

APPENDIX D BIODIVERSITY ASSESSMENT REPORT

Biodiversity Assessment Report

PARKES SOLAR FARM BIODIVERSITY ASSESSMENT REPORT



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ACRONYMS AND ABBREVIATIONS

BBAM	BioBanking Assessment Methodology
BCC	BioBanking Credit Calculator
BOS	Biodiversity Offset Strategy
Cwth	Commonwealth
EEC	Endangered Ecological Community
EIS	Environmental impact statement
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cwth)</i>
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
FBA	Framework Biodiversity Assessment
FM Act	<i>Fisheries Management Act 1994 (NSW)</i>
ha	hectares
KFH	Key Fish Habitat
km	kilometres
m	metres
Noxious Weeds Act	<i>Noxious Weeds Act 1993 (NSW)</i>
NSW	New South Wales
OEH	(NSW) Office of Environment and Heritage (formerly DECCW)
PCTs	Plant Community Types
RMS	Roads and Maritime Services, Roads and Maritime
SEARs	Secretary Environmental Assessment Requirements
SCIVI	Southeast NSW Native Vegetation Classification and Mapping
SEPP	State Environmental Planning Policy (NSW)
sp/spp	Species/multiple species
TSC Act	<i>Threatened Species Conservation Act 1995 (NSW)</i>

EXECUTIVE SUMMARY

Neoen is planning for the construction and operation of a 60 megavolt ampere (MVA) solar photovoltaic (PV) plant and associated infrastructure within the Parkes Shire Council area, approximately 10 km northwest of Parkes.

This Biodiversity Assessment Report (BAR) has been prepared by NGH Environmental on behalf of Neoen.

The aim of this BAR is to address the Secretary's Environmental Assessment Requirements (SEARs) (Appendix B) and the Framework for Biodiversity Assessment (FBA), developed for Major Projects as part of the Biodiversity Offsets Policy for Major Projects. This BAR will be used to inform an Environmental Impact Assessment as part of an application for a Major Project under the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The FBA underpins the Biodiversity Offsets Policy for Major Projects. It contains the assessment methodology that is adopted by the policy to quantify and describe the impact assessment requirements and offset guidance that applies to Major Projects. This report follows the BAR format required by the FBA.

Field surveys of the study area identified one endangered ecological community (EEC): Inland Grey Box woodland in the Riverina, NSW South Western Slopes, Cobar Penneplain, Nandewar and Brigalow Belt South Bioregions (IGBW) listed under the *Threatened Species Conservation Act 1995* (TSC Act). This EEC also constitutes Grey Box (*Eucalyptus microcarpa*) grassy woodland and derived native grasslands of south-eastern Australia (GBGWDNG) listed under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). The project would result in the removal of 0.37 ha of IGBW EEC which includes 0.37 ha of GBGWDNG.

Six threatened species (TSC Act) were predicted to occur within the study area by the BioBanking Credit Calculator (BCC):

- Diamond Firetail (*Stagonopleura guttata*)
- Glossy Black-Cockatoo (*Calyptorhynchus lathami*)
- Grey-crowned Babbler (eastern subspecies) (*Pomatostomus temporalis* subsp. *temporalis*)
- Little Pied Bat (*Chalinolobus picatus*)
- Major Mitchell's Cockatoo (*Lophochroa leadbeateri*)
- Yellow-bellied Shearwater-bat (*Saccolaimus flaviventris*)

Furthermore, the following threatened species (TSC Act) were determined by the BCC as requiring targeted survey:

- A spear-grass (*Austrostipa wakoolica*)
- Eastern Pygmy-possum (*Cercartetus nanus*)
- Grey Falcon (*Falco hypoleucos*)
- Koala (*Phascolarctos cinereus*)
- Pine Donkey Orchid (*Diuris tricolor*)
- Slender Darling Pea (*Swainsona murrayana*)

Of all the threatened species predicted to occur or requiring targeted surveys, none were recorded in the study area and none were considered likely to be adversely impacted by the proposal. It is noted that the survey period was unsuitable for the Pine Donkey Orchid (*Diuris tricolor*), however it is considered that the loss of 0.37 ha of suitable habitat for this species would not adversely impact this species.

Three threatened fauna species listed as matters of National Environmental Significance (NES) under the EPBC Act were considered potentially likely to be impacted by the proposal. These species included:

- Koala (*Phascolarctos cinereus*)
- Superb Parrot (*Polytelis swainsonii*)
- Spear-grass (*Austrostipa wakoolica*)

Impact assessments were undertaken for these species, concluding a very low likelihood of significant impact. As a result, an EPBC referral is not required for this project.

Apart from further targeted surveys required for the Pine Donkey Orchid during a suitable survey period in spring, according to the FBA, there are no impacts requiring further consideration due to the proposal

The proposal site has been selected to avoid or minimise impacts to biodiversity where possible. Most areas of EEC in the study area have been avoided through the design process with an aim for avoiding offsets. The only areas where an EEC would be impacted are the areas where the 'above ground transmission line' has been proposed to connect the solar arrays to the power station to the north. The proposed above ground transmission line has been designed so that it would only require the minimal amount of clearing or pruning of the EECs for construction and operation. Where the overhead powerline requires offsets, then the option for boring underground, or an alternative overhead route identified that avoids removal or pruning of EECs, then offsetting would not be required.

Mitigation and management measures will be put in place to adequately address impacts associated with the project, both direct and indirect.

According to the requirements of the FBA, offset requirements have been identified and calculated for residual impacts on:

- Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions EEC)
(5 credits required)
- Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion (Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions EEC)
(8 credits required)

It should be noted that offsets are only required in relation to the proposed overhead powerline between the solar array and the substation. Where an option for boring underground, or an alternative overhead route is identified that avoids removal of EECs, then offsetting would not be required.

1 INTRODUCTION

Neoen is planning for the construction and operation of a 60 megavolt ampere (MVA) solar photovoltaic (PV) plant and associated infrastructure within the Parkes Shire Council area, approximately 10 km northwest of Parkes. The development site is located at Lot 4, DP 854193. The proposal site covers approximately 240 hectares (ha) of land. The site is accessed from the north via Henry Parkes Way and Pat Meredith Drive. The proposed solar farm would connect to an existing Transgrid substation located on Pat Meredith Drive to the north of the site.

Key infrastructure components would include:

- Solar arrays: approximately 215,000 solar panels supported by approximately 27,000 piles, driven or screwed into the ground in order to support the solar array's mounting system. The panels to be installed would be either:
 - o single-axis tracking panels (which would have approximately 2,850 tracker units)
 - o north-oriented fixed-tilt panels
 - o east-west facing fixed-tilt panels
 - o or a combination of these alternatives.
- Approximately 28 PV boxes or PV skids (either containerised or installed on a 'skid' platform), each of them containing an inverter and an 11 kV, 22 kV or 33 kV transformer.
- Onsite cabling and electrical connections between solar arrays and panel inverters.
- One delivery station in a container or on a skid platform.
- Cables and trenches.
- Internal access tracks to allow for site maintenance vehicles, and gravel access road and parking for staff and visitors.
- Staff amenities and offices.
- Perimeter security fencing, approximately 2.3 metres (m) high.
- A vegetation buffer.
- A 66kV overhead or underground power line to connect into the existing Parkes Transgrid substation, approximately 600 m north of the site.

A 3.5m wide access track to the site would be developed. Figure 1-1 illustrates the route to the site from Henry Parkes Way via Pat Meredith Drive (both public roads) and the indicative route to the preferred solar plant location.

Detailed design will allow for avoidance of sensitive features on the site (including a planted row of trees which run north-south through the site and groups of trees in south eastern portion of the site which would be retained).

The construction phase of the proposal is expected to take approximately nine months. The Parkes Solar Farm is expected to operate for approximately 30 years. The proposal would be decommissioned at the end of its operational life and the site re-vegetated.

The proposed solar farm at Parkes has a capital investment estimated of \$121 million.

1.1 STUDY AIMS

This Biodiversity Assessment Report (BAR) has been prepared by NGH Environmental, on behalf of Neoen. The aim of this BAR is to address the requirements of the Framework for Biodiversity Assessment (FBA), newly developed for Major Proposals, and to address the biodiversity matters raised in the Secretary's Environmental Assessment Requirements (SEARs).

1.2 REPORT STRUCTURE

This BAR follows the reporting requirements of section 1 of the FBA and includes the following:

- Identification of biodiversity values subject to the proposed major development (the proposal) – Chapter 2 (Landscape Features), Chapter 3 (Native Vegetation), Chapter 4 (Threatened Species).
- Impacts of the proposal on biodiversity as part of an application for approval to undertake the Major Proposal under NSW planning legislation - Chapter 5 (Avoid and Minimise Impacts), Chapter 6 (Impact Summary).

It is noted that the reporting requirements of Section 2 of the FBA are not provided in this report. Section 2 will be prepared for this report if OEH determines this section is necessary for further biodiversity assessment or offsetting.

1.3 DEFINITIONS

Study area

The study area is defined as the area including the proposed site boundary and the proposed above ground transmission line (Figure 1-1) (Figure 1-2).

The study area is wholly contained within the Parkes Shire Council LGA.

Proposed site boundary

The proposed site boundary is defined as the area of land that is directly impacted by the construction and operation of the solar PV plant only (Figure 1-1) (Figure 1-2). The proposed site boundary has been defined in a precautionary manner, in that it is a 'worst case' area; some areas within it may not be required to be impacted during construction.

Proposed above ground transmission line boundary

The proposed above ground transmission line boundary is defined as the area of land that is directly impacted by the construction and operation of the transmission line connecting the solar PV plant to the power substation (Figure 1-1) (Figure 1-2).

1.4 SOURCES OF INFORMATION USED

The following information sources were used in the preparation of this report:

- Aerial maps, proposal layers and environmental layers provided by Neoen, SW Environmental, local council (Parkes Shire Council) and OEH.
- Australian Government's Species Profiles and Threats database (SPRAT)
<http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>

- Department of Environment and Climate Change NSW (DECC) (2002). Descriptions for NSW (Mitchell) Landscapes, Version 2.
- Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) EPBC Act Species Profiles and Threats Database (SPRAT).
- Environment Australia (2001) A Directory of Important Wetlands in Australia. 3rd Edition. Environment Australia, Canberra.
- NSW OEH's BioBanking credit calculator
(<http://www.environment.nsw.gov.au/bbccapp/ui/mynews.aspx>)
- NSW OEH's threatened species database
<http://www.threatenedspecies.environment.nsw.gov.au/index.aspx>
- OEH Threatened Species Profiles
- Office of Environment and Heritage (OEH) (2007). Mitchell Landscapes with per cent cleared estimates.
- Office of Environment and Heritage (OEH) (2014). Framework for Biodiversity Assessment: NSW Biodiversity Offsets Policy for Major Proposals. Published by Office of Environment and Heritage for the NSW Government.
- State of NSW and Office of Environment and Heritage (2014). NSW Biodiversity Offsets Policy for Major Proposals. Published by Office of Environment and Heritage for the NSW Government.



Figure 1-1 Site Map



Figure 1-2 Location Map illustrating inner and outer assessment circles.

2 LANDSCAPE FEATURES

2.1 IBRA BIOREGIONS AND SUBREGIONS

The proposal is located within the New South Wales Western Slopes Bioregion and the Lower Slopes – Central West Subregion (IBRA v.7 2012). Bioregions are large, geographically distinct areas of land with common characteristics such as geology, landform patterns, climate, ecological features and plant and animal communities. The geology of the region is Permian to Middle Triassic (240 million years) in age, with landforms described as mountain ranges, dissected plateaus, hills, and undulating plains. The dominant pre-European vegetation type is considered to be Poplar Box Layered Woodland, dominated by *Eucalyptus populnea*/ *E. melanophloia*/*Callitris*/*Acacia* spp. (ASRIS accessed 5/1/16).

The dominant IBRA subregion affected by the proposal is the Lower Slopes – Central West Subregion. This was entered in the BioBanking Credit Calculator (BCC) for the proposal.

2.2 NSW LANDSCAPE REGIONS (MITCHELL LANDSCAPES)

Two Mitchell Landscapes occur within the study area; Bimbi Plains and Goonumbla Hills (Table 2-1).

- Bimbi Plains occurs throughout the majority of the study area. The per cent cleared estimate for this landscape is currently 93% (OEH 2007).
- Goonumbla Hills occurs to the east and west of the study area and crosses a small section of the study area in the southeast. The per cent cleared estimate for this landscape is currently 92% (OEH 2007).

The Mitchell Landscape descriptions are provided below.

Table 2-1 Description of the Mitchell Landscape relevant to the proposal (DECC 2002)

Mitchell Landscape
Bimbi Plains(8053) Quaternary alluvial plains from bedrock hills and ridges of the Gobondery/Gillenbine and the Belmont/Brooklyn land systems. General elevation 200 to 250m, local relief 30m. Gravelly clay loams and red brown clays, red-brown texture-contrast soils on higher slopes grading to red-brown gradational and uniform profiles of clay loams and clays along creeks. Grey box (<i>Eucalyptus microcarpa</i>) and white cypress pine (<i>Callitris glaucophylla</i>) originally dominant, sparse bumble box (<i>Eucalyptus populnea</i>) along creek lines. Mostly cleared and cultivated.
Goonumbla Hills (1085) Rounded low hills on Ordovician and Silurian sandstone, andesite, siltstone and phyllite with a partial blanket of Tertiary quartz gravels and sands. General elevation 290 to 390m, local relief 70m. Stony yellow earths on the sands, thin brown structured loams on the hills merging with red-brown and red texture-contrast soils on the flats. Open forest of grey box (<i>Eucalyptus microcarpa</i>), white cypress pine (<i>Callitris glaucophylla</i>), with bumble box (<i>Eucalyptus populnea</i>) in the creeks and red ironbark (<i>Eucalyptus sideroxylon</i>) with shrubs on the gravels. Extensively cleared, grazed and cultivated.

The dominant Mitchell Landscape affected by the proposal is Bimbi Plains. The Bimbi Plains was entered into the BCC for the proposal.

2.3 NATIVE VEGETATION EXTENT

Using GIS an inner and outer assessment circle with the ratio of 1:10 was established. A 1,000 ha outer assessment circle and 100 ha inner assessment was established over the proposal site and centred over the area of native vegetation that is impacted most by the proposal.

The total area of native vegetation mapped within the outer assessment circle is 84.85 ha (Figure 1-2).

Native vegetation mapping used over-storey as a surrogate for native vegetation cover, and is considered conservative as this would include non-native vegetation that may still provide some habitat value. The local area's native vegetation is derived from woodland; no natural grasslands are relevant to the study area.

2.4 CLEARED AREAS

Cleared areas in the study area are primarily used for agriculture or grazing and provide very little in terms of fauna habitat. These areas provide suitable foraging habitat for raptors, macropods and emus, as well as introduced species such as cats, foxes and rabbits. The majority of the study area is cleared (non-native vegetation) land.

2.5 RIVERS AND STREAMS

One creek lies within the study area, being Ridgely Creek. This is an ephemeral creek and was dry during surveys. The proposed above ground transmission line crosses this creek. A description of Ridgely Creek is included in Table 2-2.

