Solar Farm

FIGURE:

3

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2. LEGISLATIVE CONTEXT

2.1 FEDERAL LEGISLATION

2.1.1 Environment Protection & Biodiversity Conservation Act 1999

The purpose of the *Environment Protection and Biodiversity Conservation Act* 1999 (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, in relation to 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 kilometre buffer) were obtained from the on-line Protected Matters Search Tool (DAWE, 2020a). 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 *Environmental Planning 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 Gunnedah Shire Council.

2.2.2 Biodiversity Conservation Act 2016

The NSW BC Act, the NSW *Biodiversity Conservation Regulation 2017* (BC Regulation) and amendments to the NSW *Local Land Services Act 2013* (LLS Act) commenced on 25 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 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 BC Act, as determined by application of an *assessment of significance* pursuant to Section 7.3 of the 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 viewed on 27/04/2020 indicates the nearest mapped area to the study area occurs over 600m to the east).
- The proposed development will not involve clearing of native vegetation that exceeds the Biodiversity Offset Scheme (BOS) clearing threshold for the site (0.5 ha threshold for a minimum lot size of 10 ha) as determined by the BC regulation.

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 BC Act that have previously been recorded within the locality (applying a 10 kilometre buffer) were obtained from the on-line Bionet Atlas of NSW Wildlife (Department of Planning, Industry and Environment) (DPIE, 2020a). These records are discussed in **Section 4**. The 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 BC Act, within the subject site.
- Assessment of potential impacts threatened species, populations and ecological communities, as listed under Schedules 1 and 2 of the BC Act, as determined by application of an *assessment of significance* pursuant to Section 7.3 of the 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 object 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.

The Department of Primary Industries (DPI) provides guidance for the control and management of Priority Weed species. Lists of Priority Weeds are provided for each region of NSW. Priority Weed species recorded within the study area 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, and 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

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 metres of the highest bank of the river, lake or estuary (NRAR, 2018).

A river is defined by the WM Act as:

- Any watercourse, whether perennial or intermittent and whether comprising a natural channel or a natural channel artificially improved.
- Any tributary, branch or other watercourse into or from which a watercourse flows.
- Anything declared by the regulations to be a river, whether or not it also forms part of a lake or estuary, but does not include anything declared by the regulations not to be a river.

No mapped waterways occur within the study area. The nearest mapped waterways occur approximately 400m to the south (**Figure 2**). These waterways are classified as 1st and 2nd order streams (Strahler, 1952).

The proposed development will not directly impact waterfront land; therefore, referral of the Development Application to the NSW Natural Resources Access Regulator for further consideration is not required.

2.2.6 State Environmental Planning Policy (Koala Habitat Protection) 2019

The *State Environmental Planning Policy (Koala Habitat Protection) 2019* (Koala Habitat Protection SEPP) aims to encourage the conservation and management of areas of natural vegetation that provide habitat for Koalas to support a permanent free-living population over their present range and reverse the current trend of Koala population decline.

No Koala's or evidence of Koalas was identified during the assessment; however, one preferred Koala feed tree species (White Box *Eucalyptus albens*) was detected within the subject site. The proposed development occurs within an area that is mapped on the Koala Development Application Map (DPIE, 2020c) (Spatial Viewer). Nine preferred Koala fee trees will be removed by the proposal.

A Koala Plan of Management (KPoM) is not applicable to the site; therefore, the proposed development is considered to represent "Tier 2 Development" as per the *Koala Habitat Protection Guideline* (DPIE, 2020d). As such, a Koala Habitat Assessment Report has been prepared for the project in **Appendix 5.**

2.3 LOCAL PLANNING INSTRUMENTS

2.3.1 Gunnedah Shire Local Environmental Plan 2012

The study area is located within the Gunnedah Shire Council LGA. The Gunnedah Shire Local Environmental Plan 2012 (Gunnedah LEP, 2012) controls development within the study area through zoning and development controls. The study area is currently zoned "RU4 – Primary Production Small Lots". The objectives of this zoning under the LEP are as follows:

- To enable sustainable primary industry and other compatible land uses.

- To encourage and promote diversity and employment opportunities in relation to primary industry enterprises, particularly those that require smaller lots or that are more intensive in nature.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To maintain the rural and scenic character of the land.
- To ensure that development does not unreasonably increase the demand for public services or public facilities.
- To conserve and enhance the quality of valuable environmental assets, including waterways, riparian land, wetlands and other surface and groundwater resources, remnant native vegetation and fauna movement corridors as part of all new development and land use.
- To provide opportunities for a restricted range of employment-generating development that is compatible with, and adds value to, local agricultural production.
- To minimise conflict between land uses in the zone and with adjoining zones.
- To maintain native vegetation and wildlife corridors.

The current assessment has been prepared in consideration of the objectives of the LEP. Potential impacts associated with the project are addressed in **Section 5.1.** Mitigation measures are presented in **Section 5.2.**

2.3.2 Gunnedah Shire Development Control Plan 2012

The Gunnedah Development Control Plan (DCP) provides specific, more comprehensive guidelines for certain types of development, or area specific requirements for the Gunnedah Shire (Gunnedah DCP, 2014). The DCP states that application documentation to Council must identify any potential environmental impacts of the development and demonstrate how they will be mitigated. Environmental controls listed within Section 6.6 of the DCP comprise the following:

- Traffic
- Flood liability
- Slope
- Construction impacts
- Solid and Liquid Waste
- Air quality (odour and pollution)
- Noise emissions
- Water quality

- Sustainability

The majority of the above listed controls are not relevant to the current assessment; however, potential construction impacts are addressed in **Section 5.1.** Mitigation measures (controls) to reduce potential construction impacts are presented in **Section 5.2.**

3. MATERIALS AND METHODS

3.1 DESKTOP ASSESSMENT

Existing information on the flora and fauna of the subject site and the locality, including relevant threatened biota was obtained from:

- Regional vegetation mapping obtained from The Central Resource for Sharing and Enabling Environmental Data in NSW (SEED, 2020).
- 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 10-kilometre radius of the site (data retrieved 27/04/2020).
- The Department of Agriculture Water and Environment (DAWE, 2020a) Protected Matters Search Tool, which involved a search for matters of national environmental significance within a 10-kilometre radius of the site (conducted on 27/04/2020).

