Appendix C

Biodiversity assessment report

Hillston Sun Farm

Overland Sun Farming

Hillston Sun Farm, NSW
Biodiversity Assessment Report

Prepared for Overland Sun Farming Pty Ltd

18 April 2017

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Biosis staff involved in this project were:

- Lauren Harley & James Shepherd (Mapping)
- Luke Stone & Sarah Allison (Background)

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Glossary

Assessment circles	Two circles (the inner and outer assessment circle) in which the percent native vegetation cover in the landscape is assessed, taking into account both cover and condition of vegetation (OEH 2014).
BA	Birds Australia
DEE	Commonwealth Department of the Environment and Energy
DCDB	Land and Property Information(LPI) digital cadastral database
DPE	NSW Department of Planning and Environment
DPI	Department of Primary Industries
DTDB	Digital topographic databases
Ecosystem credit species	A measurement of the value of EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur with a PCT. Ecosystem credits measure the loss in biodiversity values at a development.
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
FBA	NSW Framework for Biodiversity Assessment
HSF	Hillston Sun Farm
HBT	Hollow Bearing Tree
LEP	Local Environment Plan
Locality	Area located within 10 kilometres radius from the study area
LPI	NSW Land and Property Information
Matters for further consideration	Impacts that are considered to be complicated or severe that will require further consideration by the consent authority (OEH 2014). The assessment is based on thresholds detailed in Section 9 of the FBA. These can also be included as part of the project SEARs.
Matters of NES	Matters of National Environmental Significance protected by a provision of Part 3 of the EPBC Act
NV Act	NSW *Native Vegetation Act 2003*
NW Act	NSW *Noxious Weed Act 1993*
OEH	NSW Office of Environment and Heritage
PCT	Plant Community Type
PV	Photovoltaic panels
RoTAP	Rare or Threatened Australian Plant

SEARs	Secretary's Environmental Assessment Requirements
SEPP 44	NSW State Environmental Planning Policy No. 44 – Koala Habitat Protection
SIS	Species Impact Statement
SSD	State Significant Development
Assessment area	The broader area in which the development site is located, including all direct and indirect impacts (referred to as the site boundary in the Environmental Impact Statement report)
Development site	The area of direct impact for the proposed works including the development site and ancillary infrastructure (referred to as the development footprint in the Environmental Impact Statement report). The development site sits within a 'broader assessment area'.
Tg value	The ability of a species to respond to improvement in site value or other habitat improvement at an offset site with management actions.
TSC Act	NSW *Threatened Species Conservation Act 1995*
VIS	NSW Vegetation Information System
WM Act	Water Management Act 2000

Summary

Biosis Pty Ltd was commissioned by Overland Sun Farming Pty Ltd (Overland) to prepare a Biodiversity Assessment Report for the Hillston Sun Farm, a large-scale solar photovoltaic (PV) generation facility and associated infrastructure in central-western NSW. Overland proposes to develop the project on a site within the Carrathool local government area (LGA), approximately 3.5 kilometres south of the township of Hillston (Figure 1). The proposed solar farm development will involve the installation of an array of photovoltaic panels (PV), road access and substation grid connection. The site is predominantly flat agricultural land with remnant vegetation restricted to isolated patches within cropped paddocks, along roadsides or property boundaries or in adjacent road reserves.

The development site (development footprint) is defined as the maximum area to be impacted by the proposal. A broader assessment area has been defined as the development site plus the immediately surrounding land investigated during the field surveys. Both the development site and broader assessment area are shown in Figure 2.

Ecological values

Key ecological values identified within the development site include (Figure 4):

- 0.09 hectares of the PCT 57 *Belah/Black Oak – Western Rosewood – Wilga woodlands of central NSW including the Cobar Peneplain Bioregion* (LA106).
- 1.29 hectares of the PCT 13 *Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)* (LA108).
- 0.5 hectares of the PCT 15 *Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)* (LA110).
- Two scattered paddock trees.

Other ecological values in the broader assessment area include:

- Stands of PCT 70 *White Cypress Pine woodland on sandy loams in central NSW wheatbelt* (LA223), and *PCT 105 Poplar Box grassy woodland on flats mainly in the Cobar Peneplain Bioregion and Murray Darling Depression Bioregion* (LA177).
- Additional stands of PCT 13, 15 and 57 generally present as remnant vegetation around property boundaries, retained woodlots or along depressions.
- Native vegetation in adjacent Kidman Way road and railway reserves, including PCT 26, which represents *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions* endangered ecological community (NSW Scientific Committee 2005), and small patches of *Acacia melvillei* shrubland in the Riverina and Murray-Darling Depression bioregions endangered ecological community (NSW Scientific Committee 2008). The *Acacia melvillei* shrubland is embedded in disturbed stands of PCTs 15 and 57 along the road and rail easements of the Kidman Way.
- Additional scattered paddock trees.

No threatened flora species were identified within the development site despite targeted surveys being undertaken. Major Mitchell's Cockatoo and Grey-crowned Babbler were both observed using remnant native vegetation near the development site and in the broader assessment area.

Impact avoidance, minimisation and mitigation

The final development site for the solar farm infrastructure was refined through consideration of the findings of a preliminary ecological study and identification of constraints and opportunities mapped through the environmental impact assessment process. The intent of this process was to establish the built footprint on the development site while avoiding impacts on identified ecological values (Figure 4). Avoiding areas of Aboriginal cultural heritage sensitivity was also critical in the design process.

Measures to avoid and minimise impacts on native vegetation were considered during the planning stage of the project and designs were 'workshopped' through an iterative mapping process between Overland and the project ecologists and archaeologists from Biosis. This has resulted in impacts being largely avoided and minimised. The final impacts have been restricted to small areas of remnant vegetation where ancillary infrastructure is required. The PV array itself avoids all areas of remnant native vegetation except a small 0.09 hectare isolated patch, and is proposed almost entirely on regularly cultivated and cropped land. A further 1.29 hectares of the PCT 13 Black Box – Lignum woodland wetland and 0.5 hectares of the PCT 15 Black Box open woodland wetland will be impacted by the connection between southern and northern section of the solar farm and grid connection respectively. Furthermore, access to the site will be via established roads and tracks that only require minor upgrades. The substation grid connection to the north will be located next to an existing disturbed transmission easement and only minor native vegetation removal will be require for this. During the preliminary assessment two endangered ecological communities were identified in the Kidman Way road reserve and these areas have been avoided during the infrastructure planning process.