Table 2-2 Rivers and streams within the study area

Waterway	Key Fish Habitat as per DPI (Fisheries) mapping and/or definition?	Type (i.e. sensitivity) of key fish habitat present in accordance with DPI (Fisheries) guidelines ^{*1}	Endangered Ecological Community?	Waterway classification (according to Fairfull and Witheridge 2003)	Stream order (according to Strahler 1952)	Riparian, Channel, Environment (RCE) score	Comments
Ridgey Creek	Yes	Type 3	No	Class 3 – Minimal fish habitat	3	NA	Ridgey Creek is located in the study area as an ephemeral waterway that runs south to north. It is crossed by the proposed above ground transmission line. The creek is around 5 m wide bank to bank. Riparian vegetation is sparse and around 10 m wide (average) and composed of a mix of native and exotic species. The banks are generally flat and unstable, with poor vegetative structural support except for scattered trees and paddock grasses and forbs. There is no aquatic habitat present. The creek is considered to be in poor condition and dry at the time of survey.

2.6 WETLANDS

There are six man made dams occurring within the study area. These wetlands provide habitat for wetland birds, although it is considered low quality due to a lack of aquatic vegetation. The closest nationally important wetlands to the study area are the Lake Cowal/Wilbertroy Wetlands approximately 73 kilometers to the southwest.

2.7 STATE OR REGIONALLY SIGNIFICANT BIODIVERSITY LINKS

State Significant Biodiversity Links and Regionally Significance Biodiversity Links are defined in the FBA. To date, no biodiversity corridor plans have been approved by the Chief Executive of the OEH.

Under the FBA, no Regionally Significant Biodiversity Links or State Significant Biodiversity Links occur within the study area, nor within the inner and outer assessment circles.

2.8 LANDSCAPE VALUE SCORE COMPONENTS

A BioBanking credit assessment was completed for this proposal. The proposal ID for the assessment was 205/2015/2370MP Version 1 and the assessment type was selected as 'Major Proposal'. This section summarises the values entered into the Landscape values section of the BCC assessment.

2.8.1 Method applied

The proposal conforms to the definition of a *site-based development* according to the FBA; a development other than a linear shaped development, or a multiple fragmentation impact development. As a result the site based landscape assessment methodology, in accordance with Appendix 4 of the FBA for major proposals, has been used in the assessment.

The proposal contains vegetation that is likely to have been planted but which still contains habitat values. These areas of vegetation were assigned to the nearest biometric vegetation type in order that their value for threatened species would be accounted for.

2.8.2 Percent native vegetation cover in the landscape

The following steps were completed in accordance with Appendix 4 of the FBA. They were completed based on the proposed layout of the solar farm and associated infrastructure and transmission line as of January 2016.

Assessing percent current extent of native vegetation cover

Using GIS an inner and outer assessment circle with the ratio of 1:10, was established and centred on the area of native vegetation that is most impacted by the proposal.

- The total area of the inner assessment circle is 100 ha.
- The total area of the outer assessment circle, including the study area, is 1000 ha
- Current native vegetation cover within the inner assessment circle is 10.97%
- Current native vegetation cover within the outer assessment circle is 8.45
- In accordance with Table 9 of the FBA, the score for the percent current extent of native vegetation cover in the:

- o Inner assessment circle was determined to be 2.25
- o Outer assessment circle was determined to be 2.5.

Assessing percent future extent of native vegetation cover

Using the same inner and outer assessment circles centred on the area of native vegetation that is most impacted by the proposal:

- The total area of the inner assessment circle is 100 ha.
- The total area of the outer assessment circle, including the study area, is 1000 ha
- Future native vegetation cover in the inner assessment circle is 10.6%
- Future native vegetation cover in the outer assessment circle is 8.4%
- In accordance with Table 9 of the FBA, the score for the percent current extent of native vegetation cover in the:
 - o Inner assessment circle was determined to be 2.25
 - o Outer assessment circle was determined to be 2.5.

2.8.3 Connectivity value

A connecting link is when native vegetation on the site adjoins native vegetation surrounding the site and the native vegetation:

- is in moderate to good condition, and
- has an patch size >1 ha, and
- is separated by a distance of <100 m (or <30 m for non-woody ecosystems), and
- is not separated by a large water body, dual carriageway, wider highway or similar hostile link.

The proposal does not impact on any state or regional biodiversity links as defined in the defining criteria from FBA Table 10 below¹.

Extract from the FBA Table 10: Connectivity value scores for site based development

Category of connecting link	Defining criteria	Score
State significant biodiversity link	An area identified as being part of a state significant biodiversity link in a plan approved by the Chief Executive, OEH OR A riparian buffer 50 m either side of a 6th order stream or greater OR A riparian buffer 50 m around an important wetland or an estuarine area	12
Regionally significant biodiversity link	An area identified as being part of a regionally significant biodiversity link and in a plan approved by the Chief Executive, OEH OR A riparian buffer 20 m either side of a 4th or 5th order stream	9

¹ Scoring weights provided in Table 10 relate to what type of biodiversity link that will be impacted on. E.g. a 6th order stream scores higher than a 4th or 5th order stream.

Current linkage width class

For a site-based development, the assessor must determine the current linkage width class of each connecting link identified previously by measuring the width of each connecting link at the narrowest area of the connecting link and looking up the corresponding linkage width class in Table 11 of the FBA. This area may be located on or off the site.

Extract from the FBA Table 11: Linkage width classes for site based development

Linkage width (metres)	0 – 5	>5 - 30	>30 - 100	>100 - 500	>500
Linkage width class	Very narrow	Narrow	Moderate	Wide	Very Wide

Future linkage width class

For a site-based development, the assessor must determine the number of linkage width classes that will be lost for each connecting link as follows:

0 = no change or change is within the class, i.e. does not cross a threshold between the classes

1 = crosses one linkage width threshold, i.e. changes from one linkage width class to the next one across one threshold

2 = crosses two linkage width thresholds, i.e. changes from one linkage width class to another class across two thresholds

3 = crosses three linkage width thresholds, i.e. changes from one linkage width class to another linkage width class across three thresholds

4 = crosses four linkage width thresholds, i.e. changes from one linkage width class to another linkage width class across four thresholds.

The number of linkage width classes that are crossed as a result of the Major Project is used to determine the connectivity value score for the connecting link.

Current linkage condition class

For each connecting link, the assessor must determine whether any part of the connecting link within the outer assessment circle contains a Plant Community Type (PCT) identified by the assessor that is a woody PCT.

Where it contains a woody PCT:

- estimate the current average condition of the over-storey vegetation (including exotic vegetation) for each link, or part thereof, within that outer assessment circle using the categories set out in FBA Table 12, and
- estimate the current average condition of either the mid-storey or ground cover vegetation (including exotic vegetation) for each link, or part thereof, within that outer assessment circle using the categories set out in FBA Table 12. The assessor must use whichever of those strata is the most appropriate for assessing connectivity for those woody PCTs, and
- determine the corresponding current linkage condition class for the estimates for each link using Table 12.

All PCTs observed at the proposal site were determined to be woody PCTs.

Future linkage condition class

For each connecting link identified in Step 1 in this section, determine whether any part of the connecting link within the outer assessment circle (referred to in Section 1 in this appendix) contains a PCT identified by the assessor under Subsection 5.2.1 that is a woody PCT.

Where it contains such a woody PCT:

- a) take into account the impacts of the development to estimate the future average condition of the over-storey vegetation (including exotic vegetation) for each link, or part thereof, within that outer assessment circle using the categories set out in Table 12 of the FBA, and
- b) condition of either the mid-storey or ground cover vegetation (including exotic vegetation) for each link, or part thereof, within that outer assessment circle using the categories set out in Table 12 of the FBA. The assessor must use whichever of those strata is the most appropriate for assessing connectivity for those woody PCTs, and
- c) determine the corresponding future linkage condition class for those estimates for each connecting link using Table 12 of the FBA.

The number of linkage condition classes that are crossed – lost

The assessor must determine the number of linkage condition class thresholds that are crossed for each connecting link as follows:

0 = no change or change is within the same linkage condition class

1 = crosses one linkage condition threshold, i.e. changes from one linkage condition class to the next one across one threshold

2 = crosses two linkage condition thresholds, i.e. changes from one linkage condition class to another class across two thresholds

3 = crosses three linkage condition thresholds, i.e. changes from one linkage condition class to another class across three thresholds.

Connectivity value score

The proposal does not impact on a state or regionally significant biodiversity link, whilst the change in the linkage width and the linkage condition are within the same class. Therefore, the score for the connectivity value is 0.

2.8.4 Patch size

Mitchell landscape 1:

Bimbi Plains 93% cleared
Largest patch size: >50 ha
FBA Table 18 score: 12

Mitchell landscape 2:

Goonumbla Hills 92% cleared
Largest patch size: >50ha
FBA Table 18 score: 12

The final patch size score, found by averaging those scores, is 12.

Extract from the FBA Table 18: Criteria for assessing patch size Patch size class

Percent native vegetation cleared in each Mitchell landscape in which the Major Proposal occurs					
Patch size class	<30%	30–70%	>70–90%	>90%	Patch size (score)
Extra large	>1000 ha	>200 ha	>100 ha	>50 ha	12.5
Very large	>500 – 1000 ha	>100 – 200 ha	>50 – 100 ha	>20 – 50 ha	10
Large	>200 – 500 ha	>50 – 100 ha	>20 – 50 ha	>10 – 20 ha	7.5
Medium	>100 – 200 ha	>20 – 50 ha	>10 – 20 ha	>1 – 10 ha	5
Small	≤100 ha	≤20 ha	≤10 ha	≤1 ha	2.5
nil	0	0	0	0	0

2.8.5 Area to perimeter ratio

As the development is a site based development and not a linear shaped development or a multiple fragmentation development, the area to perimeter ratio for the project is not required to be assessed.

2.9 LANDSCAPE VALUE SCORE

The assessor must calculate the change in landscape value score for the study area using Equation 4 in Appendix 1 of the FBA.

$$\begin{aligned}
 \text{Impact of development on landscape scale attributes} &= \text{CURRENT (A+B +D+E)} - \text{FUTURE (A+B)} \\
 &= (2.5+2.25+0+12) - (2.5+2.25) = 12
 \end{aligned}$$

Where:

a = score for percent extent native vegetation cover in accordance with Appendix 4

b = score for percent native vegetation cover within an inner assessment circle for the site calculated in accordance with Appendix 4

d = connectivity value score for the Major Proposal determined in accordance with Appendix 4

e = total patch size score determined in accordance with Appendix 4.

The landscape value score is 12. This landscape value score is given to landscape attributes of the development site after the assessment has been undertaken. The assessment takes into consideration the current and future native vegetation extent, connectivity value and patch size.

3 NATIVE VEGETATION

3.1 PLANT COMMUNITY TYPES

3.1.1 Vegetation communities

Two distinct Plant Community Types (PCTs) were observed in the study area. These include:

1. Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW Western Slopes and Riverina Bioregions.
2. Western Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion

Non-indigenous vegetation is not considered to provide habitat to native species and has not been included in the BCC calculations.

Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW Western Slopes and Riverina Bioregions (PCT 76)

Within the study area, PCT 76 occurred in the road corridor and adjacent patches along Pat Meredith Drive, in remnant and planted patches within the proposed site boundary and as isolated trees within the proposed site boundary. This vegetation community is listed as an endangered ecological community (EEC) under the TSC Act – Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions. This vegetation community is also listed as an EEC under the EPBC Act – Grey Box (*Eucalyptus macrocarpa*) grassy woodland and derived native grasslands of south-eastern Australia. Only the remnant patch within the road corridor (Pat Meredith Drive) of this community qualifies for the EPBC Act listing of which a small patch is proposed for clearing in the proposed above ground transmission line.

Where undisturbed remnant patches of PCT 76 occur, the vegetation is a diverse and well-structured community that is dominated by Western Grey Box (*Eucalyptus microcarpa*), White Cypress Pine (*Callitris glaucophylla*) and Yellow Box (*E. melliodora*). The understorey is generally open, with sparse shrubs such as Deane's Wattle (*Acacia deanei*). Within the proposed site boundary, the understory shrubs are absent and the groundcover is generally dominated by introduced species such as prostrate heliotrope (*Heliotropium supinum*), small-flowered mallow (*Malva parviflora*), Indian hedge mustard (*Sisymbrium orientale*), oats (*Avena* sp.) and stinkgrass (*Eragrostis cilianensis*). This is particularly apparent within the planted rows of this PCT that occur in between paddocks within the proposed site boundary. Although the canopy layer is intact, the native shrub and ground cover layer is mostly absent and highly disturbed. Elsewhere, groundcovers include a diverse array of native forbs and grasses, such as Climbing Saltbush (*Einadia nutans* subsp. *nutans*), Purple Burr-daisy (*Calotis cuneifolia*), Common Wheatgrass (*Elymus scaber* var. *scaber*), Rough Spear Grass (*Austrostipa scabra* subsp. *scabra*) and Wallaby Grass (*Rytidosperma* sp.).

Table 3-1 Summary of the Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW Western Slopes and Riverina Bioregions (PCT 76) in the study area.

Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW Western Slopes and Riverina Bioregions		
Vegetation formation	Grassy woodlands	
Vegetation class	Floodplain transition woodlands	
Vegetation type	Plant Community Type (PCT) ID	76
	Biometric Vegetation Type ID	CW145, LA154, MR566, MU555
	Common Community Name	Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW Western Slopes and Riverina Bioregions
Approximate extent within study area (ha)	This vegetation community includes the majority of native vegetation within the study area of which 0.16 ha is in moderate to good condition is proposed to be cleared, most of which occurs at the north-western end of the study area (Figure 3-4).	
Condition	Moderate to Good. Generally a well-structured community with few disturbances in remnants within the road corridor (including the proposed above ground transmission line), although patches within the proposed site boundary have a disturbed understory due to livestock disturbance. However, all areas of this community were in varying states of Moderate to Good condition.	
Survey Effort	Four biometric plots (approximately 6 hours)	
Conservation Status	This vegetation community is listed as an endangered ecological community (EEC) known as Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions under the TSC Act, and Grey Box (<i>Eucalyptus macrocarpa</i>) grassy woodland and derived native grasslands of south-eastern Australia. It is noted that this community only meets the EPBC Act requirements for patches occurring within the proposed above ground transmission line.	
Estimate of percent cleared	95%.	
Threatened plant species habitat	Within the relatively undisturbed road corridor remnant patches, this community provides habitat for threatened flora species, including spear-grass (<i>Austrostipa wakoolica</i>), Pine Donkey Orchid (<i>Diuris tricolor</i>) and Slender Darling Pea (<i>Swainsona murrayana</i>).	
Fauna Habitat	This vegetation community provides numerous habitat types for fauna. Canopy trees provide foraging and nesting/resting for birds and arboreal fauna. The mid-storey (if present) provides foraging and nesting for smaller birds, as well as refuge for small-medium sized mammals and reptiles. Ground plants, logs and fallen leaves provide shelter and foraging for terrestrial fauna as well. Where hollow-bearing trees are present, it may provide daytime resting habitat for bats and mammals, and roosting habitat for birds.	

Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW Western Slopes and Riverina Bioregions

Example



Figure 3-1 Example of Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW Western Slopes and Riverina Bioregions in the study area.