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 site, and their likelihood of occurrence.

3.2 FIELD SURVEY

3.2.1 Vegetation Assessment

A diurnal inspection of the site and surrounds was undertaken on 04/03/2020 to provide specific observations for this report. The determination of native or exotic vegetation types was based on dominant flora species present within each structural layer (i.e. canopy, shrub and ground layers). Boundaries of vegetation types and communities were marked with a hand-held GPS and mapped using geographical information system (GIS) software.

Vegetation types within the subject site were assessed against identification criteria for State and Commonwealth listed threatened ecological communities (DAWE, 2020b; DPIE, 2020e). Vegetation and habitats were compared with descriptions provided in the Bionet Vegetation Classification to identify Plant Community Types (PCTs).

Although the proposed development does not trigger the BOS, elements of the Biodiversity Assessment Method or 'BAM' are considered to be best practise for the assessment of vegetation composition, structure and function (OEH, 2017). Therefore, one 400 m² floristic plot/transect (BAM Plots) was sampled in accordance with Section 5.3.4 of the BAM. Percentage cover and relative abundance was recorded for all plant species within each BAM Plot. The Plot were positioned to sample an area that was most representative of the floristic characteristics of the PCT present. The locations of the floristic plot/ transect is presented in **Figure 4**.

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).

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 device 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.

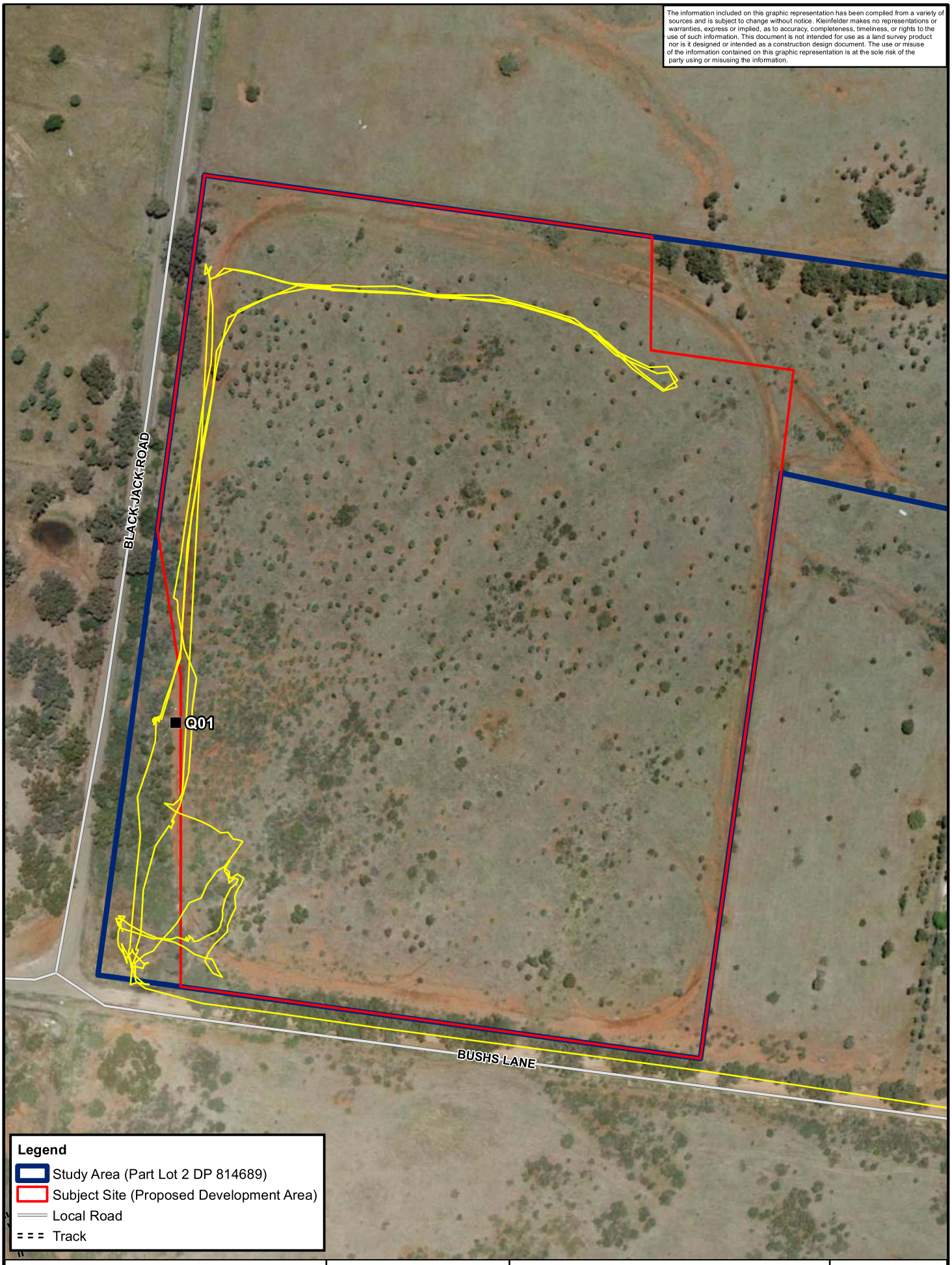
Diurnal opportunistic and incidental observations of fauna species were recorded at all times during field surveys. These included opportunistic observation of fauna activity such as scats, tracks, burrows or other traces.