As a result of the design process, the following residual impacts will arise from the solar farm at the development site:

- Removal of 0.09 hectares of the PCT 57 *Belah/Black Oak – Western Rosewood – Wilga woodlands of central NSW including the Cobar Peneplain Bioregion* (LA106). This removal is associated with the PV arrays.
- Removal of 1.29 hectares of the PCT 13 *Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)* (LA108). This removal is associated with a connection between the two PV arrays.
- Removal 0.5 hectares of the PCT 15 *Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)* (LA110). This removal is associated with a connection to the electricity sub-station to the north of the PV arrays.
- Removal of two hollow bearing trees across the development site (paddock trees).

No impacts requiring further consideration were identified. Impacts to the three vegetation communities listed above will require offsetting. The remainder of the development site supports non-native vegetation and disturbed land. No further consideration of these areas is required.

Biodiversity credits

To offset impacts arising from the development, 81 ecosystem credits are required. Table 10 in the body of this report provides a summary of the ecosystems credits resulting from the proposed development.

Credits will be retired in accordance with the Biodiversity Offset Strategy outlined in Section 9. This includes the potential for a first party offset on an adjacent property and purchasing of credits from the open market.

If, after undertaking "reasonable steps" Overland cannot identify like-for-like credits, then the variation rules may be applied or supplementary measures applied.

Conclusion

The proposed Hillston Sun Farm will result in minor impacts to the biodiversity values identified. The iterative design process has considered biodiversity values and sought to avoid and minimise impacts on these to the greatest extent possible.

Residual impacts to biodiversity will be offset in accordance with the Biodiversity Offset Strategy.

Stage 1 – Biodiversity assessment

1 Introduction

1.1 Project background

Overland Sun Farming Company Pty Ltd (Overland) proposes to develop the Hillston Sun Farm (HSF), a large-scale solar photovoltaic (PV) generation facility and associated infrastructure in central-western NSW (Figure 1) (the project). Overland proposes to develop the project on a site within the Carrathool local government area (LGA), approximately 3.5 kilometres south of the township of Hillston.

The project is a State Significant Development (SSD) under the State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP). A development application (DA) for the project is required to be submitted under Part 4, Division 4.1 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The NSW Minister for Planning, or the Minister's delegate, is the consent authority.

An environmental impact statement (EIS) is a requirement of the approval process. This Biodiversity Assessment Report (BAR) forms part of the EIS. It documents the biodiversity assessment methods and results, the initiatives built into the project design to avoid and minimise biodiversity and associated impacts, and the additional mitigation and management measures or offsets proposed to address any residual impacts not able to be avoided.

1.2 Assessment guidelines

Secretary's Environmental Assessment Requirements (SEARs) were issued by the NSW Department of Planning and Environment (DPE) in October 2016, including Agency Comments from the NSW Office of Environment and Heritage (OEH) that are relevant to this assessment. The SEARs require that biodiversity impacts related to the project are assessed and documented in accordance with the NSW Biodiversity Offsets Policy for Major Projects (OEH 2014a) and *Framework for Biodiversity Assessment* (FBA) (OEH 2014b) by an appropriately accredited person. This report has therefore been prepared by Accredited BioBanking Assessor Nathan Garvey (No. 0103).

A copy of the SEARs is attached to the EIS and below is a list of individual requirements relevant to this BAR:

- Biodiversity – including an assessment of the likely biodiversity impacts of the development, having regard to the NSW Biodiversity Offsets Policy for Major Projects, and in accordance with the Framework for Biodiversity Assessment, unless otherwise agreed by the Department.

1.3 Development proposal

The proposed HSF will involve the installation of an array of PV panels (modules) within the site and associated infrastructure, including connection to the existing Hillston substation. The solar farm is proposed to include an estimated 295,200 modules generating an estimated 85 MW capacity, although the precise module count and capacity will be dependent upon the specific PV technology selected. The ultimate decision for the module type and racking system will be dependent upon availability and market conditions at the time of procurement.

The project will require the construction a short length of 132 kV transmission line (either overhead or underground) to the Hillston Substation to export electricity produced at the site to the electricity grid. The connection line (trenches) will be approximately 80 metres in length and will run near the existing easement

that contains power lines that traverse the development site and enters the substation in the north-eastern corner of the development site (Figure 2).

Due to the site's relatively flat terrain and predominantly cleared landscape, limited site preparation and civil works will be required, other than clearing of small stands of native and introduced vegetation. A security fence will be installed on the site boundary and construction tracks will be laid down if required. Site establishment works and preparation for construction will include the establishment of a temporary construction site compound in a fenced-off area within the development site, and will include a site office, containers for storage, parking areas and construction of access tracks and boundary fencing. Access to the site will be from Kidman Way (Figure 2). A small control room will include facilities and car parking to allow for limited numbers of maintenance staff. Site access tracks will provide all weather access as required.

The construction stage is estimated to take up to approximately 12 months from the commencement of site establishment works. Construction will require the use of graders, water trucks, flatbed trucks, skid steers, front end loaders, roller compactors, trenchers, backhoes, gravel trucks, water tankers, cranes, and aerial lifts. Deliveries of modules and other equipment will be made via flatbed trucks on the approved route and site entrance off well established farms tracks from the Kidman Way.

The final development site of the solar farm infrastructure was refined through consideration of findings of previous site investigations and identification of constraints and opportunities mapped through the environmental impact assessment process, including biodiversity. The intent, however, is to establish the built footprint over the development site for an approximate 85 MW installed capacity while minimising impacts on the ecological values present on the site. Areas of Aboriginal cultural heritage sensitivity were also considered in detail during the design phase of the PV array and ancillary infrastructure.