Western Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion (PCT 82)

Within the study area, Plant Community Type (PCT) 82 occurs at the northern end of the study area in larger remnant patches within the Henry Parkes Way corridor. The proposed above ground transmission line will require some clearing of this community. This vegetation community is listed as an endangered ecological community (EEC) under the TSC Act – Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions. This vegetation community is also listed as an EEC under the EPBC Act – Grey Box (*Eucalyptus macrocarpa*) grassy woodland and derived native grasslands of south-eastern Australia. Both remnant patches of this community within the study area qualify for the EPBC Act listing of which two small patches are proposed for clearing in the proposed above ground transmission line.

The dominant trees in the community consisted of Western Grey Box (*E. macrocarpa*), White Cypress Pine (*C. glaucophylla*) and Bimble Box (*E. populnea* subsp. *bimbil*). The understory consisted of shrubs including Deane's Wattle (*Acacia deanei*) and (*Senna artemisioides* subsp. *zygophylla*). The groundcover layer consisted of a diverse assemblage of native species including Climbing Saltbush (*Einadia nutans* subsp. *nutans*), Corrugated Sida (*Sida corrugata*), Burr-daisies (*Calotis* spp.), Slender Bamboo Grass (*Austrostipa verticillata*), Curly Windmill Grass (*Enteropogon acicularis*), Common Wheatgrass (*Elymus scaber* var. *scaber*), Purple Lovegrass (*Eragrostis lacunaria*) and Rough Speargrass (*Austrostipa scabra* subsp. *scabra*).

Table 3-2 Summary of Western Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams in the proposal.

Western Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams		
Vegetation formation	Grassy woodlands	
Vegetation class	Floodplain Transition Woodlands	
Vegetation type	Plant Community Type (PCT) ID	82
	Biometric Vegetation Type ID	MR564, LA152, WE96, CW144
	Common Community Name	Western Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion
Approximate extent within proposal	This vegetation community occurs in the north of the study area of which 0.21 ha is in moderate to good condition is proposed to be cleared. (Figure 3-4).	
Condition	Moderate – Good.	
Survey Effort	2 biometric plots (3 hours)	
Conservation Status	This vegetation community is listed as an endangered ecological community (EEC) known as Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions under the TSC Act, and Grey Box (<i>Eucalyptus macrocarpa</i>) grassy woodland and derived native grasslands of south-eastern Australia. It is noted that this community only meets the EPBC Act requirements for patches occurring within the proposed above ground transmission line.	
Estimate of percent cleared	75%	
Threatened plant species habitat	Within the relatively undisturbed road corridor remnant patches, this community provides habitat for threatened flora species, including Spear-grass (<i>Austrostipa wakoolica</i>), Pine Donkey Orchid (<i>Diuris tricolor</i>) and Slender Darling Pea (<i>Swainsona murrayana</i>).	
Fauna Habitat	This vegetation community provides numerous habitat types for fauna. Canopy trees provide foraging and nesting/resting for birds and arboreal fauna. The mid-storey (if present) provides foraging and nesting for smaller birds, as well as refuge for small-medium sized mammals and reptiles. Ground plants, logs and fallen leaves provide shelter and foraging for terrestrial fauna as well. Where hollow-bearing trees are present, it may provide daytime resting habitat for bats and mammals, and roosting habitat for birds.	

Western Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams

Example



Figure 3-2 Example of Western Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams in the study area.

Non-indigenous vegetation

This highly disturbed or modified vegetation community occupies the majority of the site and is found where there is a prevalence of exotic or planted non-local flora species that make up groundcover layers and is confined to grazing areas (Figure 3-3). Non-indigenous vegetation covers the majority of the study area, making it the most abundant community in the study area. The groundlayer is mainly exotic with common grazing species including Oats, Lucerne (*Medicago sativa*) and Perennial Rye Grass (*Lolium perenne*) (see Table 3-3 for a detailed species list for this vegetation).

Table 3-3 Representative species list in predominantly non-indigenous vegetation (*denotes non-indigenous species)

Common Name	Species Name	Abundance (%)
Climbing Saltbush	<i>Einadia nutans</i>	1%
Kidney Weed	<i>Dichondra repens</i>	1%
Lucerne*	<i>Medicago sativa</i>	10%
Oats*	<i>Avena fatua</i> , <i>Avena ludoviciana</i>	40%
Perennial Ryegrass*	<i>Lolium perenne</i>	10%
Quaking Grass*	<i>Briza maxima</i>	15%
Saffron Thistle*	<i>Carthamus lanatus</i>	5%
Spear Thistle*	<i>Cirsium vulgare</i>	2%
St. Barnabys Thistle*	<i>Centaurea solstitialis</i>	1%
Wallaby Grass	<i>Rytidosperma</i> spp.	5%
White Horehound*	<i>Marrubium vulgare</i>	10%

As this vegetation often lacked a native canopy cover and was either cleared or had over 50 % exotic species composition in the ground cover, then according to the FBA, this vegetation community does not need to be assessed further.



Figure 3-3 An example of exotic-dominated vegetation within the study area.



Figure 3-4 PCTs (including condition) within the study area with plot and transect locations and vegetation impact areas.



Figure 3-5 EECs within the study area

3.1.2 Vegetation zones in the BioBanking Credit Calculator

The vegetation zones that would be impacted by the proposal, as they have been entered into the BCC, their condition class, number of biometric plots undertaken within them and their current site value score, as determined by the BCC, are as follows:

Table 3-4 BCC vegetation zones within the proposal

Zone ID	Vegetation zones	Condition class	Area (ha) within study area	Survey effort (number of plots)	Site value score (current)
1	PCT #76 BVT #CW145 Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions	Moderate to good	0.16	4	30.73
2	PCT #82 BVT #CW144 Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion	Moderate to good	0.21	2	70.31

Notes:

- Threatened species subzones / management zones were entered equivalent to the vegetation zones. No additional polygons were mapped.
- No vegetation zones had site value scores of <17.

3.1.3 Site values (plot data entered into BCC)

The following plot data were collected in December 2015 for vegetation zone 1 and 2. The management scores *with development* have been entered as 0.209 for zone 1 and 0.135 for zone 2 – that is, total removal of vegetation that would result from the development.

Table 3-5 Plot data

PCT #76, BVT #CW145 Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions

Plot name	Native plant species richness	Native over-storey cover	Native mid-storey cover	Native ground cover (grasses)	Native ground cover (shrubs)	Native ground cover (other)	Exotic plant cover	Number of trees with hollows	Overstory regeneration	Total length of fallen logs	Easting	Northing	Zone
PSF1	7	30.5	0	6	0	6	28	3	0	6	600047	6335986	55
PSF 2	4	25	0	12	0	4	48	8	0	9	600896	6334797	55
PSF 3	3	31.5	0	0	0	0	16	0	0	0	600668	6335365	55
PSF 4	14	38	8	40	0	68	8	3	0	15	600078	6336255	55

PCT #82, BVT #CW144 Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion

Plot name	Native plant species richness	Native over-storey cover	Native mid-storey cover	Native ground cover (grasses)	Native ground cover (shrubs)	Native ground cover (other)	Exotic plant cover	Number of trees with hollows	Overstory regeneration	Total length of fallen logs	Easting	Northing	Zone
PSF 5	15	23	8	72	4	34	0	3	1	12	600176	6336760	55
PSF 6	26	28	10	78	22	52	4	6	1	22	600112	6336776	55

4 THREATENED SPECIES

4.1 ECOSYSTEM CREDIT SPECIES

The following habitat feature was entered for the study area, in the Geographic / habitat feature tab of the BCC.

Table 4-1 Geographic / habitat features

Impact?	Common name	Scientific name	Feature
Yes	Grey Falcon	<i>Falco hypoleucos</i>	Land containing and within 100 m of riparian woodland on inland rivers containing mature living eucalypts or isolated paddock trees overhanging water or dry watercourses.

The following species are all species predicted by the BCC to occur, based on the data entered for the landscape assessment and the geographic and habitat features in the assessment. These constitute all species which will generate ecosystem credits in the credit calculations.

Table 4-2 Ecosystem credit species predicted to occur.

Common name	Scientific name	TS offset multiplier
Diamond Firetail	<i>Stagonopleura guttata</i>	1.3
Glossy Black-Cockatoo	<i>Calyptrorhynchus lathami</i>	1.8
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis</i> subsp. <i>temporalis</i>	1.3
Little Pied Bat	<i>Chalinolobus picatus</i>	2.1
Major Mitchell's Cockatoo	<i>Lophochroa leadbeateri</i>	1.9
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	2.2

For all species listed in the table above, no impact was entered and therefore do not generate species credits.

4.2 SPECIES CREDIT SPECIES PRESENT

4.2.1 Candidate species

Table 4-3 identifies species that were determined and returned by the BCC as requiring survey. The table below identifies if species were detected during surveys and identifies if they are likely to be impacted by the proposal and therefore are required to be offset. It is noted that several species were presumed to occur at some time. Careful consideration however, considering their broad range and the habitat values within the study area, deemed these species unlikely to be adversely impacted by the development. This is explained further in Section 4.2.3. Only affected species generate species credits.

Table 4-3 Threatened species requiring survey

Common name	Scientific name	Surveys	Present/presumed present	Affected by the proposal
A spear-grass	<i>Austrostipa wakoolica</i>	Not detected.	Presumed to occur on occasion. 4 records nearby.	Unlikely – not recorded within the study area.
Eastern Pygmy-possum	<i>Cercartetus nanus</i>	Not detected.	No.	Unlikely – not recorded within the study area, or previously within 10 km or the Parkes Shire LGA. Only marginal habitat present.
Grey Falcon	<i>Falco hypoleucos</i>	Not detected.	No.	Unlikely – not recorded within the study area. Only minimal habitat clearing proposed for this large ranging species.
Koala	<i>Phascolarctos cinereus</i>	Not detected.	No.	Unlikely – not recorded within the study area and closest record approximately 12 km southeast. No primary feed trees will be impacted.
Pine Donkey Orchid	<i>Diuris tricolor</i>	Not detected.	Presumed to occur on occasion. 3 Records occur nearby.	Possible – however not detected during surveys.
Slender Darling Pea	<i>Swainsona murrayana</i>	Not detected.	No.	Unlikely – not recorded within the study area.

4.2.2 Targeted surveys

Comprehensive and targeted survey methods and results are included below. The following section sets out the surveys undertaken that underpin knowledge of the study area. This information is used in the BCC assessment and particularly to support the decisions regarding candidate species that would be affected by the proposal. Section 4.2.3 also addresses this issue.

Flora and fauna field surveys were undertaken in summer to ensure that the majority of species likely to be occurring within the study area could be detected. This includes flowering times of threatened flora and maximum activity times of threatened fauna likely to be occurring within the study area.

Site surveys

AIMS

The aims of the site surveys were as follows:

1. Determine vegetation communities present within the study area, their condition and extent.
2. Identify potential EECs within the study area and determine their condition and extent.
3. Conduct targeted searches for threatened flora and fauna species predicted to occur in the study area.
4. Assess the availability and extent of flora and fauna habitat, particularly threatened species habitat, such as hollow-bearing trees.

RANDOM MEANDER AND TARGETED SEARCHES FOR THREATENED FLORA SPECIES

Targeted surveys were used for threatened flora species predicted to occur in the study area as determined by habitat evaluations, previous recordings in the local area and the BCC. These species included a Spear Grass (*Austrostipa wakoolica*), Slender Darling Pea (*Swainsona murrayana*) and Pine Donkey Orchid (*Diuris tricolor*). Formal random meanders (after Cropper 1993) were undertaken on foot throughout the study area in suitable habitat, searching for threatened flora species. This method provides a comprehensive approach in terms of detecting the species and variation within vegetation types, and improves opportunities for detecting significant or sparsely distributed plant species. In areas of habitat considered most suitable for the above listed threatened species, targeted searches were carried out by conducting informal transects (random meanders) at distances of 3 - 6 m (depending on vegetation density), covering as much of the vegetation patch as was accessible.

Approximately 4 hours was spent surveying the study area in order to search for threatened plant species and assess the condition and extent of vegetation communities present in the study area to determine areas for further surveys using BioMetric Vegetation Plots. Additional time was also taken to confirm species and community identifications.

BIOMETRIC VEGETATION PLOTS

BioMetric Vegetation Plots were established in each area/zone of homogenous vegetation type and condition, as defined by the 2014 OEH BioBanking Assessment Methodology (BBAM 2014). The plots were placed using a stratified approach to ensure that all native vegetation types were adequately surveyed. In total, six plots were surveyed within the study area. These vegetation plots were undertaken utilising the methodology presented in BBAM 2014. Each vegetation plot was assigned to a suitable BioMetric Vegetation Type, as per the OEH database.

Vegetation plots included:

- 4 vegetation plots were surveyed in areas of Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions.
- 2 vegetation plots in Western Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion.

No plots were undertaken in areas of vegetation that were dominated by exotic grazing species. Locations of all vegetation plots have been mapped.

FAUNA HABITAT ASSESSMENT

An assessment of habitat types available and their quality and suitability as threatened species habitat was conducted across the study area. Factors such as arboreal resources, ground-layer resources, vegetation structure, connectivity and disturbance were noted.

All trees within the study area were inspected for hollows. The number, size and occupancy of the hollows, as well as the species, diameter at breast height (dbh) and height of the hollow-bearing trees were all recorded.

Incidental sightings of fauna and their traces (e.g. scats, tracks, scratches) made while present on the site were also recorded.

Approximately five hours were spent assessing fauna habitat within the study area.

OPPORTUNISTIC

An opportunistic record of fauna species observed during the fauna assessments was also taken.

TARGETED FAUNA SURVEYS

Grey Falcon (*Falco hypoleucos*), Diamond Firetail (*Stagonopleura guttata*), Glossy Black-cockatoo (*Calyptorhynchus lathami*), Grey-crowned Babbler (eastern sub-species) (*Pomatostomus temporalis* subsp. *temporalis*) and Major Mitchells Cockatoo (*Lophochroa leadbeateri*)

In relation to avifauna only the Grey Falcon required targeted surveys, however, predicted threatened birds were also surveyed for. During the survey investigations, diurnal bird surveys (20 minutes each per 2 hectare area) were undertaken at eight locations across the study area, giving a total survey effort of 2 hours and 40 minutes. Survey locations were designed to cover all available bird habitats within the study area including woodland, open paddock, dams and isolated or planted rows of trees. Six surveys were conducted at dawn when most birds are most active, and two surveys were conducted during the day to target diurnal raptor species. In addition, opportunistic records of bird species observed during fauna assessments, vegetation surveys and hollow-bearing tree assessments were recorded, and a total species list compiled. Four surveys were undertaken within woodland habitat, and two surveys within open grassland with isolated trees habitat. Two surveys were undertaken at dams (Figure 4-1).

These bird surveys were used to target the threatened species predicted to occur in the study area and the threatened species requiring survey through the BCC (Table 4-2) (

Table 4-3).

Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) and Little Pied Bat (*Chalinolobus picatus*).

These two threatened microbats were predicted to utilise the site by the BCC. As such, these species did not require targeted surveys, however ecosystem credits apply. Furthermore, habitat features such as tree hollows and fissures, decorticating bark and woodland habitat structure was assessed.