3.3 SURVEY LIMITATIONS

The survey techniques and survey effort applied for this study were appropriate to the nature and condition of the site. Due to these limitations, priority was given to habitat identification and assessment for relevant threatened biota. Favourable habitat features and characteristics for relevant species were noted and used to further define the likelihood of occurrence of these species on the site.

The field survey was undertaken during a four-hour survey period. A longer survey duration would likely result in detection of a greater diversity of species. The subject site is considered to be largely unsuitable for threatened plant species due to the extent of vegetation clearing for agricultural development. Due a lack of habitat for native plant species within the subject site, *the NSW Guide to Surveying Threatened Plants* (OEH, 2016) was not considered to be applicable.

No nocturnal surveys or fauna trapping was conducted and therefore targeted surveys for cryptic fauna species was not conducted. For example, no 'call playback' for arboreal fauna, large forest owl species or Koalas was conducted or considered to be applicable to the assessment. Given the limited availability of woody vegetation within the study area, the survey effort was considered adequate to detect the majority of the species likely to be present.



Legend

- Study Area (Part Lot 2 DP 814689)
- Subject Site (Proposed Development Area)
- Local Road
- Track

Metres
0 10 20 40 60 80 100

N

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DATA SOURCE:
NSW DFSI - 2018
NSW OEH - 2019

Survey Effort

KDC Pty Ltd
Flora & Fauna Assessment
Gunnedah Solar Farm

FIGURE:

4

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4. RESULTS

4.1 VEGETATION ASSESSMENT

4.1.1 Plant Diversity and Vegetation Structure

A total of 32 plant species were identified during the assessment. These were comprised of eight (8) exotic species and twenty-four (24) native species. Due to the extent of vegetation clearing within the subject site, the majority of the plant species were detected in the small patches of vegetation outside the subject site, such as along the site boundaries.

An examination of the vegetation structure of vegetation outside the study area in areas with a similar topography and geology (red earth) indicate that prior to vegetation clearing, the vegetation within the subject site was comprised of an open shrubby forest community (further discussed in **Section 4.1.3.**

A complete list of flora species is presented in **Appendix 2**

4.1.2 Priority Weeds

The NSW Department of Primary Industries (DPI, 2020) lists Priority Weed species within the region that are to be prioritised for control due to their potential threat to both agriculture and the natural environment. Review of this list determined that of the eight (8) exotic plant species identified within the study area, the following species are Priority Weeds:

- *Lycium ferocissimum* (African Box Thorn)
- *Opuntia stricta* (Prickly Pear)
- *Xanthium spinosum* (Bathurst Burr)

In accordance with the NSW *Biosecurity Act 2015*, the above listed species are to be managed to eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant of these species, who knows or ought to know of any biosecurity risk, has a duty to ensure that infestations are managed so far as is reasonably practicable.

The Priority Weed species previously discussed are also determined to be High Threat Exotic (HTE) species by the NSW Department of Planning Industry and Environment (DPIE, 2020b).

These species are therefore recognised as having the potential to cause habitat degradation of native ecosystems. *Opuntia stricta* (Prickly Pear) and *Lycium ferocissimum* (African Box Thorn) are also recognised as a Weed of National Significance (WONS) (DAWE, 2020c). Declared WONS are species identified by the Commonwealth a having the potential to cause major economic, environmental and social impacts in Australia.

No major infestations of weeds were identified within the subject site. As such, control of onsite weeds is not required. Mitigation measures are presented in **Section 5** to prevent the further spread of weeds and to reduce the risk of introducing new weed species to the study area during the construction phase of the project.

4.1.3 Plant Community Types

One native vegetation community was identified within the study area (**Appendix 1, Plate 2**): An open shrubby forest community was identified as *PCT 458: White Cypress Pine - Buloke - White Box shrubby open forest on hills in the Liverpool Plains - Dubbo region, Brigalow Belt South Bioregion* (**Figure 5**). This community was restricted to small patches along the western boundary of the study area and in the north-east corner of the study area. No areas of intact vegetation will be impacted by the proposed development.

Characteristic species in the canopy of the community include: *Eucalyptus albens* (White Box), *Eucalyptus melliodora* (Yellow Box) *and Callitris glaucophylla,* (White Cypress). Characteristic shrub species included *Cassinia laevis* (Cough Bush), *Eremophilla mitchelli* (False Sandalwood), *Myoporum montanum* (Western Boobialla), *Olearia elliptica* subsp. *elliptica* (Sticky Daisy-bush) and *Senna artemisioides* (Silver Cassia). The ground layer was sparse; however, several native forbs were detected including *Abutilon oxycarpum, Boerhavia dominii, Callotis lappulacea, Desmodium brachypodium, Dysphania pumilio, Glycine tabacina, Hypericum gramineum, Pimelea glauca, Portulaca oleracea, Sida corrugata, Sida subspicata, Vittadinia cuneata var. cuneata* and *Wahlenbergia gracilis*. One native grass species was detected (*Aristida ramosa*).

The constructed dams within the study area did not contain water or aquatic vegetation at the time of assessment.

4.2 THREATENED ECOLOGICAL COMMUNITIES

No Threatened Ecological Communities (TECs) were identified within the study area.