The development site is defined as the maximum area to be directly impacted by the proposal. The broader assessment area is defined as the development site plus the immediately surrounding land investigated during the field surveys. Both the development site and assessment area are shown on Figure 2.

Impacts to biodiversity arising from the project within the development site are the subject of this assessment.

1.4 Site description

The 290 hectare development site is located approximately 3.5 kilometres south of Hillston and approximately 680 kilometres west of Sydney. The development site is located on the western side of the Kidman Way and the Hillston substation is located adjacent to the north-eastern boundary of the development site. The site is zoned RU1 Primary Production under the Carrathool Local Environmental Plan 2012 (Carrathool LEP).

The development site and broader assessment area consist of predominantly flat agricultural land with remnant native vegetation in isolated patches within cropped paddocks and along depressions, road and rail reserves. There are several mapped watercourses or drainage lines within the development site, most of them non-perennial and one perennial dissecting the western half of the development site. These are irrigation channels, with all watercourses mapped as Strahler order 1 tributaries of the Lachlan River. There are two farm dams and a large drainage line is visible from aerial photography running through the south-east of the development site. The development site is approximately 2.9 kilometres to the south-east of the Lachlan River. Overland plans to develop as much of the 'buildable' site as possible, with infrastructure proposed across 172 hectares of the 290 hectare development site.

The development site and broader assessment area are within the:

- Riverina Bioregion, near the boundary of the Murray Darling Depression Bioregion, according to the Interim Biogeographic Regionalisation for Australia (IBRA)
- Lachlan IBRA subregion
- Lachlan Catchment Management Area
- Carrathool Shire Council Local Government Area (LGA).

1.5 Information sources

1.5.1 Publications and databases

In order to provide a context for this investigation, information about flora and fauna from within 10 kilometres (the 'locality') was obtained from relevant public databases. Records from the following databases were collated and reviewed:

- DEE Protected Matters Search Tool for matters protected by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- NSW BioNet - the database for the Atlas of NSW Wildlife, Office of Environment and Heritage (OEH).
- PlantNET (The Royal Botanic Gardens and Domain Trust) for Rare or Threatened Australian Plants (RoTAP).
- BirdLife Australia, the New Atlas of Australian Birds 1998-2015 (BA).
- Other sources of biodiversity information:
  - The NSW Plant Community Types, as held within the Vegetation Information System (VIS) Classification 2.1 database.
  - Relevant vegetation mapping, accessed through the OEH VIS mapping through the Spatial Information eXchange (SIX) Vegetation Map Viewer.
  - Central West / Lachlan Regional Native Vegetation Map Version 1.0 (OEH 2015).
  - Vegetation mapping by 3-D digital aerial photo interpretation: vegetation of central-southern New South Wales (OEH 2011).

The following reports were also reviewed:

- Hillston sun farm site: Ecological constraints assessment (Biosis 2016).
- Hillston Sun Farm (SSD 7955) Secretary's Environmental Assessment Requirements.
- NSW Scientific Committee final determinations for threatened biota, including (but not limited to):
  - *Acacia melvillei* shrubland in the Riverina and Murray-Darling Depression bioregions endangered ecological community (NSW Scientific Committee 2008).
  - *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions* endangered ecological community (NSW Scientific Committee 2005).
  - *Approved Conservation Advice Weeping Myall Woodlands* (Threatened Species Scientific Committee 2008).

1.5.2 Spatial data

Aerial photography was supplied by NSW Land and Property Information (LPI) (dated 1/2/2008), and by Overland (captured 27/01/2017)

Mapping was conducted using hand-held (uncorrected) GPS units (GDA94), mobile tablet computers running Collector for ArcGIS™ and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the GPS units (generally ± 7 metres) and dependent on the limitations of aerial photo rectification and registration.

Base map data was obtained from LPI 1:25,000 digital topographic databases (DTDB), with cadastral data obtained from LPI digital cadastral database (DCDB). Mapping of stream order was undertaken manually, using the Hydroline layer within the DTDB.

Aerial photography was obtained from NearMap (date: February 2008) (Figures 2, 4 & 5), LPI January 2014 (Figures 1 & 3) and Overland's independently captured aerial imagery from 27/01/2017.

The following spatial datasets were utilised during the development of this report:

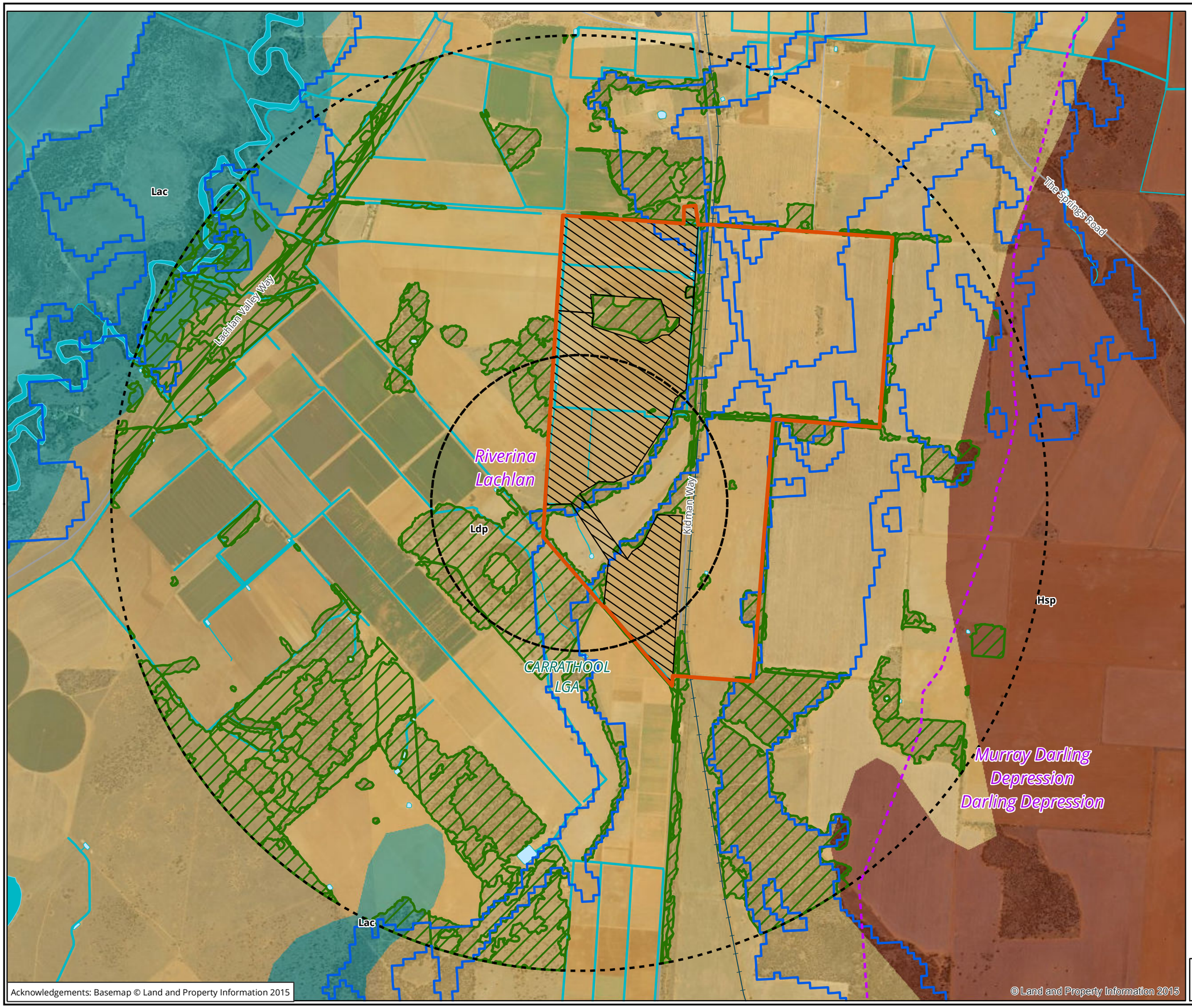
- Catchment data was obtained from the Catchment Boundaries of New South Wales dataset.
- Mitchell Landscapes Version 3.0.
- Interim Biogeographic Regionalisation of Australia (IBRA) Version 7.
- Directory of Important Wetlands (DIWA).
- State Environmental Planning Policy (SEPP) 14 Wetlands.
- NSW Soil and Land Information System (SALIS).

Mapping has been produced using a Geographic Information System (GIS).

1.6 Additional legislative requirements

The project has been assessed against key biodiversity legislation and government policy, including:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Environmental Planning and Assessment Act 1979* (EP&A Act)
- *Threatened Species Conservation Act 1995* (TSC Act)
- *Fisheries Management Act 1994* (FM Act)
- *Noxious Weeds Act 1993* (NW Act)
- Carrathool Local Environment Plan 2012.



Legend

- Broader assessment area
- Development site
- Assessment circles
- IBRA Sub-region
- Local wetlands
- Native vegetation extent

MItchell landscape v3

- Hsp, Hillston Sandplains
- Lac, Lachlan Channels and Floodplains
- Ldp, Lachlan Depression Plains

Figure 1: Location map – Hillston Sun Farm

0 300 600 900 1,200 1,500

Metres
Scale: 1:30,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56

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Biosis Pty Ltd

Ballarat, Brisbane, Canberra, Melbourne, Newcastle, Sydney, Wangaratta & Wollongong

Matter: 24032
Date: 24 March 2017,
Checked by: ABM, Drawn by: LH, Last edited by: lharley
Location:P:\24000s\24032\Mapping
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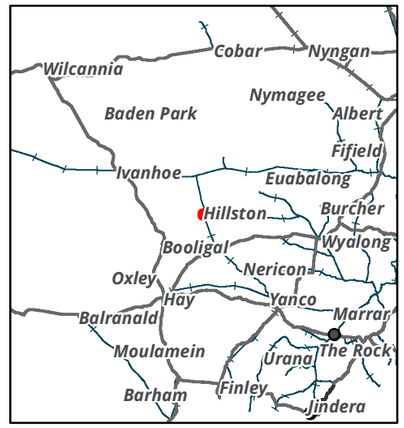

Legend

- Broader assessment area
- Development site
- Local wetlands
- Local wetlands buffer

Strahler stream order

- Not calculated
- 1st
- 3rd
- Stream buffers

Figure 2: Site map - Hillston Sun Farm

0 150 300 450 600 750

Metres

Scale: 1:15,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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Matter: 24032
Date: 24 March 2017,
Checked by: ABM, Drawn by: LH, Last edited by: lharley
Location:P:\24000s\24032\Mapping
24032_F2_SitePlan

2 Legislative context

This section provides an overview of key biodiversity legislation and government policy considered in this assessment. Where available, links to further information are provided. This section does not describe the legislation and policy in detail and guidance provided here does not constitute legal advice.

2.1 Commonwealth

2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is the Australian Government's key piece of environmental legislation. The EPBC Act applies to developments and associated activities that have the potential to significantly impact on Matters of National Environmental Significance (NES) protected under the Act.

Nine Matters of NES are identified under the EPBC Act:

- World heritage properties
- National heritage places
- Wetlands of international importance (also known as 'Ramsar' wetlands)
- Nationally threatened species and ecological communities
- Migratory species
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- Nuclear actions (including uranium mining)
- A water resource, in relation to coal seam gas development and large coal mining development.

Under the EPBC Act, activities that have potential to result in significant impacts on Matters of NES must be referred to the Commonwealth Minister for the Environment for assessment.

Matters of NES relevant to the current project include nationally threatened species and ecological communities, migratory species and Ramsar wetlands. Threatened species and ecological communities protected by the EPBC Act are outlined in Section 4.3 (communities) and Section 5 (species). An assessment of potential impacts to all Matters of NES under the provisions of the EPBC Act is provided in Section 8.1.