Eastern Pygmy-possum (*Cercartetus nanus*)

The Eastern Pygmy-possum was listed as requiring targeted survey under the BCC. Habitat assessments were carried out for this species. These included hollow-bearing tree surveys and assessments of other habitat features for this species including the structure of shrub and ground cover layers, and available food sources such as nectar, flowers, fruits and invertebrates. At the time of survey, this species was not targeted as there have been no previous recordings within 10 kilometres of the study area or within the Parkes Shire LGA for this species. Furthermore, the habitat was considered marginal as this species prefers larger remnant patches of good quality box woodland.

Koala (*Phascolarctos cinereus*)

The Koala was listed as requiring targeted surveys under the BCC. Targeted Koala surveys were carried out in accordance with the Referral Guidelines for the Vulnerable Koala (DoE 2014). These included visual assessments of all trees in the study area, the scat Spot Assessment Technique (SAT) for all trees in the study area and habitat assessments. Habitat assessments included using the Koala habitat assessment tool (DoE 2014) and identifying Koala primary, secondary and supplementary food trees for the Western Slopes and Plains Koala Management Area (DECCW 2008). These surveys were carried out during the hollow-bearing tree surveys with a survey effort of approximately four hours.

OTHER THREATENED SPECIES OF NOTE

There were a number of other threatened species of note that were identified in background searches with previous recordings within a 10km radius. These species, their survey results, evidence of suitable habitat in the study area and likely impacts due to the proposal are summarised in Table 4-4:

Table 4-4 Other threatened species of note that were identified in background searches with previous recordings within a 10km radius:

Common name / Status (TSC Act, EPBC Act)	Scientific name	Number of records (OEH/AoLA)	Suitable habitat within the study area	Surveys	Present/presumed present	Affected by the proposal
Curlew Sandpiper / E, CE	<i>Callidris ferruginea</i>	0/2	Marginal	Not detected	No.	Unlikely
Speckled Warbler / V	<i>Chthonicola sagittata</i>	0/1	Yes	Not detected	Presumed to occur on occasion. Habitat elements that occur onsite are common in the local area.	Unlikely
Spotted Harrier / V	<i>Circus assimilis</i>	2/21	Yes	Not detected	Presumed to occur on occasion. Habitat elements that occur onsite are common in the local area.	Unlikely
Brown Treecreeper / V	<i>Climacteris picumnus</i> subsp. <i>victoriae</i>	2/5	Yes	Not detected	Presumed to occur on occasion. Habitat elements that occur onsite are common in the local area.	Unlikely
Varied Sittella / V	<i>Daphoenositta chrysoptera</i>	1/3	Yes	Not detected	Presumed to occur on occasion. Habitat elements that occur onsite are common in the local area.	Unlikely

Common name / Status (TSC Act, EPBC Act)	Scientific name	Number of records (OEH/AoLA)	Suitable habitat within the study area	Surveys	Present/presumed present	Affected by the proposal
White-fronted Chat / V	<i>Epthianura albifrons</i>	0/5	Marginal	Not detected	Presumed to occur on occasion. Habitat elements that occur onsite are common in the local area.	Unlikely
Little Lorikeet / V	<i>Glossopsitta pusilla</i>	0/18	Yes	Not detected	Presumed to occur on occasion. Habitat elements that occur onsite are common in the local area.	Unlikely
Little Eagle / V	<i>Hieraaetus morphnoides</i>	0/19	Yes	Not detected	Presumed to occur on occasion. Habitat elements that occur onsite are common in the local area.	Unlikely
Black-tailed Godwit / V	<i>Limosa</i>	0/2	Marginal	Not detected	No.	Unlikely
Superb Parrot / V, V	<i>Polytelis swainsonii</i>	0/30	Yes	Not detected	Presumed to occur on occasion. Habitat elements that occur onsite are common in the local area.	Unlikely
Australian Painted Snipe / E, E	<i>Rostratula australis</i>	0/2	Marginal	Not detected	No.	Unlikely
Freckled Duck / V	<i>Stictonetta naevosa</i>	0/5	Marginal	Not detected	Presumed to occur on occasion. Habitat elements that occur onsite are common in the local area.	Unlikely

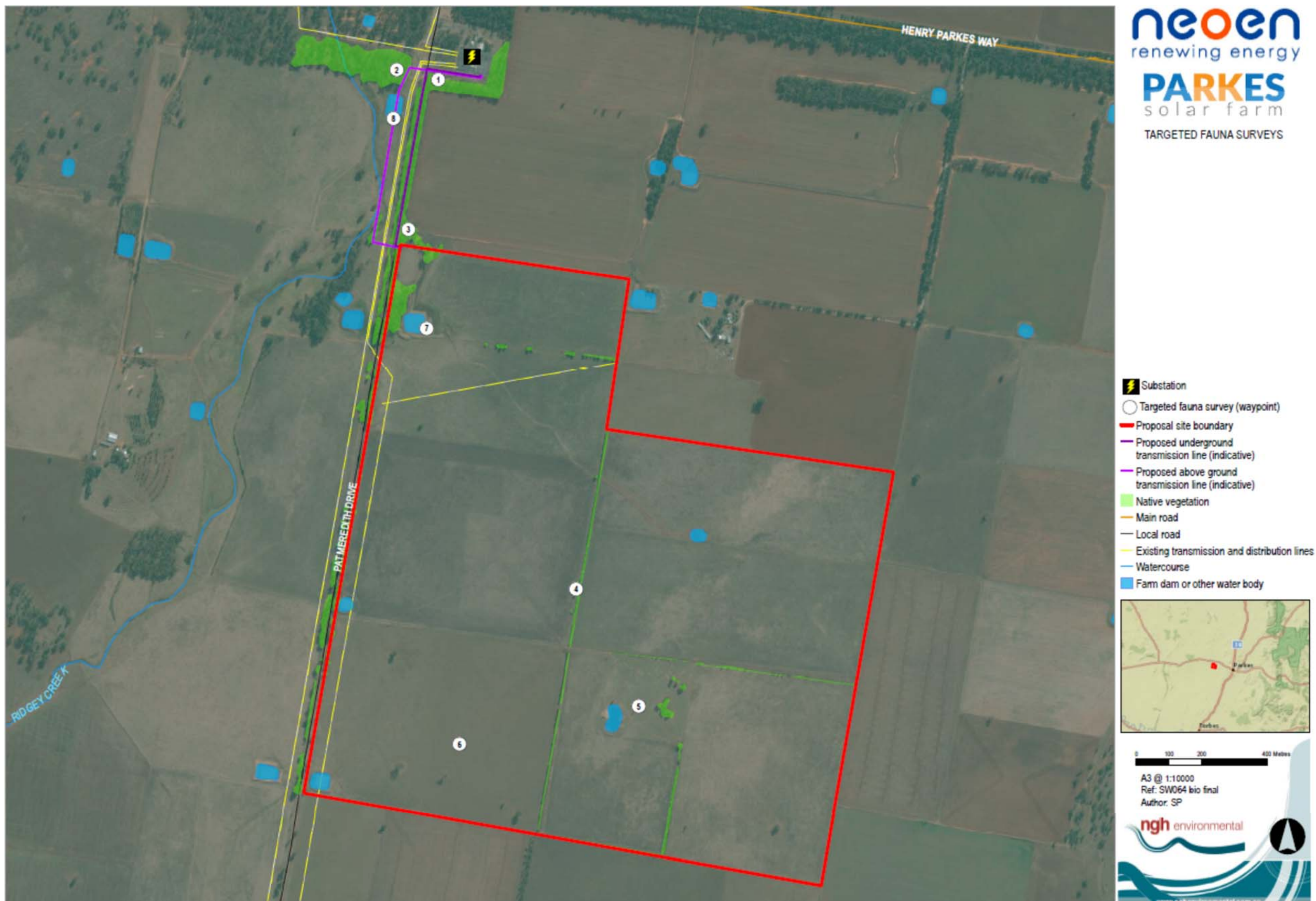


Figure 4-1 Targeted survey locations - fauna

Weather conditions during the field surveys

Table 4-5 Weather conditions during the field surveys, recorded at Parkes.

Date	Temperature min (°C)	Temperature max (°C)	Rain (mm)	Max wind speed (km/h)
07/12/15	17.7	37.8	0	57
08/12/15	24.0	32.7	0	50

4.2.3 Survey results

Sixty one flora species and 33 fauna species were detected during the surveys.

Of all the species recorded, no flora or fauna species are listed as threatened species, either under NSW or Commonwealth legislation.

Six threatened species were returned by the BCC assessment as requiring survey (and therefore with potential to generate species credits) were considered to have some potential to occur in the study area (see

Table 4-3). However, based on the extensive survey effort undertaken (described in Section 4.2.2) and the areas that would be cleared by the proposal, none of these threatened species were considered likely to be *adversely impacted* by the proposal. However, it is noted that the Pine Donkey Orchid (*Diuris tricolor*) was not in flower during surveys, this species is a large orchid which usually occurs in colonies and hence, should have been detectable during surveys.

Species of note are discussed below to justify this assumption.

Pine Donkey Orchid

The Pine Donkey Orchid is listed as vulnerable under the TSC Act. This conspicuous orchid extends across the western slopes of NSW. This species was targeted during the current surveys. The closest previous recording of the Pine Donkey Orchid is approximately seventeen kilometres to the north of the study area. Habitat for this species including Bimble Box woodland communities were recorded within the study area, however no individuals were detected during surveys. Although this species would not have been in flower at the time of surveys, it is a large conspicuous orchid and would have been detected if it was present.

While the study area may contain some suitable habitat for this species and individuals have been recorded 17 kilometres north of the study area, considering the extensive survey effort and minimal proposed clearing of woodland, **it is unlikely that a population of Pine Donkey Orchid would be impacted by the proposal.**

Spear Grass

The Spear-grass (*Austrostipa wakoolica*), listed as endangered under the TSC Act and EPBC Act, is usually found on floodplains of Murray River tributaries and is associated with woodland tree species such as Western Grey Box, Bimbil Box and White Cypress Pine. This species has been previously recorded approximately one kilometre to the northwest of the study area, however these recordings were approximately 25 years ago. Although targeted, this species was not recorded during the current surveys.

While the study area may contain some suitable habitat for this species and individuals have been recorded one kilometre northwest of the study area, considering the extensive survey effort and minimal proposed clearing of woodland due to the proposal, **it is unlikely that a population of a Spear-grass (*A. wakoolica*) would be impacted by the proposal.**

Slender Darling Pea

The Slender Darling Pea (*Swainsona murrayana*), listed as vulnerable under the TSC Act and EPBC Act, occurs in a variety of habitats including red-brown loams and grassy woodlands which occurs in the study area. However, it is usually associated with black box communities. This species has been previously recorded approximately six kilometres to the east of the study area (one recording). Although targeted, this species was not recorded during the current surveys.

While the study area may contain some suitable habitat for this species and an individual has been recorded six kilometres to the east of the study area, considering the extensive survey effort and minimal proposed clearing of woodland due to the proposal, **it is unlikely that a population of a Slender Darling Pea would be impacted by the proposal.**

Eastern Pygmy-possum

The Eastern Pygmy-possum (*Cercartetus nanus*), is listed as vulnerable under the TSC Act, occurs in a variety of habitats including grassy woodland which occurs in the study area. It forages on nectar and pollen from Myrtacea species. This species uses small tree hollows for shelter and nesting, of which 15 were recorded in areas to be impacted within the study area. Targeted surveys were not carried out for this species, however habitat assessments were including tree hollow surveys, habitat complexity and food source assessments. Nectar resources were considered sparse in the study area. This species has not been previously recorded within ten kilometres of the study area.

Despite there being suitable habitat within the study area, it is concluded that the proposal is **unlikely to cause an adverse affect on the Eastern Pygmy Possum** because of the lack of previous recordings in the local area, only a minimal amount of clearing of woodland habitat proposed and sparse nectar resources in the study area.

Grey Falcon

The Grey Falcon (*Falco hypoleucos*), listed as endangered under the TSC Act and EPBC Act, is sparsely distributed in NSW and occurs over a variety of habitats, although wooded water courses, shrubland and grasslands are preferred. Breeding is restricted to arid regions. Despite targeted surveys, this species was not recorded in the study area, nor were any potential nests. One individual has been previously recorded within ten kilometres of the study area.

Due to there being only marginal habitat within the study for the Grey Falcon, no individuals being recorded and only a minimal amount of habitat to be cleared, **it is unlikely that the proposal will cause an adverse impact to this species.**

Koala

No individual Koalas, listed as vulnerable under the TSC Act and EPBC Act, were recorded within the study area. Furthermore, no scats were recorded for this species following the SAT surveys which would suggest the Koala is not currently using the study area for habitat, although it may from time to time. The closest records of the Koala are approximately twelve kilometres southeast and twenty kilometres northwest of the study area. Secondary food tree species for the Koala occur within the study area (*E. microcarpa*, *E. melliodora* and *E. populnea* subsp. *bimbil*) (DECC, 2008), therefore habitat for this species occurs within the study area. However, considering this species was not detected during targeted surveys, scats were not detected during targeted SAT surveys and only a minimal amount of habitat will be cleared due to the proposal, **it is assessed that there will not be an adverse impact on a population of Koalas in the study area.**

4.3 SUMMARY OF ECOSYSTEM CREDIT AND SPECIES CREDIT SPECIES

In summary, applying the information to the BCC assessment, using the BCC landscape assessment data, including the geographic features relevant to the area, vegetation zones and the results of comprehensive and targeted surveys:

- Eleven ecosystem species credit species are relevant to the project. All of these are fauna species.
- Six species credit species was considered relevant to the project. These include three fauna species and three flora species.

These are listed in the table below.

Table 4-6 Final list of ecosystem credit and species credit species

Species returned by the BCC	Recorded within development footprint	Ecosystem credit species	Species credit species
Flora			
Bluegrass <i>Dichanthium setosum</i>	No	No	Yes
Slender Darling Pea <i>Swainsona murrayana</i>	No	No	Yes
Pine Donkey Orchid <i>Diuris tricolor</i>	No (but unsuitable survey period)	No	Yes
Fauna			
Eastern Pygmy-possum <i>Cercartetus nanus</i>	No	No	Yes
Grey Falcon <i>Falco hypoleucos</i>	No	No	Yes
Koala <i>Phascolarctos cinereus</i>	No	No	Yes
Diamond Firetail <i>Stagonopleura guttata</i>	No	Yes	No
Glossy Black-Cockatoo <i>Calyptorhynchus lathami</i>	No	Yes	No
Grey-crowned Babbler (eastern subspecies) <i>Pomatostomus temporalis</i> subsp. <i>temporalis</i>	No	Yes	No
Little Pied Bat <i>Chalinolobus picatus</i>	No (how not targeted)	Yes	No
Major Mitchell's Cockatoo <i>Lophochroa leadbeateri</i>	No	Yes	No
Yellow-bellied Sheathtail-bat <i>Saccolaimus flaviventris</i>	No (however not targeted)	Yes	No

Notes: No other threatened species credit species were detected onsite. Therefore, no credits have been generated for these species. However, it is noted that the current survey period was unsuitable for detecting the Pine Donkey Orchid which flowers in spring.