4.3 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, 2020a) returned a list of one threatened flora species which has been previously been recorded within a 10km radius of the study area: *Cadellia pentastylis* (Ooline), which is listed as 'vulnerable' under the BC Act and the EPBC Act. This species Occurs along the western edge of the North West Slopes from north of Gunnedah to west of Tenterfield. The species often forms a closed or open canopy mixing with eucalypt and cypress pine species. There appears to be a strong correlation between the presence of Ooline and low to medium-nutrient soils of sandy clay or clayey consistencies, with a typical soil profile (DPIE, 2020e). The field assessment determined that this soil type does not occur within the subject site. A likelihood of occurrence assessment has been prepared for the species in **Appendix 3**. The assessment determined that the habitat present within the subject site is not suitable for this threatened plant species.

4.4 TERRESTRIAL FAUNA HABITAT

The assessment revealed that the subject site is comprised of cleared land. At the time of the assessment, the area had been recently tilled to expose bear earth. Habitat trees, rock outcrops and woody debris were absent throughout the subject site.

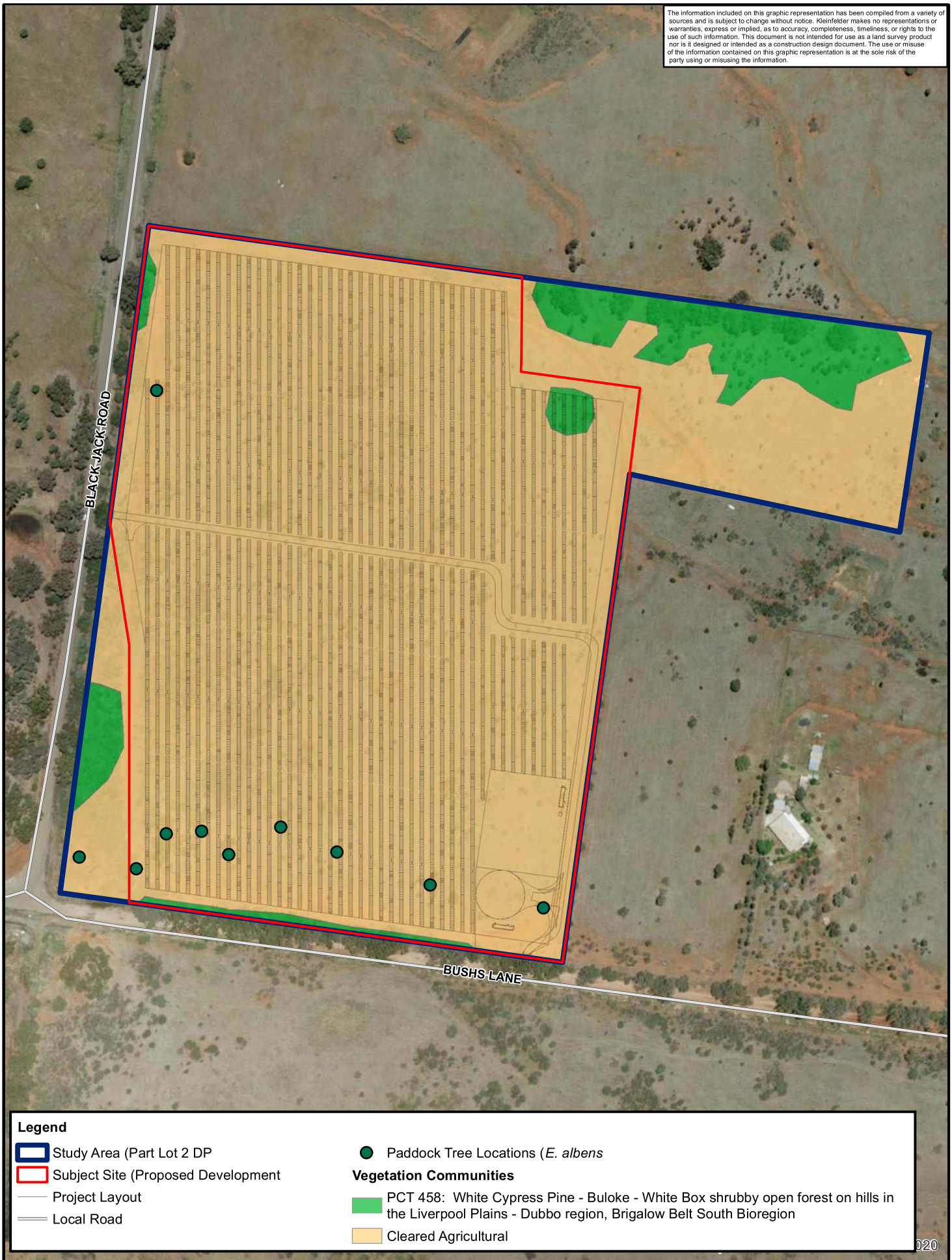
The subject site was found to lack vegetation with a complex structure (canopy, shrubs and midstorey species were absent). The habitat is likely to support a low diversity of native fauna, which are likely to utilise the area for movement and dispersal rather than for roosting or breeding. No sedentary fauna species were identified during the assessment.

Extant native vegetation within the Subject Site, meets the definition of Core Koala Habitat. A Koala Assessment Report is provided in Appendix 5.

Opportunistic fauna observations included sightings of common bird species such as the Galah *(Eolophus roseicapilla)* and the Australian Raven *(Corvus coronoides).* No mammal, reptile or amphibian species were detected.

In summary, the fauna habitat assessment determined the following:

- No nesting habitat is present within the subject site.
- The cleared areas (bare earth) may provide marginal foraging habitat for seed-eating native birds and are considered to be exposed and generally unsuitable for most native fauna species.
- A small area (nine isolated *Eucalyptus albens)* is to be removed, which constitutes Core Koala Habitat.