2.2 State

2.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act was enacted to encourage the proper consideration and management of impacts of proposed development or land-use changes on the environment (both natural and built) and the community. The Act is administered by DPE.

The HSF has been deemed SSD and will be assessed under Section 89C of the EP&A Act. Biodiversity impacts arising from SSD projects are assessed in accordance with the FBA.

The EP&A Act provides the overarching structure for planning in NSW; however is supported by other statutory environmental planning instruments. Sections of the EP&A Act of primary relevance to the natural environment are outlined further below.

Local Environment Plans (Part 3 Division 4)

Local Environment Plans (LEP) apply either to the whole, or part of, a local government area and make provision for the protection or utilisation of the environment through zoning of land.

The study area is subject to the Carrathool Local Environment Plan and is zoned RU1 Primary Production. This zoning provides for:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To encourage eco-tourism enterprises that minimise any adverse effect on primary industry production.
- To permit non-agricultural uses that supports the primary production purposes of the zone.
- To permit small scale rural tourism uses associated with primary production and environmental conservation with minimal impact on primary production and the scenic amenity of the area.
- To encourage the provision of tourist accommodation in association with agricultural activities.
- To provide opportunities for employment-generating development that adds value to local agricultural production and integrates with tourism.

Elements of the LEP objectives are relevant to this assessment and are discussed further in Section 8.2.1.

State Environmental Planning Policies (Part 3 Division 2)

State Environmental Planning Policies (SEPPs) outline policy objectives relevant to state wide issues. The SEPP relevant to the current development is:

SEPP No. 44 Koala Habitat Protection

SEPP 44 aims to encourage the conservation and management of natural vegetation areas that provide habitat for koalas to ensure permanent free-living populations will be maintained over their present range and to reverse the current trend of koala-population decline. It applies to areas of native vegetation greater than one hectare and in councils listed in Schedule 1 to the SEPP.

The study area is located in the Carrathool LGA, a Schedule 1 listed Council. Therefore SEPP 44 is relevant to the current assessment and is discussed further in Section 8.2.2.

2.2.2 Threatened Species Conservation Act 1995

The TSC Act is the key piece of legislation providing for the protection and conservation of biodiversity in NSW through the listing of threatened species, populations and ecological communities and the declaration and mapping of their critical habitats, as well as the identification of key threatening processes.

The TSC Act also establishes a system for biodiversity certification and establishes the Biodiversity Banking and Offsets Scheme. For all major projects, impacts to biodiversity are assessed in accordance with the FBA.

2.2.3 Fisheries Management Act

The FM Act provides for the protection and conservation of aquatic species and their habitat throughout NSW. Impacts to threatened species, populations and communities, and critical habitats listed under the FM Act must be assessed through the Assessment of Significance process under Section 220ZZ of the FM Act and Section 5A of the EP&A Act.

Two key objectives of the FM Act are to; conserve fish stocks and key fish habitats, and conserve threatened species, populations and ecological communities of fish and marine vegetation. When reviewing applications the Department of Primary Industries (DPI) will assess the likelihoods of impacts to waterways in relation to their sensitivity (TYPE) and waterway class (CLASS).

The Lachlan River, to the west of the study area, is mapped as Key Fish Habitat by DPI.

However, as no impacts to this waterway will result from the HSF, no further consideration is required.

2.2.4 Noxious Weeds Act 1993

The NW Act was enacted to provide for the identification, classification and control of noxious weeds. The NW Act aims to reduce the negative impact of weeds on the economy, community and environment of NSW by:

- Establishing control mechanisms to prevent the establishment of significant new weeds in NSW.
- Preventing, eliminating or restricting the spread of particular significant weeds in NSW.
- Effectively managing widespread significant weeds in NSW.

Plants declared as noxious weeds are currently listed under *Noxious Weeds (Weed Control) Order 2014* published in the NSW Government Gazette No. 23. The NW Act is supported by a number of regulations and is administered by the DPI.

Noxious weeds are discussed further in Section 8.3.

3 Landscape

3.1 Bioregions and landscapes

The broader assessment area and development site occur within the Riverina IBRA bioregion and the Lachlan IBRA subregion. The Lachlan IBRA subregion covers the entire development site and is the subregion used in this assessment. However, a portion of the inner and outer assessment circles are also located within the Darling Depression IBRA subregion in the east (Figure 1).

The assessment area occurs within the Lachlan Depression Plains Mitchell Landscape, bordering the Hillston Sandplains Mitchell Landscape in the west and Lachlan Channels and Floodplains Mitchell Landscape in the east (Figure 1). The Lachlan Depression Plains Mitchell Landscape was used in this assessment as it covers the assessment area and development site.

3.2 Waterways and wetlands

The development site is located within the Lachlan catchment, in central NSW and west of the Great Dividing Range. The Lachlan catchment borders the Murrumbidgee catchment to the south and the Darling catchment to the north.

There are several mapped watercourses or drainage lines within the development site, most of them non-perennial and one perennial dissecting the western half of the study area. These are irrigation channels, with all watercourses mapped as Strahler order 1 tributaries of the Lachlan River (Figure 2).

The Lachlan River is mapped as Key Fish Habitat by the NSW Department of Primary Industries and is located 2.9 kilometres north-west of the development site. A drainage line mapped by NSW LPI flows towards a dam adjacent to the southern boundary of the site.

The development site contains two farm dams.

3.3 Native vegetation extent

The smallest inner and outer assessment circles (500 hectare and 5000 hectare) were used, as the 5000 hectare assessment circle was sufficient to fit the development site (Figure 3). The assessment circles were centred on the area of native vegetation that is most impacted by the project.

Mapping of vegetation within the inner and outer assessment circles was undertaken using the Central West / Lachlan Regional Native Vegetation Map Version 1.0 (OEH 2015), which is considered the most reliable and comprehensive local vegetation mapping. This mapping was modified using vegetation extent as assessed by Biosis (see Section 4). Vegetation in the inner and outer assessment circles is shown in Figure 3.