5 AVOID AND MINIMISE IMPACTS

5.1 DIRECT IMPACTS

5.1.1 Site selection and planning phase

The proposal site has been selected to avoid or minimise impacts to biodiversity where possible. Most areas of EEC in the study area have been avoided through the design process with an aim for avoiding offsets. These areas include the patches of Inland Grey Box Woodland (EEC-TSC Act) and Grey Box grassy woodland (EEC-EPBC Act) within the proposed site boundary, as well as planted rows of trees which constitute the same EECs, which will be retained on-site. This, in turn would also avoid impacts to threatened species predicted to occur in the study area through the BCC (Section 4.1). The only areas where an EEC would be impacted are the areas where the 'above ground transmission line' has been proposed to connect the solar arrays to the power station to the north (Figure 5-1). The proposed above ground transmission has been designed so that it would only require the minimal amount of clearing or pruning of the EECs for construction and operation. Where the overhead powerline requires offsets, then the option for boring underground, or an alternative overhead route be identified that avoids removal or pruning of EECs, then offsetting would not be required (see 'proposed underground transmission line – indicative' Figure 5-1).

There is an option to offset impacts to the Box Gum woodland EEC by retaining the Grey Box woodland EEC located within the central part of the site of the solar array, and further enhancing this community by planting smaller trees (such as Kurrajongs) within and adjacent to this remnant vegetation. This would be subject to a Biodiversity Offset Strategy (BOS) if required.

5.1.2 Construction phase

The construction phase of the project can have a number of direct impacts on biodiversity values. Direct impacts are as follows:

Impact	Frequency	Intensity	Duration	Consequence
Habitat clearance for permanent and temporary construction facilities (e.g. solar infrastructure, compound sites, stockpile sites, access tracks)	Regular	High	Construction phase	• Direct loss of native flora and fauna habitat including threatened species and EECs • Potential over clearing of habitat outside of the development footprint. • Injury and mortality to fauna during clearing of fauna habitat and habitat trees. • Disturbance to fallen timber, dead wood and bush rock

A range of mitigation measures would be implemented to ensure that impacts on biodiversity during the construction phase are avoided where possible, and minimised where they cannot be avoided. The mitigation measures that would be employed during the construction phase are provided in Table 5-1.



Figure 5-1 Development footprint

Table 5-1 Measures proposed to avoid and minimise direct impacts of the project during the construction phase

Impact	Consequence	Measures to be implemented	Timing	Outcome	Responsibility
Habitat clearance for permanent and temporary construction facilities	Direct loss of native flora and fauna habitat	- A Flora and Fauna Management Plan (FFMP) will be prepared as part of the Contractor's Environmental Management Plan (CEMP) to minimise the ecological impacts of the project. - Utilise areas already impacted by previous clearing or disturbance for access purposes during construction or the establishment of compound sites. - A 'Clearing and Grubbing Plan' will be developed. This will include best practice methods for the removal of woody vegetation and non-woody vegetation. - Trees will be removed in such a way as not to cause damage to surrounding vegetation. Root systems of trees and shrubs to be removed will be retained in-ground to ensure surrounding ground layer vegetation is undisturbed and to prevent soil erosion. - EEC areas to be retained would be delineated, and construction activities would be excluded from these areas. - Where trees are to be retained, an adequate tree protection zone (TPZ) will be provided around each tree for the duration of construction. Details for calculating TPZs are provided within <i>Australian Standard 4970-2009 – Protection of trees on development sites</i>. - If work cannot avoid encroaching into the TPZ, it will not impinge on the structural root zones (SRZ) of trees to be retained. Details for calculating the SRZs are provided within <i>Australian Standard 4970-2009 – Protection of trees on development sites</i>. - Where possible, trees to be removed will be mulched on-site and re-used to stabilise disturbed areas.	Pre-construction phase Construction phase Post-construction phase	Minimise the impacts of habitat removal on native flora and fauna	Neoen Contractor

Impact	Consequence	Measures to be implemented	Timing	Outcome	Responsibility
		Minimise clearing of EECs, namely 'White Box–Yellow Box–Blakely's Red Gum Woodland'. Clearing and construction contractors should be given inductions that make clear the importance of the sensitive area habitat and its species.			
	Potential over clearing and/or damage of habitat outside of the development footprint.	- Stockpiling materials and equipment and parking vehicles will be avoided within the dripline (extent of foliage cover) of any tree. - Stockpile and compound sites will be located using the following criteria: - Within the study area. - At least 40 metres away from the nearest waterway. - In areas of low ecological conservation significance (i.e. pasture land). - On relatively level ground. - Prior to the commencement of work, a physical vegetation clearing boundary at the approved clearing limit is to be clearly demarcated and implemented. This will include environmentally sensitive areas such as EECs. The delineation of such a boundary may include the use of temporary fencing, flagging tape, parawebbing or similar. - Identify and protect areas of vegetation to be retained showing them as exclusion zones or 'no-go' areas.	Construction phase	Prevention of over-clearing	Contractor
	Injury and mortality to fauna during clearing of fauna habitat and habitat trees	A pre-clearing process will be implemented before clearing begins. Pre-clearing surveys will be carried out by an ecologist and will include general fauna surveys, general tree hollow inspections and dam/waterway inspections. Habitat trees will be clearly marked with flagging tape.	Construction phase	Prevent and minimise the risk of injury and mortality to fauna Minimise displacement of fauna	Contractor

Impact	Consequence	Measures to be implemented	Timing	Outcome	Responsibility
		- When programming the works, consider breeding periods of fauna that may be impacted (<i>If hollow-dependent fauna (e.g. arboreal mammals, microbats, parrots) are found breeding in tree hollows to be cleared, consider avoiding works in these locations until the breeding season has finished</i>). - An unexpected threatened species finds procedure will be developed before clearing commences. - An ecologist will be present during tree-felling of all hollow-bearing trees to ensure that any potential impacts on fauna are minimised. - Staged habitat removal for the removal of hollow-bearing trees will be undertaken. - Where fauna is encountered that requires handling or rescue, a Fauna Handling and Rescue Procedure will be followed.			
	Disturbance to fallen timber, dead wood and bush rock	Any fallen timber, dead wood and bush rock (if present) encountered on site will be left in situ or relocated to a suitable place nearby. Rock will be removed with suitable machinery so as not to damage the underlying rock or result in excessive soil disturbance.	Construction phase	Minimise loss and/or damage to native flora and fauna habitats	Contractor
	Introduction and spread of noxious weeds and pathogens	A Weed Management Plan would be developed for the sites to prevent/minimise the spread of weeds in and between sites. This would include: - Declared noxious weeds would be managed according to the requirements stipulated by the <i>Noxious Weeds Act 1993</i> during and post construction (e.g. Chilean Needle Grass) - Develop protocol for weed hygiene in relation to plant, machinery and importation and management of fill	Construction phase	Prevent spread of Noxious Weeds and pathogens	Contractor

Impact	Consequence	Measures to be implemented	Timing	Outcome	Responsibility
		- All pesticides would be used in accordance with the requirements on the label. Any person undertaking pesticide (including herbicide) application would be trained to do so and have the proper certificate of completion/competency or statement of attainment issued by a registered training organisation. - Any occurrences of pathogens such as Myrtle Rust and Phytophthora would be monitored, treated and reported.			

5.1.3 Operational phase

The operational phase of the project can have a number of direct impacts on biodiversity values. Direct impacts are as follows:

Impact	Frequency	Intensity	Duration	Consequence
Existence of new and permanent solar infrastructure	Constant	Moderate	Operational phase	• Permanent removal of flora and fauna habitat • Collision risks to birds on solar infrastructure • Collision risk to birds and microbats to exterior barbed-wire fencing
Inappropriate landscaping	Constant	Moderate	Operational phase	Reduction in the quality of habitat for native flora and fauna species

Measures to avoid and minimise impacts that may occur during the operational phase would be implemented as part of the project. Where practical, measures to avoid impacts on biodiversity during operation have been identified. Where impacts are unavoidable measures to minimise impacts would be implemented. Table 5-2 outlines the mitigation measures that would be implemented during operation, or to ensure the operational phase avoids and minimises impacts on biodiversity to the greatest extent possible.

Section 6 outlines the requirements for biodiversity offsets for those impacts that cannot be avoided as a result of the project.

Table 5-2 Measures proposed to avoid and minimise direct impacts of the project during the operational phase

Impact	Consequence	Measures to be implemented	Timing	Outcome	Responsibility
Existence of permanent solar infrastructure	- Collision risks to birds and microbats on solar infrastructure and barbed wire fencing - Light pollution to adjacent woodland habitat	- Use non barbed-wire on exterior fencing - Use of reflective power line marking balls on any overhead transmission lines - Use of 'fauna friendly' lighting	Operational phase	Minimise impacts to fauna and flora as a result of infrastructure	Neoen Contractor
Inappropriate landscaping	Reduction in the quality of habitat for native flora and fauna species	Native vegetation should be utilised in associated with any landscaping.	Operational phase	Increase/improve native species diversity and connectivity	Neoen Contractor

5.2 INDIRECT IMPACTS

Vegetation and habitat removal are considered *direct impacts* of the project.

Indirect impacts could occur as a consequence of the proposal, further from the study area. A number of indirect impacts to biodiversity during construction and operation have been identified below.

5.2.1 Site selection and planning phase

Design refinements were made to the proposed study area to avoid indirect biodiversity impacts. To reduce the impact on ephemeral drainage depressions and dams, the proposed site boundaries have been designed to avoid construction on the main arteries of ephemeral drainage depressions and to largely avoid man-made dams.

The selection of sites to minimise direct and indirect biodiversity impacts is consistent with the principles of avoiding and minimising biodiversity impacts, as outlined under the Framework for Biodiversity Assessment.

5.2.2 Construction phase

The construction phase of the project can have a number of indirect impacts on biodiversity values. Indirect impacts are as follows:

Impact	Frequency	Intensity	Duration	Consequence
Accidental spills and contamination from construction activities (including compound sites)	Rare	Moderate	Construction phase	Pollution of waterways
Earthworks	Regular	Moderate	Construction phase	Erosion and sedimentation of waterways
Noise	Regular	Low	Construction phase	Construction machinery and activities may disturb local fauna
Dust generation	Regular	Low	Construction phase	Inhibit the function of plant species and communities, waterways
Light spills during night works	Rare	Low	Construction phase	Night works may alter fauna activities/movements
General construction activities	Regular	Moderate	Construction phase	Feral pest, weed and/or pathogen encroachment

Table 5-3 Measures proposed to avoid and minimise indirect impacts of the project during the construction phase

Impact	Measures to be implemented	Timing	Outcome	Responsibility
Accidental spills and contamination from construction activities	- Carry out refuelling of plant and equipment, chemical storage and decanting at least 50 m away from aquatic habitats in impervious bunds. - Ensure that dry and wet spill kits are readily available - Reclamation works, if proposed, will take into consideration the requirements of the Policy and guidelines for fish habitat conservation and management (NSW Department of Primary Industries, 2013).	Construction phase	Prevent/minimise pollution of ephemeral waterways and dams, and sensitive adjacent habitat	Contractor
Earthworks	A Soil and Water Management Plan will be prepared.	Construction phase	Prevent/minimise erosion and sedimentation of ephemeral waterways and dams, and sensitive adjacent habitat	Contractor
Dust generation	The Construction Environmental Management Plan would include measures to prevent dust spreading to nearby ephemeral drainage lines or dams.	Construction phase	Prevent dust inhibiting the function of plant species and communities ephemeral waterways and dams.	Contractor
Light spill	If night work is unavoidable, ensure lights are directed away from wildlife or habitat corridor (biodiversity links	Construction phase	Prevent disturbance to local fauna at the habitat corridor location.	Contractor
General construction activities	Weed and hygiene protocols will be prepared and implemented.	Construction phase	Prevent feral pest, weed and/or pathogen encroachment into vegetation adjoining study area.	Neoen Contractor

5.2.3 Operational phase

The operational phase of the proposal can have a number of indirect impacts on biodiversity values. Indirect impacts are as follows:

Impact	Frequency	Intensity	Duration	Consequence
Light spill	Regular	Low	Operational phase	Alter movements of fauna through the landscape
Weed encroachment	Regular	Moderate	Operational phase	Ingress of weeds along the boundary of the development
Pest animals	Irregular	Low	Operational phase	Increase in pest species specialising in edge habitats

Table 5-4 Measures proposed to avoid and minimise indirect impacts of the proposal during the operational phase

Impact	Consequence	Measures to be implemented	Timing	Outcome	Responsibility
Light spill	Alter movements of fauna through the landscape	Direct lights away from adjacent habitat. Avoid excessive lights in areas adjacent to wildlife.	Operational phase	Minimise impacts to fauna movements and activity	Neoen
Weed encroachment	Ingress of weeds along the boundary of the study area	Weed and planting protocols will be prepared and implemented.	Operational phase	Prevent spread of weeds	Neoen Contractor
Pest animals	Invasion of pest species specialising in edge habitats such as foxes	Implement a vertebrate pest management plan.	Operational phase	Minimise invasion of pest species	Neoen Contractor

5.3 CUMULATIVE IMPACTS

The clearing of native vegetation, which is a key threatening process at both State and Commonwealth level, is considered a major factor in the loss of biological diversity. At least 61 per cent of the native vegetation in NSW has been cleared or highly modified since European settlement (NSW Scientific Committee 2001), and the removal of vegetation for this proposal is contributing to this process. The cumulative impact of similar renewable energy projects, particularly where EECs are involved, can be considerable given that many poorly-conserved vegetation communities have a substantial portion of their extents represented on private land where the majority of renewable energy projects are proposed. Small losses of such communities, which may be insignificant at a project level, may accumulate over time to cause a significant reduction in the extent of remnant patches.

Cumulative impacts are considered best addressed by avoiding and minimising. Where avoidance is not possible, the impacts of each contributing project is assessed on a case by case basis. Long term mechanisms like offsetting through the BioBanking assessment methodology, are structured to address the ongoing impacts of multiple projects in a cohesive manner. Offsetting is a commitment of this project if clearing of native vegetation is considered necessary.

6 IMPACT SUMMARY

6.1 AREAS NOT REQUIRING ASSESSMENT

Areas within the development footprint without native vegetation or aquatic features do not need to be assessed further. They include treeless paddock areas with an understory of exotic pasture grasses. Furthermore, areas without any vegetation such as roads, existing infrastructure and other developments do not require further assessment (Figure 3-4), and – all areas within the study area that are not an EEC. The total area of land within the study area not requiring further assessment is approximately 232.72 ha.

6.2 AREAS NOT REQUIRING AN OFFSET

6.2.1 Impacts on native vegetation

Offsets are not required where the project would impact on PCTs that:

- a) Have a site value score of <17; or
- b) Are not identified as CEEC or EEC.

All native vegetation within the study area that was considered in 'low condition' or had a site value score of <17 were not considered to be requiring offsets.

All other native vegetation within the development footprint were either CEEC and/or EEC or in moderate to good condition and therefore, will require offsets in accordance with Table 4 of the FBA.

All other areas within the development footprint will not require offsets (see Figure 3-4).