Legend

- Study Area (Part Lot 2 DP
- Subject Site (Proposed Development
- Project Layout
- Local Road
- Paddock Tree Locations (*E. albens*

Vegetation Communities

- PCT 458: White Cypress Pine - Buloke - White Box shrubby open forest on hills in the Liverpool Plains - Dubbo region, Brigalow Belt South Bioregion
- Cleared Agricultural

Metres
0 10 20 40 60 80 100

N

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PROJECT REFERENCE: 20203963
DATE DRAWN: 2020/09/07 11:42 Version 4
DRAWN BY: GJoyce
DATA SOURCE:
NSW DFSI - 2018
NSW OEH - 2019

Vegetation Communities

KDC Pty Ltd
Flora & Fauna Assessment
Gunnedah Solar Farm

FIGURE:
5

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4.5 THREATENED SPECIES (BC ACT)

No threatened fauna species were detected within the subject site. A search of the Bionet Atlas of NSW Wildlife on the 09/03/2020 (DPIE, 2020a) returned a list of 26 threatened fauna species that have previously been recorded within 10km of the subject site: A “likelihood of occurrence” assessment determined that the habitat is too degraded or unsuitable to support populations of any of these species (**Appendix 3**).

4.6 EPBC ACT PROTECTED MATTERS

4.6.1 Relevant Matters

An EPBC Protected Matters Search (searched 27/04/2020) returned a list of MNES predicted to occur within a 10km radius of the study area (**Appendix 4**). This list included five (5) threatened ecological communities, twenty-one (21) threatened species and ten (10) migratory species. A discussion of each of these groups in regard to the availability of habitat within the study area is presented below.

4.6.2 Threatened Species

The subject site contains no key habitat features for threatened species. No hollow-bearing trees or native vegetation with a complex structure occurs within the subject site; therefore, the habitat is considered too degraded to support EPBC listed threatened species.

4.6.3 Threatened Ecological Communities

No Threatened Ecological Communities (TEC) were identified within the study area. Given that the proposed development will not directly impact any EPBC Listed TECS, the *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (DEWHA, 2013) have not been applied.

4.6.4 Migratory Species

The Fork-tailed Swift (*Apus pacificus)* and the White-throated Needletail (*Hirundapus caudacutus)* were considered to have a moderate likelihood of occurrence. These bird species

may forage aerially over a very wide range of habitats. The proposed development will remove highly disturbed exotic vegetation which is unlikely to impact on the foraging range of these species.

5. DISCUSSION

5.1 IMPACT ASSESSMENT

5.1.1 Removal of Trees and Native Vegetation

The subject site is comprised of mostly of cleared land with isolated paddock trees (see **Figure 5**). The proposed development will require the removal of nine isolated trees (White Box, *Eucalyptus albens*) which do not contain hollows. A small patch of regrowth vegetation in the north east corner of the site will also require removal. This vegetation is dominated by immature shrubs, including *Callitris glaucophylla* (White Cypress).

5.1.2 Impacts to Threatened Biota

The proposed development will not directly impact any habitat features considered to represent important habitat for threatened species or TECs; therefore, the proposed development is unlikely to have a significant impact on any threatened biota.

5.1.3 Impacts to Resident Fauna

No important habitat features for fauna species will be removed by the proposed development. The following potential indirect impacts of the proposed development to resident fauna have been identified:

- Noise and lighting during the construction phase may cause minor disturbance to resident fauna within the locality and disrupt their natural behaviour.
- Ground disturbance by machinery during the construction phase may create dust and facilitate the movement of sediment. Sedimentation could adversely affect adjacent habitats such as native vegetation and downstream aquatic habitat.

Removal of nine isolated paddock trees *Eucalyptus albens* (which constitute Core Koala Habitat under the Koala Habitat Protection SEPP), is unlikely to impact the local population – see Koala Assessment Report (**Appendix 5**).

Protection measures are presented in **Section 5.2** to reduce the potential for these impacts.

5.1.4 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 subject site. The design of the solar panel array will ensure that the majority of the vegetation within the study area will be retained following the development. Trees to be removed do not contain hollows and are therefore unlikely to provide breeding habitat for fauna species such as arboreal mammals and birds.

5.2.2 Mitigation Measures

Weed Control

Priority weed species were identified within the study area. Measures to prevent the spread of these weeds should include the following weed hygiene procedures:

- All vehicles, equipment, footwear and clothing should be clean and free of weed propagules prior to entering the subject site.
- Any weeds that are removed during the proposed works should be disposed of appropriately.

Erosion Control

Earth works will mainly be limited to the construction of the access road. Mitigation measures to reduce soil erosion and pollutant run-off during construction activities should include:

- The installation of a stormwater management system including an onsite detention basin supported with a low flow outlet.

- Regular inspection of erosion and sediment control measures, particularly following rainfall events to ensure their ongoing functionality.
- The immediate removal offsite of any excavated materials.
- Avoiding stockpiling of materials adjacent to native vegetation, but instead use areas that are already cleared/ disturbed.
- Undertake maintenance of silt fences and other mitigation measures to isolate runoff.

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 or similar to spray unpaved access tracks during the construction phase where required.
- Application of dust suppressants or covers on soil stockpiles where required.

Chemical Spill Control

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 of vehicles, washing of vehicles or maintenance of vehicles and plant to be undertaken within 10 meters of native forest vegetation.

Noise and lighting Control

During the construction phase an increase of traffic to the site and the use of power tools and earth moving equipment will result in a temporary increase in noise. The noise associated with the solar farm post construction will be required to comply with the NSW *Noise Policy for Industry* (EPA, 2017).