OEH (2015) mapping of native vegetation communities within the outer assessment circle includes:

- PCT 11 River Red Gum - Lignum very tall open forest or woodland wetland on floodplains of semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion) (LA190).
- PCT 13 Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone mainly Riverina Bioregion and Murray Darling Depression Bioregion (LA108).

- PCT 15 Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion (LA110).
- PCT 17 Lignum shrubland wetland of the semiarid (warm) plains mainly Riverina Bioregion and Murray Darling Depression Bioregion (LA156).
- PCT 24 Canegrass swamp tall grassland wetland of drainage depressions, lakes and pans of the inland plains (LA129).
- PCT 26 Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion (LA212).
- PCT 28 White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone (LA222).
- PCT 45 Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion (LA174).
- PCT 57 Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion (LA106).
- PCT 72 White Cypress Pine - Poplar Box woodland on footslopes and peneplains mainly in the Cobar Peneplain Bioregion (LA221).
- PCT 165 Derived corkscrew grass grassland/forbland on sandplains and plains in the semi-arid (warm) climate zone (LA137).
- PCT 166 Disturbed annual saltbush forbland on clay plains and inundation zones mainly of south-western NSW (LA140).
- PCT 174 Mallee - Gum Coolabah woodland on red earth flats of the eastern Cobar Peneplain Bioregion (LA159).
- PCT 216 Black Roly Poly low open shrubland of the Riverina Bioregion and Murray Darling Depression Bioregion (LA112).

3.4 Assessment of landscape value

Landscape value has been calculated using the method for site-based developments, outlined in Appendix 4 of the FBA (OEH 2014b).

3.4.1 Assessment of the current extent of native vegetation cover

The extent of native vegetation cover before development for both outer and inner assessment circles was determined as the sum of areas of each of the native vegetation map units listed above.

To determine the extent of native vegetation cover after development, the extent of vegetation to be removed as a part of the project was subtracted from the extent of native vegetation cover before development. Table 1 provides a summary of the extent of native vegetation cover within the inner and outer assessments circles, before and after development.

Table 1 Extent of native vegetation cover before and after development

Assessment circle	Before development		After development	
	Area (ha)	%	Area (ha)	%
Outer assessment circle	1187	24 (21 – 25)	1185	24 (21 – 25)
Inner assessment circle	153	31 (31 – 35)	152	30 (26 – 30)

The proposed development will not result in a change in the class of vegetation in the outer assessment circle. However there will be a change in the class of vegetation in the inner assessment circle.

3.4.2 Assessment of connectivity value

The development site does not support any of the following:

- An area identified as being part of a state significant biodiversity link.
- A riparian buffer 50 metres either side of a 6th order stream.
- A riparian buffer 50 metres around an important wetland or estuarine area.
- An area identified as being part of a regionally significant biodiversity link.
- A riparian buffer 20 metres either side of a 4th or 5th order stream.

Therefore, the proposed development will not impact on any state significant biodiversity links or regionally significant biodiversity links.

The development site was assessed as being part of two connective links (Figure 3). Native vegetation in the Kidman Way road reserve provides a north-south connective link along the eastern boundary of the development site. Native vegetation in the southern section of the development site provides east-west connective links through and along the edges of the development site.

Both connective links will be affected by the HSF. The connectivity width category before and after development will change from 5-30 metres to 0-5 metres. The development will result in one linkage width threshold crossed.

Overstorey condition for the inner and outer assessments circles was assessed based on aerial photo interpretation and on-ground assessment. Overstorey vegetation within these links was assessed as being in benchmark condition. No change in overstorey condition will result from the HSF. Midstorey/groundcover condition was assessed based on a rapid assessment of vegetation within the locality, with vegetation reviewed from roadsides. Midstorey/ groundcover vegetation adjacent to the development site is also largely intact, with a moderate to high diversity in most areas. No change to midstorey/groundcover condition will result from the HSF.

The proposed development will not result in any change in linkage condition classes.

3.4.3 Assessment of patch size

Patch size was assessed using a select process in ArcGIS. All vegetation not defined as low condition and separated by a distance of less than 100 metres (woody vegetation types) and 30 metres (non-woody vegetation types) was mapped sequentially. Using this method, the vegetation within the study area forms part of a relatively large patch of connecting vegetation with a patch size larger than 1000 hectares.

Regardless of the estimated level of clearing within the Lachlan Depression Plains Mitchell Landscape, at this patch size the study area fits into the 'Extra Large' patch size class.

Acknowledgements: Basemap © Land and Property Information 2015

Legend

- Broader assessment area
- Development site
- Assessment circles
- Local wetlands
- Connective links
- Native vegetation extent

Figure 3: Vegetation (OEH 2015) within the inner and outer assessment circle including connective links

0 300 600 900 1,200 1,500

Metres

Scale: 1:30,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

Biosis Pty Ltd

Ballarat, Brisbane, Canberra, Melbourne, Newcastle, Sydney, Wangaratta & Wollongong

Matter: 24032
Date: 24 March 2017,
Checked by: ABM, Drawn by: LH, Last edited by: lharley
Location:P:\24000s\24032\Mapping
24032_F3_Veg_OuterAC

4 Native vegetation

The extent of native vegetation within the development site was determined using Section 5 of the FBA.

4.1 Background review

A review of regional vegetation mapping by OEH (2015) was undertaken to inform the site investigation. OEH (2015) identifies four vegetation communities within the development site, including:

- PCT 15 Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion (LA110).
- PCT 72 White Cypress Pine - Poplar Box woodland on footslopes and peneplains mainly in the Cobar Peneplain Bioregion (LA221).
- PCT 13 Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone mainly Riverina Bioregion and Murray Darling Depression Bioregion (LA108).
- PCT 174 Mallee - Gum Coolabah woodland on red earth flats of the eastern Cobar Peneplain Bioregion (LA159).

Detailed mapping of vegetation and confirmation of PCTs (which in some places differ to OEH's mapping) was undertaken for this assessment (Figure 4).The methodology is outlined in Section 4.2 and results presented in Section 4.3.