6.2.2 Impacts on species and populations

Offsets are not required where the project:

- a) Impacts on non-threatened species and populations that do not form part of a CEEC or EEC
- b) Impacts on threatened species habitat associated with a PCT within a vegetation zone with a site value score of <17

Non-threatened species or populations do not form part of the offset requirement.

To ascertain whether native vegetation within the development site provided threatened species or threatened population habitat, all vegetation zones were entered into the credit calculations (site scores for these PCTs were all >17):

- PCT #76 Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW Western Slopes and Riverina Bioregions
- PCT #82 Western Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Penneplain Bioregion

As discussed in Section 4.2.1, the Pine Donkey Orchid is presumed to occur on occasion while the presence of individuals of the species is unknown. While the works would be unlikely to impact on a population of Pine Donkey Orchid the BCC requires that further targeted surveys are necessary to determine if any offsets are required for this species. Targeted surveys are recommended to occur within the next flowering season which will be between August and September 2016.

Species that do not require any offsets are discussed specifically below. Refer also to Section 4.2.1.

Flora

SPEARGRASS

The project would only impact potential habitat for this species and no individuals are likely to be affected by the project. This species does not require offsets.

SLENDER DARLING PEA

The project would only impact potential habitat for this species and no individuals are likely to be affected by the project. This species does not require offsets.

PINE DONKEY ORCHID

The proposal has the potential to impact on this vulnerable species, the Pine Donkey Orchid. Despite this species being targeted during the current surveys, it was not in flower during the surveys (flowers from August to October) making it almost undetectable. The closest previous recording of the Pine Donkey Orchid is approximately seventeen kilometres to the north of the study area. Habitat for this species including Bimble Box woodland communities were recorded within the study area, however no individuals were detected during surveys. Although this species would not have been in flower at the time of surveys, it is a large conspicuous orchid and would have been detected if it was present. While the study area may contain some suitable habitat for this species, considering the extensive survey effort and minimal proposed clearing of woodland, it is unlikely that a population of Pine Donkey Orchid would be impacted by the proposal. However the BCC assessment requires further targeted surveys to confirm if the species is present or absent within the study area

Fauna

Specific to the BCC assessment, species not requiring offsets include:

EASTERN PYGMY-POSSUM

The relevant geographic feature was present, however, only habitat assessment surveys were carried out for this species including tree hollow surveys, habitat complexity and food source assessments. This species uses small tree hollows for shelter and nesting, of which 15 were recorded in areas to be impacted within the study area. However, many of these hollows were recorded in isolated trees in paddocks which are considered unsuitable habitat for the Eastern Pygmy-possum. Furthermore, due to a lack of understory complexity and hence feeding resources, and the highly fragmented nature of the majority of the habitat within the study area, it is concluded that this habitat is only considered marginal for this species and that the Eastern Pygmy-possum would not be adversely impacted by the proposal and no further assessment is required.

GREY FALCON

The relevant geographic feature was present however, targeted surveys did not record this species in the study area; not included as a species credit species. No offset is required.

KOALA

The relevant geographic feature was present however, targeted surveys did not record this species or any evidence of this species in the study area; not included as a species credit species. No offset is required.

Hollow-bearing trees

A total of nine hollow-bearing trees were identified within the study area that could be removed as a result of the proposal. Hollows potentially provide roosting habitat for some species of microbats, parrots, owls and arboreal mammals. Hollow-dependant fauna species are likely to be impacted due to the proposal. However, the impact on hollow-dependent fauna in the study area is likely to be low. Mitigation measures have been recommended to address the clearing risks to resident species (Section 5).

The number of hollows to be impacted is assessed within the BCC, via the plot data collected for each vegetation zone. This data adds to the value of the habitat to be removed, thereby requiring greater number of credits to be retired. No specific requirement to offset hollows has been identified.

6.3 PCTS AND SPECIES POLYGONS REQUIRING AN OFFSET

6.3.1 Impacts on native vegetation

Offsets are required where the project would impact on any native vegetation that is:

- identified as a CEEC that is specifically nominated in the SEARs for the Major Project as a CEEC for which an impacts does not require further consideration;
- identified as an EEC, unless it is an EEC that is specifically nominated in the SEARs for the project as an EEC for which an impact requires further consideration; or
- associated with threatened species habitat and in a vegetation zone that has a site value score ≥ 17 .

The project would have a direct impact on two vegetation communities listed as EECs under the TSC Act within the study area as a result of vegetation clearing. However, this does not generate ecosystem credits and does not require offsetting.

Table 6-1 Extent of vegetation communities within the development footprint and the estimated loss of those communities from the development footprint.

Vegetation Community	Threatened Ecological Community (TSC Act or EPBC Act)?	PCT Id	Threatened habitat species	BioMetric vegetation condition	Extent of vegetation (ha) in development footprint
PCT #76 BVT #CW145 Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions	Yes – Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions (EEC TSC Act, EEC EPBC Act)	76	Spear-grass, Pine Donkey Orchid and Slender Darling Pea.	Moderate - good	0.16

Vegetation Community	Threatened Ecological Community (TSC Act or EPBC Act)?	PCT Id	Threatened habitat species	BioMetric vegetation condition	Extent of vegetation (ha) in development footprint
PCT #82 BVT #CW144 Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion	Yes - Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions under the TSC Act, and Grey Box (<i>Eucalyptus macrocarpa</i>) grassy woodland and derived native grasslands of south-eastern Australia. (EEC TSC Act, EEC EPBC Act)	82	Spear-grass, Pine Donkey Orchid and Slender Darling Pea.	Moderate - good	0.21
Total Vegetation	-	-	-	-	0.37

Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW Western Slopes and Riverina Bioregions

Western Grey Box tall grassy woodland occurs on fertile, productive agricultural areas, where they have been highly modified historically. This is the situation within the development footprint, where this community forms the highest proportion of native vegetation extent within the development footprint (see Figure 1-2). Approximately 0.16 ha of Western Grey Box tall grassy woodland (TSC Act EEC, EPBC Act EEC) would be directly removed as a result of the development (see Table 6-2). The VIS classification System 2.1 estimates that 40000 ha of this community is still extant, and 95% of the pre-European distribution has been cleared in the central west CMA. Thus the 0.16 ha of the community that is present within the development footprint represents under 0.0001% of the regional extent.

Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion

The area of Western Grey Box - Poplar Box - White Cypress Pine tall woodland in the development footprint represents a small proportion of this EEC within the region. The VIS classification System 2.1 estimates that 100,000 ha of this community is still extant, and from 75% of the pre-European distribution has been cleared in the central west CMA. Thus the 0.21 ha of the community that is present within the development footprint represents under 0.0001% of the regional extent.

Table 6-2 Extent and condition of Western Grey Box tall grassy woodland and Western Grey Box - Poplar Box - White Cypress Pine tall woodland within the development footprint.

Blakely's Red Gum – Yellow Box grassy woodland	Plots	BioMetric Vegetation Value Score (average for site)	Extent Vegetation (ha) in the development footprint (impact area)	Extent of Vegetation (ha) in the study area
Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions	PSF1 - 4	30.73	0.16	6.6
Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion	PSF 5 -6	70.31	0.21	4.78
Total Vegetation	-	-	0.37	11.38

6.3.2 Impacts on species and populations

Offsets are required where the project would impact on:

- Any critically endangered species;
- A threatened species or population that was not specifically nominated in the SEARs as a species or population for which an impact requires further consideration; or
- Threatened species habitat associated with a PCT in a vegetation zone with a site value score of ≥ 17 .

Flora

Specific to the BCC assessment, no flora species require offsets, however, the Pine Donkey Orchid requires further survey. For flora, the BCC uses individuals not threatened species polygons in the credit calculations. No threatened flora species were recorded or were predicted to occur, therefore no threatened flora species need to be offset at this stage. However, further targeted surveys are required for the Pine Donkey Orchid.

Fauna

No fauna species credits are generated in the assessment. In this discussion, fauna that generate ecosystem credits (but not species credits) are discussed.

Specific to the BCC assessment, species requiring offsets include:

- Diamond Firetail - targeted surveys did not record this species in the study area. This species does however require offsets. It generates ecosystem credits but not species credits.
- Glossy Black-cockatoo - targeted surveys did not record this species in the study area. This species does however require offsets. It generates ecosystem credits but not species credits.

- Grey-crowned Babbler - targeted surveys did not record this species in the study area. This species does however require offsets. It generates ecosystem credits but not species credits.
- Little Pied Bat – this species was not targeted for surveys in the study area. This species does however require offsets. It generates ecosystem credits but not species credits.
- Major Mitchell’s Cockatoo - targeted surveys did not record this species in the study area. This species does however require offsets. It generates ecosystem credits but not species credits.
- Yellow-bellied Sheath-tail-bat - this species was not targeted for surveys in the study area. This species does however require offsets. It generates ecosystem credits but not species credits.

None of these species that are predicted to occur were recorded during targeted surveys, however habitat occurs and they have all been previously recorded in similar habitats in the local area.

Offsetting requirements would include offsetting for fauna habitat by requiring specific vegetation types that provide habitat to these species to be offset. For the current assessment, this includes offsetting impacts on the following vegetation types:

- Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions
- Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Penneplain Bioregion

6.4 IMPACTS REQUIRING FURTHER CONSIDERATION

6.4.1 Impacts on landscape features

Impacts reducing width of riparian buffer of important rivers, streams and estuaries

Further consideration is required where the project would impact on areas of native vegetation within:

- a) 20 m either side of a 4th and 5th order stream;
- b) 50 m either side of a 6th order stream;
- c) 50 m around an estuarine area.

No 4th, 5th or 6th order streams, or estuarine areas will be impacted by the proposal.

Impacts on important wetlands

Further consideration is required where the proposal would impact on an important wetland and/or its buffer distance of 50 m. Important wetlands are those identified as SEPP 14 Coastal wetlands or those listed in the Directory of Important Wetlands of Australia (DIWA). There are no important wetlands listed for the study area. The project would not impact on any important wetlands, nor on the buffer area of any important wetland, therefore, further consideration is not required.

Impacts on species movements along corridors

No state significant biodiversity links as defined by the FBA occur within the study area, therefore the proposal does not trigger the requirement for further consideration to impacts on species movement along corridors.

6.4.2 Impacts on native vegetation

No Critically Endangered Ecological Communities (CEECs) would be impacted by the project and no EECs were nominated in the SEARs as likely to become extinct or have their viability significantly reduced in the IBRA subregion if impacted by the project.

6.4.3 Impacts on threatened species

Further consideration is required where the project would impact:

- a) Any critically endangered species;
- b) A threatened species or population that is specifically nominated in the SEARS as a species or population that is likely to become extinct or have its viability significantly reduced in the IBRA subregion if it is impacted on by the development; or
- c) a threatened species that has not previously been recorded in the IBRA subregion according to records in the NSW Wildlife Atlas.

The SEARs did not identify any threatened species or populations as likely to become extinct or have their viability significantly reduced in the IBRA subregion if impacted on by the proposal and no threatened species were detected that had not previously been recorded in the IBRA subregion according to records in the NSW Wildlife Atlas. Therefore, further consideration to impacts on threatened species is not required.

6.4.4 Impacts on critical habitat

The study area does not contain any areas that have been declared as critical habitat under either the TSC Act or EPBC Act.

6.5 ECOSYSTEMS AND SPECIES CREDITS

The following credit requirements have been generated for the development footprint (BCC Major Project 205/2015/2370MP Version 1):

- Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions
- Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion

BCC full credit report is provided in Appendix C.

Ecosystem credits

Table 6-3 Credit requirements

Biometric veg code / PC type code	Plant community type name	Management zone area (ha)	Loss in Landscape Value	Loss in site value score	EEC Offset Multiplier	Credits required for Threatened species	Threatened Species with highest credit requirements	TS offset multiplier	Ecosystem credits required
PCT #76	Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions	0.16	30.73	51.91	3.0	4	Yellow-bellied Sheathtail-bat	2.2	5
PCT #82	Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Penepine Bioregion	0.21	70.31	56.25	3.0	6	Yellow-bellied Sheathtail-bat	2.2	8

Species credits

No species credits are required. Where the Pine Donkey Orchid is recorded on-site species credits would be generated through BCC. These would require offsetting.

It is noted that while Yellow-bellied Sheathtail-bat is driving the credit requirement for the two EECs requiring offsets, this species was not identified onsite. It has been assumed by the BCC to occur, based on the landscape values and the vegetation zones entered in the assessment. This assumption affects the total number of ecosystem credits required but is not related to the assessment of threatened species habitat that would be affected by the proposal or to threatened species credit requirements for the project.

7 BIODIVERSITY CREDIT REPORT

The credit report produced by the BCC is provided overleaf. Credit requirements for the project include:

- Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions EEC) (5 credits required)
- Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion (Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions EEC) (8 credits required)

Limitations that should be understood when interpreting these credit results include:

- Assessment methodology – a ‘site based impact development’ best addresses this type of pattern of clearing and follows Appendix 4 of the FBA.
- Surveys have been used to identify which species would be impacted by the development and offset. However, surveys provide a snap shot and not a definitive answer to the question of whether a species may occur at some time and be impacted. It is accepted that the species determined unlikely to be impacted may at some time use the site. However, the site is not considered important habitat for these species and no areas of impact have been entered for them. This is justified in Section 4.2.1 – 4.2.3.

It should be noted that offsets are only required in relation to the proposed overhead powerline between the solar array and the substation. Where an option for boring underground, or an alternative overhead route is identified that avoids removal of EECs, then offsetting would not be required.

BioBanking Credit Calculator

Ecosystem credits



Proposal ID : 205/2015/2370MP
 Proposal name : Parkes Solar Farm
 Assessor name : Matthew Hingee
 Assessor accreditation number : 205
 Tool version : v4.0
 Report created : 01/03/2016 15:27

Assessment circle name	Landsc ape score	Vegetation zone name	Vegetation type name	Condition	Red flag status	Management zone name	Management zone area	Current site value	Future site value	Loss in site value	Credit required for biodiversity	Credit required for TS	TS with highest credit requirement	Average species loss	Species T/G Value	Final credit requirement for management zone
1	12.00	CW145_Moderate/Good	Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions	Moderate/Good	No	MZ1	0.21	30.73	0.00	30.73	5	4	Yellow-bellied Shearwater	44.44	2.20	5
1	12.00	CW144_Moderate/Good	Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Penneplain Bioregion	Moderate/Good	Yes	MZ1	0.14	70.31	0.00	70.31	8	6	Yellow-bellied Shearwater	50.00	2.20	8

8 OTHER OFFSET CONSIDERATIONS

8.1 EPBC OFFSETS

One EEC listed on the *Environment Protection Biodiversity Conservation* (EPBC Act) occurs within the study area. Impact assessments were undertaken for these threatened entities and concluded very low likelihood of significant impact (Appendix C). As a result, no EPBC referral is being undertaken and no Commonwealth offsets are proposed for this project. The characterisations of significance are included in the section below.

The Matters of National Environmental Significance are:

- Listed threatened species and ecological communities including;
 - Inland Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia (EEC)
 - Koala (*Phascolarctos cinereus*) (V)
 - Superb Parrot (*Polytelis swainsonii*) (V)
 - Spear-grass (*Austrostipa wakoolica*) (E)

Conclusions of the Assessments of Significance

Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia

It is likely that the proposal will have a minimal effect on the extent and composition of this community within the study area. However, considering the proportionally small area to be impacted by the proposal (approximately 0.37 hectares) compared to the remaining extent of this community within the study area, the proposed works are not considered likely to have a significant impact on this community, such that it needs to be referred further.