Motion activated security lighting may also be installed. Due to the lack of native vegetation within the subject site it is unlikely that an increase in noise and lighting will have a significant impact on fauna.

Fauna Movement and Dispersal

The installation of fencing may create a novel barrier for the movement of terrestrial fauna species in the locality; however, given the lack of key habitat features and resources within the study area, these impacts are likely to be negligible.

5.2.3 Offset Provisions

As described previously in **Section 2.2.2**, entry into the Biodiversity Offsets Scheme (BOS) is not required for the proposed development. As such, a Biodiversity Development Assessment Report (BDAR) is not required to support the DA.

However, it is recommended that the loss of nine Koala Feed Trees be offset by planted Koala Feed Trees at a ratio of 2:1 (see **Appendix 5**).

5.3 CONCLUSION

Impacts of the proposed development will be limited to areas of the subject site that have predominantly been cleared of native vegetation (agricultural land). Nine isolated trees will be removed; however, these trees do not represent important habitat for any threatened species or ecological communities. In accordance with the BC Regulation, entry into the NSW BOS is not triggered by the proposed development due to the following:

- The BOS clearing threshold for the site will not be exceeded.
- The proposed development is unlikely to cause a significant impact to any threatened species, populations or ecological communities listed under the BC Act.

No EPBC listed species, ecological communities, migratory species or important habitat for such biota was identified within the subject site. The assessment determined that impacts to MNES are therefore unlikely. 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 1: SITE PHOTOGRAPHS

Plate 1: **Cleared land (agricultural and) within the subject site (east direction).**

Plate 2: **Cleared land (agricultural and) within the subject site (north direction).**

Plate 3: Vegetation Survey Plot location within the study area.

Plate 4: Sparse native groundcover associated with native vegetation within the study area.

APPENDIX 2: FLORA SPECIES LIST

Table 1: Flora species recorded during the assessment

Growth Form	Plant Species	Plot 1		RM
		Cov.	Abun.	
Chenopod	*Euphorbia drummondii*	0.1	10	
Chenopod	*Maireana microphylla*	0.2	1	
Exotic	*Atriplex prostrata*	0.5	1	
Exotic	*Euphorbia maculata*			x
Exotic	*Gomphocarpus physocarpus*			x
Exotic	*Schkuhria pinnata*	0.1	50	
Exotic	*Tribulus terrestris*			x
Forb	*Abutilon oxycarpum*			
Forb	*Boerhavia dominii*	0.1	1	
Forb	*Callotis lappulacea*			
Forb	*Desmodium brachypodium*			x
Forb	*Dysphania pumilio*			x
Forb	*Glycine tabacina*	0.1	50	
Forb	*Hypericum gramineum*			
Forb	*Pimelea glauca*	1	20	
Forb	*Portulaca oleracea*			x
Forb	*Sida corrugata*	0.1	20	
Forb	*Sida subspicata*	0.5	20	
Forb	*Solanum sp.*	0.1	5	
Forb	*Vittadinia cuneata var. cuneata*			
Forb	*Wahlenbergia gracilis*	0.1	20	
Grass	*Aristida ramosa*			
High Priority Weed and THE	*Lycium ferocissimum*	1	1	
High Priority Weed and THE	*Opuntia stricta*			x
High Priority Weed and THE	*Xanthium spinosum*			x
Shrub	*Cassinia laevis*			

Growth Form	Plant Species	Plot 1		RM
		Cov.	Abun.	
Shrub	*Eremophylla mitchelli*			x
Shrub	*Myoporum montanum*	0.5	2	
Shrub	*Olearia elliptica subsp. elliptica*			
Shrub	*Senna artemisioides*	0.1	5	
Tree	*Callitris glaucophylla*	5	3	
Tree	*Eucalyptus albens*	20	6	

Notes:

- *Abbreviations: Cover (Cov.), Abundance (Abun.), Random Meander (RM)*
- *Priority Weeds: Exotic Plant Species listed within the Berrigan LGA that are prioritised for management (DPI).*
- *High Threat exotics (HTE) are classified in accordance with the DPIE HTE List.*
- *Growth forms were classified in accordance with the DPIE growth forms data.*

APPENDIX 3: THREATENED SPECIES 'LIKELIHOOD OF OCCURRENCE'

APPENDIX 4: EPBC ACT PROTECTED MATTERS SEARCH REPORT

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.

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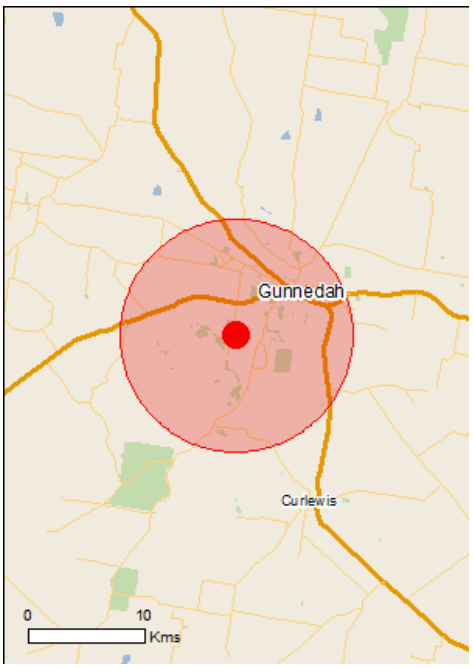

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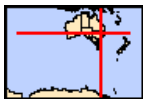