4.2 Methods

4.2.1 Site investigation

An initial ecological survey of the broader assessment area was undertaken by Biosis in August 2016 and included the development site as well as the broader assessment area. The purpose of this initial assessment was to undertake detailed vegetation mapping and a preliminary assessment of vegetation conditions of all vegetation in accordance with the requirements of the FBA.

Additional assessments were undertaken by Biosis on 9 and 10 November 2016 that included targeted surveys of the development site in accordance with the requirements of the SEARs, the FBA methodology and the *NSW Guide to Surveying Threatened Plants* (OEH 2016).

Through an iterative design process, which considered the biodiversity values outlined in these assessments, Overland decided to reduce the initial area of the proposed development and restrict it to the current development site. Biosis used the data collected in the broader assessment area from the initial and targeted surveys to inform the current biodiversity assessment.

Detailed mapping of vegetation communities was conducted using hand-held (uncorrected) tablet units (Samsung Galaxy Tab 3) using the ArcGIS Collector application and aerial photo interpretation. Areas of native vegetation for which a Plant Community Type (PCT) could accurately be assigned were identified and delineated in the field, and vegetation condition determined. Identification of PCTs was confirmed with reference to the community profile descriptions (and diagnostic species tests) held within the OEH (2015) mapping project and NSW Vegetation Information System (VIS): Classification Version 2.1.

General classification of native vegetation in NSW used in this report is based on the classification system in Keith (2004) which uses three groupings of vegetation: vegetation formation, vegetation class and vegetation type (or PCT), with vegetation type the finest grouping. The grouping referred to in this report is PCT. PCTs were stratified into Vegetation Zones based on condition (low or moderate/good) and ancillary code.

Following stratification of Vegetation Zones, site value was assessed using data obtained via a series of plots and transects, as per the methodology outlined in Section 5 of the FBA. Plot and transect data was collected from the broader assessment area and the development footprint on 9 and 10 November 2016 and included:

- A 20 metre x 50 metre quadrat and 50 metre transect for assessment of site attributes.
- A 20 metre x 20 metre quadrat, nested within the quadrat outlined above, for full floristic survey to determine native plant species richness.

The minimum number of plots/transects per Vegetation Zone was determined using Table 3 of the FBA. A total of eight plots/transects were completed within the development site and broader assessment area. All plots/transects completed are shown in Figure 4.

A list of flora species was compiled for each vegetation type. Records of all flora species will be submitted to OEH for incorporation into the Atlas of NSW Wildlife.

4.3 Results

4.3.1 Vegetation description

The broader assessment area is currently used for winter cereal and irrigated cropping activities. Native vegetation within the broader assessment area is composed of isolated patches of vegetation in an agricultural matrix or small sections of shelterbelts or roadside reserves. These isolated patches within cropped paddocks have a high cover of introduced species, with most patches subject to historical grazing. This has prevented recruitment of most native shrubs and eucalypts. The vegetation is therefore characterised by a canopy of mature and semi-mature native trees over an understorey of predominantly introduced pasture grasses and weeds. Resilience in the understorey was low, with a moderate to low cover of native forbs and grasses. Native vegetation within shelterbelts and road reserves was of a higher quality than patches within the paddocks, with recruitment and persistence of native species in the midstorey and understorey. Native species diversity was generally higher and, while still present, introduced species cover was lower than in the paddocks. The assessment area supports a number of isolated paddock trees in amongst an agricultural matrix largely devoid and any native species cover.

Through detailed design and consideration of the biodiversity values present within the broader assessment area, impacts to native vegetation have been restricted to the PV arrays, the electrical connection between arrays in the south-western area, and electrical grid connection to the sub-station near the north-eastern boundary. The development site supports 1.88 hectares of native vegetation. This vegetation occurs mostly as small, isolated patches with varying levels of disturbance (Figure 4). There is a patch of contiguous vegetation in the middle of the development site, which connects to native vegetation south-west of the study area.

A rapid vegetation assessment identified Weeping Myall *Acacia pendula* woodland and Yarran *Acacia melvillei* woodland within the Kidman Way road reserve, within the broader assessment area. *Weeping Myall Woodland* is an EPBC Act and TSC Act listed endangered ecological community and *Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions* is a TSC Act listed endangered ecological community. These areas will be avoided and were not assessed further during the targeted surveys.

4.3.2 Plant community types

Site investigations, including determination of PCTs using the methodology outlined in Section 4.2.1, identified the presence of three PCTs within the development site. The PCT, vegetation formation and vegetation class (Keith 2004) are described in Table 2.

Table 2 Plant community types of the development site and corresponding formation and class (Keith 2004)

Plant community type	Vegetation formation	Vegetation class
PCT 57: Belah/Black Oak – Western Rosewood – Wilga woodlands of central NSW including the Cobar Peneplain Bioregion (LA106)	Semi-arid Woodlands (Shrubby sub-formation)	Semi-arid Sand Plain Woodlands
PCT 13: Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion) (LA108)	Semi-arid Woodlands (Grassy sub-formation)	Inland Floodplain Woodlands
PCT 15: Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion) (LA110)	Semi-arid Woodlands (Grassy sub-formation)	Inland Floodplain Woodlands

The vegetation of the development site was assessed as being in moderate/good condition in accordance with the FBA. No further stratification of PCTs using ancillary codes was undertaken. This resulted in three vegetation zones being identified within the development site (Table 3 and Figure 4).

Table 3 Vegetation zones mapped within the study area

Vegetation zone (VZ)	Plant community type	Condition	Ancillary code	Area (ha)
VZ1	PCT 57: Belah/Black Oak – Western Rosewood – Wilga woodlands of central NSW including the Cobar Peneplain Bioregion (LA106)	Moderate/ Good	N/A	0.09
VZ2	PCT 13: Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion) (LA108)	Moderate/ Good	N/A	1.29
VZ3	PCT 15: Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion) (LA110)	Moderate/ Good	N/A	0.50
TOTAL				1.88

A detailed description of the Vegetation Zones is provided in Table 4.