Koala (*Phascolarctos cinereus*)

The proposed vegetation removal (approximately 0.37 hectares of potential habitat plus eight isolated trees) within the study area is unlikely to significantly impact the Koala. There is no recent evidence that any Koalas are utilising the study area, and it is more likely to be inhabiting more contiguous habitat in larger patches, such as in Goobang National Park to the east. Safeguards and mitigations measures would be recommended.

Superb Parrot (*Polytelis swainsonii*)

The Assessment of Significance has concluded that the proposal is unlikely to significantly affect the Superb Parrot, given that there is suitable or higher quality habitat available within the surrounding landscape. The removal of only a minimal amount of box-dominated woodland in the study area (approximately 0.37 hectares) means that the movement corridor provided by the existing road corridors is likely to remain traversable by the species. Therefore the proposed works are unlikely to impact the movement patterns of the species. Safeguards and mitigations measures would be recommended.

Spear-grass (*Austrostipa wakoolica*)

This species is usually found on floodplains of Murray River tributaries and is associated with woodland tree species such as Western Grey Box, Bimbil Box and White Cypress Pine. This species has been previously

recorded approximately one kilometre to the northwest of the study area, however these recordings were approximately 25 years ago. Although targeted, this species was not recorded during the current surveys.

While the study area may contain some suitable habitat for this species and individuals have been recorded one kilometre northwest of the study area, considering the extensive survey effort and minimal proposed clearing of woodland due to the proposal, it is unlikely that Spear-grass (*A. wakoolica*) would be impacted by the proposal.

9 REFERENCES

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APPENDIX A CREDIT PROFILE

As of 08/01/2016.

Proposal ID for the assessment: 205/2015/2370MP

Assessment type: 'Major Proposal'.

Summary of ecosystem credits required

Plant Community type	Area (ha)	Credits created
Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Penneplain Bioregion	0.14	7.80
Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions	0.21	5.47
Total	0.35	13

1. Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Penneplain Bioregion, (CW144)

Number of ecosystem credits created

8

IBRA sub-region

Lower Slopes - Central West

Offset options - Plant Community types	Offset options - IBRA sub-regions
Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Penneplain Bioregion, (CW144) Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions, (CW145) Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW, (CW152) Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW, (CW167) Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt), (CW172) Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion, (CW317)	Lower Slopes - Central West and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

No species credits required.

APPENDIX B SEARS

The proposal is considered State Significant Infrastructure and requires assessment under Part 5.1 of the EP&A Act. Biodiversity factors are to be assessed in an EIS, as per the Secretary Environmental Assessment Requirements (SEARs) for environmental impact assessment. A Final SEARs was provided by the Department of Planning and Environment on 18 March 2015.

Secretary's Environmental Assessment Requirements
Section 78A (8A) of the *Environmental Planning and Assessment Act 1979*
Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*

Application Number	SSD 6784
Development	Parkes Solar Farm The construction and operation of a 30MVA solar photovoltaic (PV) plant and associated infrastructure.
Location	Located within the Parkes Shire Council area, approximately 10 km north west of Parkes. The development site is located at Lot 4, DP 854193.
Applicant	Neoen Australia Pty Ltd
Date of Issue	9 December 2014
General Requirements	The Environmental Impact Statement (EIS) must be prepared in accordance with, and meet the minimum requirements of, Part 3 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (the EP&A Regulation) and include the following: - The information required under clause 6: - the description of the development for the solar farm should include: → construction, operation and decommissioning details; → a site plan at an adequate scale with dimensions, showing the development's location, orientation, site coverage, access roads and entrances to public roads; → the location and dimensions of all development components including the solar PV module array, transformer stations and switchgears, control system, underground and above ground cabling, and transmission line linking the solar farm to the substation, fencing and landscaping around the solar-farm, on-site office, operations and maintenance buildings, temporary construction infrastructure and compounds, and access roads/road upgrades (including access tracks); → a timeline identifying the development's proposed construction and operation components, their envisaged lifespan and arrangements for decommissioning and staging; → supporting maps/plans clearly identifying existing environmental features (e.g. watercourses, vegetation), infrastructure and land use (including nearby residences and approved residential developments or subdivisions) and the location/siting of the development (including associated infrastructure) in the context of this existing environment; and → resourcing requirements (including, but not limited to, water supply and gravel). - the content listed in clause 7, including, but not limited to: - a summary of the EIS; - a statement of the objectives of the development, including a description of the strategic need, justification, objectives and outcomes. This should include: → a strategic assessment of the need, scale, scope and location of the development in relation to predicted electricity demand, predicted transmission constraints and the strategic direction of the region and the State in relation to electricity supply, demand and electricity generation technologies, and its role within the Commonwealth's Renewable Energy Target Scheme; and → a clear demonstration of quantified and substantiated

	greenhouse gas benefits, taking into consideration sources of electricity that could realistically be replaced and the extent of their replacement; • an analysis of feasible alternatives to the carrying out of the development, having regard to its objectives, including an assessment of the environmental costs and benefits of the development relative to alternatives and the consequences of not carrying out the development, the suitability of the chosen option and whether or not the development is in the public interest. This should include: → an analysis of the suitability of the development with respect to potential land use conflicts with existing and future surrounding land uses (including rural residential development, land of significant scenic or visual value, land of high agricultural value, mineral reserves including existing mineral exploration operations within the proximity of the subject area, forestry and conservation areas), taking into account local and strategic land use objectives including the potential loss of agricultural land the impact on the local community; and → describe the alternatives considered (location and/or design) for all development components, and provide justification for the preferred development demonstrating its benefits including community benefits (for example community enhancement programmes) on a local and strategic scale and how it achieves states objectives. • an analysis of the development, including an assessment, with a particular focus on the requirements of the listed key issues, in accordance with clause 7(1)(d) of the EP&A Regulation (where relevant); • an identification of how relevant planning, land use and development matters (including strategic and statutory matters) have been considered in the impact assessment (direct, indirect and cumulative impacts) and/or developing management/mitigation measures, including section 79C of the EP&A Act, applicable State Planning Policies (SEPP), Local Environmental Plans, the nature and extent of any prohibitions that apply to the development and demonstration that the site is suitable for the proposed use in accordance with SEPP 55; • a compilation of the measures proposed to mitigate any adverse effects of the development on the environment; • a justification for the development taking into consideration the objects of the EP&A Act; and • detail how the principles of ecologically sustainable development will be incorporated in the design, construction and ongoing operation phases of the development.
Key Issues	The EIS must address the following specific matters: • Flora and Fauna – the EIS must: → include an assessment of the impacts of all development components on flora and fauna (both terrestrial and aquatic, as relevant) and their habitat; → The assessment must take into account: ○ the <i>Threatened Species Assessment Guidelines</i> (DECC, 2007); ○ the <i>Threatened Species Biodiversity Survey and Assessment: Guidelines for Developments and Activities</i> (DEC, 2004); and ○ <i>Central West Local Land Services Transitional Catchment Action Plan</i> including details on the existing site conditions and likelihood of disturbance (including quantifying the worst case extent of the impact on the basis of vegetation type and total

	native vegetation disturbed); and ○ The <i>Framework for Biodiversity Assessment</i>. → specifically consider impacts on threatened species and ecological communities listed under both State and Commonwealth legislation that have the potential to occur on the site and surrounding land, impacts on riparian and/ or instream habitat in the case of disturbance of waterways, and on biodiversity corridors; → include details of how flora and fauna impacts would be managed during construction and operation including adaptive management and maintenance protocols (including the mitigation and/or management of weeds); and → any steps taken to mitigate or offset any identified impacts to the environment should also be detailed in the EIS. Current OEH offsets policy should be used in assessing and determining the adequacy of any offsets. Note that a <i>NSW Biodiversity Offsets Policy for Major Projects</i> is now being implemented. • Visual Impacts - the EIS must: → provide an assessment of the landscape character and values and any scenic or significant vistas of the area potentially affected by the development. This should describe community and stakeholder values of the local and regional visual amenity and quality, and perceptions of the development based on surveys and consultation; → include a full assessment of the visual impacts associated with the solar farm, including identification and documentation of all key viewing points and corridors particularly from identified sensitive lands. This should also include the associated transmission line. Alternative pole designs should be presented and assessed and the potential for undergrounding in sensitive locations should also be assessed; → provide an assessment of the potential for reflectivity from the panels and associated infrastructure, and any safety impacts for motorists or aircraft; → include photomontages of the development taken from potentially affected residences (including approved but not yet developed dwellings or subdivisions with residential rights), settlements and significant public view points, and provide a clear description of proposed visual amenity mitigation and management measures for the solar farm; and → provide an assessment of the feasibility, effectiveness and reliability of proposed mitigation measures and any residual impacts after these measures have been implemented. • Noise Impacts - the EIS must: → include a noise assessment of all phases and components of the development including, but not limited to construction noise (focusing on high noise-generating activities and any works proposed outside of standard construction hours, traffic noise, and vibration generating activities). The assessment must identify noise/vibration sensitive locations (including approved but not yet developed dwellings), baseline conditions based on monitoring results, the levels and character of noise (eg. tonality, impulsiveness etc.) generated by noise sources, noise/vibration criteria, modelling assumptions and worst case and representative noise/vibration impacts; → include monitoring to ensure that there is adequate background noise data that is representative for all sensitive receptors;
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- provide justification for the nominated average background noise level used in the assessment process, considering any significant difference between daytime and night time background noise levels if there are noise generating activities at night; and
- clearly outline the noise mitigation, monitoring and management measures that would be applied to the development. This must include an assessment of the feasibility, effectiveness and reliability of proposed measures and any residual impacts after these measures have been incorporated.

The assessment must take into account the following guidelines (as relevant):

- Site Establishment and Construction – *Interim Construction Noise Guidelines* (DECC, 2009);
 - Traffic Noise – *NSW Road Noise Policy* (DECCW, 2011);
 - Vibration – *Assessing Vibration: A Technical Guideline* (DECC, 2006); and
 - Operation – *NSW Industrial Noise Guideline* (EPA, 2000).
- **Heritage** – the EIS must include an assessment of impacts on Aboriginal heritage. The EIS must demonstrate the likely impacts of the development to Aboriginal heritage (including cultural and archaeological significance). Where impacts are identified the assessment shall:
 - outline the proposed mitigation and management measures (including measures to avoid significant impacts and an evaluation of the effectiveness of the measures) generally consistent with the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (Department of Environment and Conservation, 2005) and *Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW* (DECCW, 2011);
 - be undertaken by a suitably qualified heritage consultant(s);
 - demonstrate effective consultation with Aboriginal communities in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW) in determining and assessing impacts and developing and selecting options and mitigation measures (including the final proposed measures); and
 - demonstrate that an appropriate archaeological assessment methodology, including research design (where relevant) has been undertaken, to guide physical archaeological test excavations of areas of potential archaeological deposits. The full spatial extent and significance of any archaeological evidence shall be established and results of excavations included.
 - **Traffic and Transport** – the EIS must assess the construction and operational traffic impacts of the development including:
 - details of the nature of traffic generated, transport routes, traffic volumes and potential impacts on local and regional roads (including impacts on the structural integrity of the road network), bridges and intersections, including any proposed road upgrades and repairs;
 - details of measures to mitigate and/or manage the potential impacts, including measures to control soil erosion and dust generated by traffic volumes and measures to ensure efficiency and safety on the public road network; and
 - details of site access roads including how these would connect to the existing road network and any operational maintenance or handover requirements.

	This must be prepared in accordance with the methodology set out in Section 2 of the RTA's <i>Guide to Traffic Generating Development's 2002</i>. • Hazard/Risks– the EIS must include an assessment of potential hazards and risks associated with electric and magnetic fields (EMFs) (with reference to Australian Radiation Protection and Nuclear Safety Agency standards) and bushfires. The EIS should demonstrate the application of the Principles of Prudent Avoidance in relation to EMFs. The EIS must also detail measures to contain any hazardous substances to prevent the contamination of pasture and dams. • Water Quality, Waterways and Flooding – The EIS must include: → an assessment of the likely impacts to the waterways and measures to minimise impacts including details of the design of waterway crossings; → an assessment of soil erosion issues and the potential for clearing to create salinity risks; → details of water supply demands and an assessment of whether an adequate and secure water supply is available for the project, including statutory (licensing) context of the water supply sources, and assess potential environmental impacts associated with the use of identified sources including impacts on surface and groundwater sources and implications for existing licensed users; → an assessment of any proposed modification to surface water management including modelling of redistribution of waters and an assessment of the impact on neighbouring properties and the associated watercourse and floodplain; → an assessment of the potential for groundwater to be intercepted; → an assessment demonstrating consistency with the relevant Water Sharing Plan(s); and → an appropriate assessment of potential flooding impacts, undertaken generally in accordance with the principles, processes and guidelines as outlined in the NSW Government <i>Floodplain Development Manual 2005</i>. The study shall consider a full range of potential flood events up to and including the Probable Maximum Flood (PMF) and any local floodplain risk management planning processes.
Environmental Risk Analysis	General Environmental Risk Analysis – notwithstanding the key assessment requirements, the EIS must include an environmental risk analysis to identify potential environmental impacts associated with the development, proposed mitigation measures and potentially significant residual environmental impacts after the application of proposed mitigation measures. Where additional key environmental impacts are identified through this environmental risk analysis, an appropriately detailed impact assessment of the additional key environmental impact(s) must be included in the EIS.
Consultation	The Proponent must undertake a consultation program as part of the environmental assessment process, including consultation with, but not necessarily limited to, the following parties: • Parkes Shire Council; • Central West Local Land Services; • Office of Environment and Heritage and Environment Protection Authority; • Department of Primary Industries (NSW Office of Water); • NSW Trade and Investment (Crown Lands Division and NSW Mineral Resources);

	• NSW Roads and Maritime Service; • NSW Rural Fire Service; • TransGrid; • Local Aboriginal Land Council; • Relevant mineral stakeholders (including exploration and mining title holders); and the local community and landowners The consultation process shall include measures for disseminating information to increase awareness of the development as well as methods for actively engaging stakeholders on issues that would be of interest/concern to them. The EIS must: → Demonstrate effective consultation with stakeholders, and that the level of consultation with each stakeholder is commensurate with their degree of interest/concern or likely impact; → Clearly describe the consultation process undertaken for each stakeholder/group including details of the dates of consultation and copies of any information disseminated as part of the consultation process (subject to confidentiality); and → Describe the issues raised during consultation and how and where these have been addressed in the EIS.
Further consultation after 2 years	If you do not lodge an EIS for the development within 2 years of the issue date of these SEARs, you must consult with the Secretary in relation to the requirements for lodgement.

APPENDIX C EPBC ASSESSMENTS OF SIGNIFICANCE

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) protects the environment, particularly Matters of National Environmental Significance (Protected matters). It streamlines the national environmental assessment and approvals process, protects Australian biodiversity and integrates management of important natural and cultural places. The Matters of National Environmental Significance are:

- Listed threatened species and ecological communities including;
 - Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia (EEC)
 - Koala (*Phascolarctos cinereus*) (V)
 - Superb Parrot (*Polytelis swainsonii*) (V)
 - Spear-grass (*Austrostipa wakoolica*) (E)
- Migratory species protected under international agreements including;
- Ramsar wetlands of international importance;
- The Commonwealth marine environment;
- World Heritage properties;
- National Heritage places; and
- Nuclear actions.