Summary

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:	3
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
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:	2
Commonwealth Heritage Places:	None
Listed Marine Species:	17
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:	29
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	900 - 1000km upstream
Riverland	900 - 1000km upstream
The coorong, and lakes alexandrina and albert wetland	1100 - 1200km

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
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South 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
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community likely to occur within area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community may 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		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Fish		
Maccullochella peelii		
Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area
Mammals		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Nyctophilus corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat known to 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 known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
Androcalva procumbens		
[87153]	Vulnerable	Species or species habitat may occur within area
Cadellia pentastylis		
Ooline [9828]	Vulnerable	Species or species habitat known to occur within area
Dichanthium setosum		
bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Euphrasia arguta		
[4325]	Critically Endangered	Species or species habitat may occur within area
Swainsona murrayana		
Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area
Tylophora linearis		
[55231]	Endangered	Species or species habitat may occur within area
Reptiles		
Aprasia parapulchella		
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat known to occur within area
Uvidicolus sphyrurus		
Border Thick-tailed Gecko, Granite Belt Thick-tailed Gecko [84578]	Vulnerable	Species or species habitat may 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		

Name	Threatened	Type of Presence
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to 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
Rhipidura rufifrons Rufous Fantail [592]		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

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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
Commonwealth Land - Commonwealth Bank of Australia

Listed Marine Species [Resource Information]

* 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 alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
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
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 likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may 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
Rhipidura rufifrons Rufous Fantail [592]		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

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Wondoba	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

Name	Status	Type of Presence within area
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
Streptopelia chinensis Spotted Turtle-Dove [780]		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
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat may 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
Capra hircus Goat [2]		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
Feral deer Feral deer species in Australia [85733]		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
Rattus rattus Black Rat, Ship Rat [84]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Sus scrofa Pig [6]		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		
Cylindropuntia spp. Prickly Pears [85131]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		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
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		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

-31.00731 150.20827

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.

Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

APPENDIX 5: KOALA HABITAT ASSESSMENT REPORT

Koala Assessment Report

Introduction
Describe the nature of the proposed development.
The proposed development comprises an 5MW grid-connected solar PV installation, comprising 14,196 solar PV panels. Other electrical generation infrastructure is proposed on the site including a skid-mounted MV Power Station consisting of inverters, transformer and switchgear. The PV arrangement will consist of 196 ground mounted single axis trackers. The PV arrays will have a clearance above the existing ground surface and extend to approximately 2.7m at maximum tilt. The PV mounting structure would comprise steel posts driven to approximately 1.5m below ground using a small pile driver. A 4m wide access road is proposed connecting the solar farm to Bush's Lane at the south-eastern corner of the lot. Access to the site during construction will also be provided off Black Jack Road. The solar farm will be fully fenced with 2.2m security fencing including barbed wire at the top. The subject site consists of an area of land approximately 12 hectares (ha). The subject site had been cleared of most native vegetation prior to the assessment. The project layout has been designed to avoid impacting the majority of existing trees and native vegetation within the study area.
Define how the SEPP applies to the proposed development.
An approved KPoM does not exist for the land. The proposed development occurs within an area that is mapped on the Koala Development Application Map (DPIE, 2020c) (Spatial Viewer). See figure below. The proposed development is also determined to be a Tier 2 development because native vegetation is required to be removed. Discussions with the landowner and review of satellite imagery indicate that this occurred around mid-2017 (however, recent evidence of clearing and tilling of the soil was noted during field surveys). Note that although the aerial imagery presented shows large areas of native forest and isolated trees within the subject site, these areas have been predominantly cleared of native vegetation.

Koala Habitat Values – addressing criteria 1 and 2

Describe the site area, including the general environment and condition, location and extent of the development area and any other areas that may be directly or indirectly impacted by the proposed development.

The study area is located approximately 3 km southwest of the township of Gunnedah within the Gunnedah Shire Council Local Government Area (LGA) (Figure 1). The study area and surrounds lie within the North West Slopes region of NSW. The western boundary of the study area is bordered by Black Jack Road. The southern boundary is bordered by Bushs Lane and the western boundary is bordered by Hunts Road. The northern boundary adjoins an adjacent property, which is comprised of cleared lands and bushland to the north. The predominant land use within the locality is large lot residential, low-density residential, and primary production (agricultural development).

A small isolated patch of native vegetation ('bush block') lies approximately 200m to the north of the subject site, access by Black Jack Road. Further to the south-west lies a greater expanse of bushland (Surrounding Black Jack Mountain) which is weakly connected to the subject site. Connective habitat occurs along the southern extent of Black Jack Road.

As discussed above, the site has been predominately cleared of native vegetation. Remaining patches of vegetation consist of the Plant Community Type: White Cypress Pine - Buloke - White Box shrubby open forest on hills in the Liverpool Plains - Dubbo region, Brigalow Belt South Bioregion. Almost all areas of this vegetation are to be retained (outside the Subject Site). Also remaining are eight paddocks trees (*Eucalyptus albens*) in the southern portion of the Study Area. One of these paddock trees is to be retained, while nine trees will require removal. *Eucalyptus albens* (White Box) is listed as a Koala Feed Tree within the Northwest Slopes Koala Management Area.

Provide details of koala survey as undertaken in accordance with core koala habitat survey guidelines. This should include details of the results of the koala surveys, including how the site area meets the definition of core koala habitat and mapping that shows habitat areas and koala records within the site area and adjoining areas.

Extant native vegetation within the Study Area was inspected on 4 March 2020. Scats searches were conducted around the base of Koala feed tree species (White Box *Eucalyptus albens*). Tree's were also inspected for the presence of Koalas. Given the lack of native vegetation, diurnal inspections of

trees were presumed adequate to confidently determine if Koalas were inhabiting vegetation within the Subject Site.