An action will require approval if the action has, will have, or is likely to have a significant impact on a species listed in any of the following categories:

- Extinct in the wild;
- Critically endangered;
- Endangered; or
- Vulnerable.

An action will also require approval if the action has, will have, or is likely to have a significant impact on an ecological community listed in any of the following categories:

1. Critically endangered: or
2. Endangered.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

a) Lead to a long-term decrease in the size of an important population of a species

Koala (*Phascolarctos cinereus*)

An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are key source populations either for breeding or dispersal, populations that are necessary for maintaining genetic diversity, and/or populations that are near the limit of the species range. No Koalas were recorded during the field survey and the Koala has not been previously recorded within ten kilometres of the study area. The proposal site does not contain an important population of the Koala.

Superb Parrot (*Polytelis swainsonii*)

An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are key source populations either for breeding or dispersal, populations that are necessary for maintaining genetic diversity, and/or populations that are near the limit of the species range. No Superb Parrots were recorded within the study area and no important breeding sites are known within the study area (OEH 2008b). The proposal site does not contain an important population of the Superb Parrot, i.e. the population is not likely to be a key source population, not necessary for maintaining genetic diversity, and not at the limit of the species range.

b) Reduce the area of occupancy of an important population

Koala (*Phascolarctos cinereus*)

The proposal site does not contain an 'important population' of the Koala.

Superb Parrot (*Polytelis swainsonii*)

The proposal site does not contain an 'important population' of the Superb Parrot.

c) Fragment an existing important population into two or more populations

Koala (*Phascolarctos cinereus*)

The proposal site does not contain an 'important population' of the Koala.

Superb Parrot (*Polytelis swainsonii*)

The proposal site does not contain an 'important population' of the Superb Parrot.

d) Adversely affect habitat critical to the survival of a species

Koala (*Phascolarctos cinereus*)

Habitat critical to the survival of this species includes areas of forest or woodland where:

- Primary koala food tree species comprise at least 30 per cent of the overstorey trees.
- Primary koala food tree species comprise less than 30 per cent of the overstorey trees, but together with secondary food tree species comprise at least 50 per cent of the overstorey trees.
- Primary food tree species are absent but secondary food tree species alone comprise at least 50 per cent of the overstorey trees.
- the above qualities may be absent in a forest or woodland but other essential habitat features are present and adjacent to areas exhibiting the above qualities (e.g. koalas in the Pilliga are known to escape the heat of the day by taking refuge in white cypress pines, which are not food trees), or
- Relatively high density of Koalas are supported, regardless of the presence of food tree species. Koala population densities vary across their range and regional data should be used to judge relative density.

Habitat critical to the survival of the koala is also considered to be any form of landscape corridor which is essential to the dispersal of koalas between forest or woodland habitats (DSEWPoC (2012)).

Secondary feed tree species comprise over 50% of most areas of native vegetation in the proposal site, making these areas "habitat critical to the survival" of the Koala. Secondary feed tree species include Grey

Box (*E. macrocarpa*), Yellow Box (*E. melliodora*) and Poplar Box (*E. populnea* subsp. *bimbi*). However, there is little evidence that the Koala is currently utilising the site due to it not being recorded and the absence of records from the locality (10 km radius).

Superb Parrot (*Polytelis swainsonii*)

No areas of critical habitat have been identified for this species.

e) Disrupt the breeding cycle of an important population

Koala (*Phascolarctos cinereus*)

The proposal site does not contain an important population of the Koala.

Superb Parrot (*Polytelis swainsonii*)

The proposal site does not contain an important population of the Superb Parrot.

f) Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

Koala (*Phascolarctos cinereus*)

The action proposed is for the removal of approximately 0.37 hectares of potential habitat. This includes approximately 0.37 hectares of feeding woodland habitat and approximately eight isolated trees. The majority of the vegetation is in moderate to good condition (except the eight isolated trees that are in low condition) and contains three species (Inland Grey Box, Poplar Box and Yellow Box) that are recognised as secondary feed trees for the Koala (DECC 2008). No Koalas were recorded during the field survey, and none are considered likely to occur, however one record for this species has been previously recorded approximately 12 kilometres southeast of the study area. Potential habitat does exist for this species within the study area. Considering the lack of any evidence of this species in the study area, and the scarcity of previous recordings, the proposal is unlikely to remove habitat to the extent that the Koala is likely to decline.

Superb Parrot (*Polytelis swainsonii*)

The Superb Parrot was not recorded within the proposal site, however this species has been previously recorded approximately 30 times previously within 10 kilometres (AoLA 2016). Approximately 0.55 hectares potential foraging habitat including approximately ten potentially suitable hollow-bearing trees for the Superb Parrot were recorded within the study area. According to the Superb Parrot Recovery Plan (DECC 2008b) the study area is not located within known breeding habitat, however there is potential for the species to be utilising the region for breeding purposes. During Superb Parrot dispersal or pseudo-migration periods, Superb Parrots are likely to utilise the vegetation within the study area as movement corridors and feeding areas. It is presumed that this is a regular occurrence, because the Superb Parrot shows an aversion to crossing extensive open areas, and usually moves along wooded corridors (Webster & Ahern 1992). Despite this, the proposal is unlikely to decrease the habitat corridor to the point that the species is likely to decline, as the retained vegetation will still be traversable by the species.

g) Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat

Koala (*Phascolarctos cinereus*)

The degradation of remnant habitat as a result of weed invasion, tree dieback and changes in species composition is a threat to Koalas. For example, dense thickets of invasive shrubs reduce the ability of Koalas to move freely between trees. These species were not recorded within the study area.

Superb Parrot (*Polytelis swainsonii*)

The proposed works have potential to facilitate the spread of weeds which would impact on habitat quality. However weed control measures would be put in place during construction and ongoing management to ensure that the risk of weed spread is minimised. The presence of Noisy Miners may increase within the road reserve as a result of the proposal, however this species is already widely established within the region and is already present within the available habitat.

h) Introduce disease that may cause the species to decline

Koala (*Phascolarctos cinereus*)

The pathogen *Chlamydia* spp. is considered to be a threat to Koala populations. Chlamydiosis weakens koalas, making them more vulnerable to death from other causes, in particular dog attack and severe weather conditions (DECC 2008). The proposed works would not introduce *Chlamydia* to the study area.

Superb Parrot (*Polytelis swainsonii*)

The wild population of the Superb Parrot may be subject to disease. Beak and Feather Disease is an infectious affliction suffered by parrots, caused by the Beak and Feather Disease circovirus. This common disease apparently originated in Australia (DoEH, 2004). It is capable of causing very high death rates in nestlings, and the potential effects of the disease on parrot populations vary from inconsequential to devastating, depending on environmental conditions, and the general health and immunity of the parrots. Lesions suggesting Beak and Feather Disease virus have been identified in Superb Parrots. It can be introduced to threatened populations of parrots via the movements of common species carrying the disease (DEH 2005q). The proposed works are unlikely to introduce this disease.

i) Interfere substantially with the recovery of the species

Koala (*Phascolarctos cinereus*)

There is a Recovery Plan for the Koala (DECC 2008). Two of the seven objectives of the recovery plan are relevant to this proposal which include:

- To conserve koalas in their existing habitat.
- To rehabilitate and restore koala habitat and populations.

Field surveys did not detect the Koala. Considering that the species has only been detected once approximately 12 kilometres southwest of the proposal site, it is unlikely that the proposal would interfere with these two objectives.

Superb Parrot (*Polytelis swainsonii*)

There is a National Recovery Plan for the Superb Parrot (DECC 2008b). Two of the four objectives of the recovery plan are relevant to this proposal which include:

- *Increase the level of knowledge of the Superb Parrot's ecological requirements.* This includes identifying and mapping areas used for foraging during the non-breeding season, and identifying flight corridors used in the non-breeding season.

The proposal would not interfere with this objective, as this species was not identified during surveys.

- *Develop and implement threat abatement strategies.* This includes developing and implementing a Superb Parrot 'Habitat Retention and Enhancement' policy which uses all administrative avenues (e.g. native vegetation retention Acts), to protect box-gum woodland from clearing and degradation within the range of the Superb Parrot. Also, identify and revegetate critical breaks in flight corridors.

The proposal is not consistent with this objective, as box-gum woodland would be removed as a result of the proposed works. However, it is unlikely that the removal of a small amount of native vegetation for the proposal would fragment a flight corridor that is used by the species during its annual dispersal to and/or from breeding grounds.

Conclusion (Koala)

The proposed vegetation removal (approximately 0.37 hectares of potential habitat plus eight isolated trees) within the study area is unlikely to significantly impact the Koala. There is no recent evidence that any Koalas are utilising the study area, and it is more likely to be inhabiting more contiguous habitat in larger patches, such as in Goobang National Park to the east. Safeguards and mitigations measures would be recommended.

Conclusion (Superb Parrot)

The Assessment of Significance has concluded that the proposal is unlikely to significantly affect the Superb Parrot, given that there is suitable or higher quality habitat available within the surrounding landscape. The removal of only a minimal amount of box-dominated woodland in the study area (approximately 0.37 hectares) means that the movement corridor provided by the existing road corridors is likely to remain traversable by the species. Therefore the proposed works are unlikely to impact the movement patterns of the species. Safeguards and mitigations measures would be recommended.

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

a) Reduce the extent of an ecological community

Inland Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia

The proposal would remove approximately 0.37 hectares of Inland Grey Box Woodland. This represents a minimal amount of this community occurring within the study area and the local area of which the EEC is likely to extend along the Henry Parkes Way road corridor. The clearing of this EEC would take part within the proposed above ground transmission line,

b) Fragment or increase fragmentation of an ecological community

Inland Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia

The 0.37 hectares of Inland Grey Box Woodland proposed for clearing within the study area is largely connected through road corridors along Pat Meredith Drive and Henry Parkes Way. The proposed clearing is unlikely to increase fragmentation of this community within the study area as the areas proposed to be cleared are either on the edge of a remnant patch or of an insignificant width such that it would not cause further significant fragmentation (for example along Pat Meredith Drive) (Figure 3-5).

c) Adversely affect habitat critical to the survival of an ecological community

Inland Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia

Approximately 0.37 hectares of moderate to good condition Inland Grey Box Woodland would be cleared as a result of the proposal. Most of this vegetation consists of mature trees with an understorey of shrubs and groundcover species, and occurs in the existing road reserves of Pat Meredith Drive and Henry Parkes Way. This represents only a minimal amount of the community occurring within the study area and locality. Therefore, although some vegetation will be lost, this loss of habitat will not be critical to the survival of this community within the locality. With an offset strategy in place, that has an objective of enhancing remnant patches, and their connectivity within the road corridors and locality through revegetation, regeneration and management, losses of this EEC due to the proposal will largely be mitigated.

d) Modify or destroy abiotic (non-living) factors (such as water, nutrients or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns

Inland Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia

The proposal would modify the abiotic factors necessary for the survival of the patches of this community where direct habitat removal occurs, and where direct modification to drainage features occurs within the proposal site. However, these impacts are unlikely to affect the survival of the ecological community in the local area.

e) Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting

Inland Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia

The proposal would cause a change in the species composition of this community occurring within the proposed clearing areas in the study area through the clearing of the vegetation within it. The composition of the community in these areas would be substantially and adversely modified, however, this is considered negligible as 0.37 ha of this vegetation community would be impacted.

f) a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:

- Assisting invasive species, that are harmful to the listed ecological community, to become established, or
- Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which will kill or inhibit the growth of species in the ecological community, or
- Interfere with the recovery of an ecological community

Inland Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia

The removal of approximately 0.37 ha of this ecological community from the study area would only slightly modify the patch in which it occurs. It is likely that the proposal will assist invasive species to become established further in the community as a result of the construction and operation of the solar farm and transmission line. However, the community is already surrounded by invasive species in the landscape. With the implementation of safeguards and management protocols, the proposal is unlikely to cause the regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community. Although the patch of Inland Grey Box Woodland is already disturbed due to historical factors, any recovery of the ecological community in the patch proposed for removal will be prevented in perpetuity. With an offset strategy in place that has an objective of enhancing remnant patches, and their connectivity within the road corridors and locality through revegetation, regeneration and management, losses of this EEC due to the proposal will largely be mitigated.

Conclusion

It is likely that the proposal will have a minimal effect on the extent and composition of this community within the study area. However, considering the proportionally small area to be impacted by the proposal compared to the remaining extent of this community within the study area, the proposed works are not considered likely to have a significant impact on this community, such that it needs to be referred further.

An action is likely to have a significant impact on an endangered species if there is a real chance or possibility that it will:

a) Lead to a long-term decrease in the size of a population

Spear-grass (*Austrostipa wakoolica*)

A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. No plants of this species were recorded within the study area. The proposal site is very unlikely to contain an important population nor is it likely to be a key source population, necessary for maintaining genetic diversity, nor is at the limit of the species range.

b) Reduce the area of occupancy of the species

Spear-grass (*Austrostipa wakoolica*)

This species which is usually found on floodplains of Murray River tributaries was not observed on site during the site assessment. As such the proposed action would be very unlikely to reduce the area of occupancy of this species

c) Fragment an existing important population into two or more populations

Spear-grass (*Austrostipa wakoolica*)

The proposal site does not contain an 'important population' of this species, and works proposed would not fragment a population.

d) Adversely affect habitat critical to the survival of a species

Spear-grass (*Austrostipa wakoolica*)

No areas of critical habitat have been identified for this species.

e) Disrupt the breeding cycle of a population

Spear-grass (*Austrostipa wakoolica*)

The proposal site does not contain a population of this species.

f) Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

Spear-grass (*Austrostipa wakoolica*)

While the proposed action would result in the removal of approximately 0.37 hectares of woodland, the absence of this species, and the nature of works proposed (ie. a linear development of a power line), provides that it is unlikely that the action would modify, destroy, remove or isolate or decrease the availability or quality of habitat of this species to the extent that the species is likely to decline.

g) Result in invasive species that are harmful to a critically or endangered species becoming established in the endangered or critically endangered species' habitat

Spear-grass (*Austrostipa wakoolica*)

Weed invasion and competition, particularly from exotic grasses is a threat to this species (www.environment.gov.au/biodiversity/threatened/species/pubs/66623-conservation-advice.pdf). However weed control measures would be put in place during construction and ongoing management to ensure that the risk of weed spread is minimised.

h) Introduce disease that may cause the species to decline

Spear-grass (*Austrostipa wakoolica*)

No diseases are identified as having potential to cause the species to decline (www.environment.gov.au/biodiversity/threatened/species/pubs/66623-conservation-advice.pdf).

i) Interfere with the recovery of the species

Spear-grass (*Austrostipa wakoolica*)

A National Recovery Plan has not been developed for this species.

Conclusion

The proposed vegetation removal (approximately 0.37 hectares of woodland) within the study area is unlikely to significantly impact the *Austrostipa wakoolica*. Further there is no recent evidence that this species occurs within the study area.