No Koala's or evidence of Koalas was identified during the assessment. However, given the proportion of *Eucalyptus albens* within the Subject Site (constituting 'Highly Suitable Habitat') and the existence of records within Koala records (less than 18 years old) within 5 kms of the Subject Site, the paddock trees meet the definition of 'Core Koala Habitat' (**Figure 5**).

Describe the site context (including mapping showing habitat that might be associated with vegetation in the adjoining landscape and records within the vicinity of the site area) and provide an analysis of the koala habitat values (including how koalas might use the site area and the relative importance of the site area to a local koala population).

As detailed above, the Study Area is connected to a larger patch of native vegetation (areas of Black Jack Mountain). While most recent records of Koala are known from within the township of Gunnedah, it is likely that a population of Koalas stems from native bushland surrounding Black Jack Mountain, and another disjunction population (with little connectivity to the subject site) to the south of the township of Gunnedah. These larger patches of native vegetation are likely to be essential to local population. Koalas, may move through the Study Area, on occasion, from areas to the south-west.

Measures taken to avoid impacts to koalas – addressing criteria 3, 4, 5 ,6, 7 and 8

Describe the site selection process, including how koala habitat was taken into account and any avoidance outcomes achieved through this process.

The subject site was deleted due to the predominate absence of native vegetation. The Subject site is comprised of mostly of cleared land with nine isolated Koala feed trees. The majority of the Koala feed trees within the study area will be retained following completion of the proposed development.

Describe how the proposed development avoids or minimises direct impacts to koala habitat and habitat function within the site area.

The proposed development avoids impacts to a number of Koala Feed Trees within proximity to the Subject Site, however, nine isolated Koala Feed Trees will require removal. The removal of these trees is unlikely to impact connectivity between other areas of Koala habitat, nor will it significantly reduce the amount of foraging habitat for the species within the locality.

Analysis of potential impacts – addressing criteria 9

Identify the residual direct impacts to koalas and koala habitat within the site area, including the nature and extent of impacts and the likely implications for the viability of a local koala population.

The proposed development, and the removal of nine Koala Feed Trees is unlikely to exacerbate any potential indirect impacts such as dog attacks, vehicle strikes, drowning in pools, increased risk of fire, introduction or spread of disease, disturbance, or impediments to movement.

Identify the relevant potential indirect impacts to koalas and koala habitat within the site area and adjacent habitat areas, including the nature and extent of potential indirect impacts and the likely implications for the viability of a local koala population.

No potential indirect impacts are expected as a result of the habitat removal or through the construction of the solar farm. The trees to be impacted do not provide important habitat connectivity and are somewhat isolated from intact areas of high-quality vegetation which may provide habitat for Koalas. However, review of Koala records within the locality indicate the site and adjacent areas may support Koalas on occasion.

Plan to manage and protect koalas and their habitat – addressing criteria 10, 11, 12 and 13

Describe the management measures that will be implemented as part of proposed construction and operations to manage the direct and indirect impacts identified. These measures should be outcomes focussed and include performance targets.

Given the lack of potential direct and indirect impacts, few management measures are recommended. However, Koala Feed Trees to be retained on site should be demarcated and fenced to avoid unintentional impacts. Additionally, planting of Koala Feed Tree species onsite could be strategically

positioned to improve connectivity of retained trees to habitat to the north (i.e. Along the western edge of the Study Area to improve connectivity to the north).
Describe any compensatory measures that will be delivered, including an analysis of the suitability of these measures against criteria 9 and 10.
Compensatory measures will include the replacement of Koala Feed Trees at a ratio of 2:1. Koala Feed Trees species will be planted within or adjacent to the Study Area.
Outline a plan for monitoring, adaptive management and reporting against the key outcomes and performance targets.
Following construction, planting of Koala Feed Trees will be confirmed through a letter to council. No ongoing monitoring or adaptive management is required due to potential for Koala habitation onsite once fences are erected. Any sightings of koalas (including any injuries or deaths) within proximity of the Study Area will be communicated to Council.
References
Include a list of all references cited in the report.
NSW Department of Planning, Industry and Environment (2019) Koala Development Application Map, https://webmap.environment.nsw.gov.au/Html5Viewer291/index.html?viewer=KoalaSEPP.htm5 NSW Department of Planning, Industry and Environment (2019) Koala Habitat Protection SEPP, https://www.legislation.nsw.gov.au/#/view/EPI/2019/658 NSW Department of Planning, Industry and Environment (2019) Koala Habitat Protection Guideline, https://pp.planningportal.nsw.gov.au/draftplans/under-consideration/koala-habitat-protection-guideline NSW Department of Planning, Industry and Environment (2019) BioNet Atlas Search, https://www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_/AtlasSearch.aspx
Appendices
Include any additional information or supplementary material pertinent to the DA proposal.
NA

Suitably qualified person	
Name	Dr Gilbert Whyte (Senior Ecologist)
Tertiary qualification in ecology, environmental management, forestry	Ph.D. (Ecology), Bachelor of Biological Science (Hons).
Experience in flora and fauna identification, survey and management, including experience in conducting koala surveys	• Has routinely conducted Koala Surveys within NSW over the past 15 years. • Has undertaken Spotlighting, Call playback and scat searches in various vegetation communities and is familiar with the identification of Koala Scats. • Has extensive experience identifying Koala feed trees and mapping koala habitat.

APPENDIX 6: LICENSES AND PERMITS

Kleinfelder employees involved in the current study are licensed or approved under the *National Parks and Wildlife Act 1974* (License Number: SL100730, Expiry: 31 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.