Table 4 Vegetation zones description

Vegetation zone 1 – *Belah/Black Oak – Western Rosewood – Wilga woodlands of central NSW including the Cobar Peneplain Bioregion*	
PCT ID	57
Biometric vegetation type ID	LA106
Common name	Belah/Black Oak – Western Rosewood – Wilga woodlands of central NSW including the Cobar Peneplain Bioregion
Condition	Moderate/Good (development site) Moderate/Good (broader assessment area) Moderate/Good, Other (broader assessment area)
Extent within study area	Development site – 0.09 ha of this PCT was recorded and mapped in one small patch within cropped paddocks (Figure 4). This community exhibits high levels of introduced species cover and low/moderate native species diversity. Broader assessment area – 14.87 ha of this PCT was recorded and mapped in linear strips in the road reserve either side of Kidman Way and three patches within cropped paddocks east of Kidman Way (Figure 4).
Description	Wilga *Geijera parviflora* is the dominant canopy tree to 4 metres tall. Species characteristic of the mid stratum include Galvanized Burr *Sclerolaena birchii*, Ruby Saltbush *Enchylaena tomentosa* and Black Rolypoly *Sclerolaena muricata* subsp. *muricata*. The ground cover includes introduced species such as Barley Grass *Hordeum* sp. Wimmera *Ryegrass Lolium rigidum*, Patterson's Curse *Echium plantagineum* and African Boxthorn *Lycium ferocissimum.* Native species are present in the ground cover and include Spear-grass *Austrostipa nitida*, Ringed Wallaby Grass *Austrodanthonia caespitosa* and Rough Speargrass *Austrostipa scabra*. This community is found on brown to orange clay/loam soils on flat plains.
Survey effort	Due to small size of the patch within the development site, two plot/transect (Q1 and Q2) were undertaken in the broader assessment area in this PCT (Figure 4).
Condition	Within the development footprint this PCT is in a poor condition with an absent or sparse mid-storey shrub layer and low native diversity and cover in the ground layer. This condition state is dominated by introduced pasture species. Regeneration is inhibited by pasture grass and crop weed germination. In the broader assessment area, this PCT is in a moderate condition with some native diversity in the mid and ground layer but a high cover of introduced pasture species. The linear nature of the patch allows for increased edge effect and weed encroachment.
Characteristic species used for identification of PCT	According to the NSW VIS: Classification Version 2.1, the overstorey species recorded within the development site that align with the dominant species listed as characterising for this PCT include Wilga. Aligning mid-storey and ground layer species recorded include Warrior Bush *Apophyllum anomalum*, Emu bush *Eremophila longifolia,* Sticky Hop-bush *Dodonaea viscosa,* Galvanised Burr, Common White Sunray *Rhodanthe floribunda*, Ringed Wallaby Grass and Rough Spear Grass.

Vegetation zone 1 – *Belah/Black Oak – Western Rosewood – Wilga woodlands of central NSW including the Cobar Peneplain Bioregion*	
Justification of evidence used to identify the PCT	Apart from the species composition, the stated landscape position on plains and peneplains is consistent with the landscape positioning within the development site and broader assessment area. Other diagnostic features that are stated as occurs on red to brown sandy loams on the outer clay pans is consistent with the structure and soils found within the study area.
Status	Commonwealth EPBC Act: Not listed NSW TSC Act: Not listed. The PCT is associated with the *Acacia loderi* shrublands endangered ecological community; however, the study area is outside of the mapped distribution of this community.
Estimate of percent cleared value of PCT in the major catchment area	95%
Plate 1 Belah/Black Oak – Western Rosewood – Wilga woodlands of central NSW including the Cobar Peneplain Bioregion (Plot Q1 in broader assessment area)	

Vegetation zone 1 – *Belah/Black Oak – Western Rosewood – Wilga woodlands of central NSW including the Cobar Peneplain Bioregion*

Plate 2 Belah/Black Oak – Western Rosewood – Wilga woodlands of central NSW including the Cobar Peneplain Bioregion (Plot Q2 in broader assessment area)

Vegetation zone 2 – *Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)*	
PCT ID	13
Biometric vegetation type ID	LA108
Common name	Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Condition	Moderate/good (development site and broader assessment area)
Extent within study area	Study area – 1.29 ha of this PCT was recorded and mapped in two patches connected to bigger patches that are outside of the development site (Figure 4). These areas show high levels of introduced species cover and low native species diversity. Broader assessment area – 25.28 ha of this PCT was recorded and mapped in two linear patches running either side of a drainage line or slight depression in the south-west of the assessment area (Figure 4).
Description	Black Box *Eucalyptus largiflorens* is the dominant canopy tree to 18 metres tall with Bimble Box *Eucalyptus populnea* subsp. *bimble* also occurring as a canopy tree. Species characteristic of the mid stratum include Lignum *Duma florulenta*, Wilga, Grey Copperburr *Sclerolaena diacantha*. The ground cover is dominated by introduced species including Barley Grass., Smooth Mustard *Sisymbrium erysimoides*, Common Peppercress *Lepidium africanum* and Common Sow-thistle *Sonchus oleraceus*. Native ground cover is present and includes Climbing Saltbush *Einadia nutans*, Spear-grass, and Wild Onion *Bulbine semibarbata*. Vegetation in the development site and broader assessment area has a similar species composition however some stands of this PCT within the development site has a sparse to absent canopy. This community is found on brown to orange clay/loam soils on flat alluvial areas bordering depressions and drainage lines. It is likely these areas are inundated during large riverine floods on the Lachlan River floodplain or by heavy local rainfall events.
Survey effort	Development site – One plot/transect (Q7) was undertaken in this PCT (Figure 4). This plot/transect was used to determine site value. Broader assessment area - One plot/transect (Q8) was undertaken in this PCT (Figure 4). This plot/transect was not used.
Condition	In the development site this PCT shows high levels of modification and disturbance, with low shrub cover and ground cover predominantly dominated by introduced species. The canopy within the development site varies and may have been previously cleared in places. Disturbance is primarily the result of ongoing agricultural practices and past clearing. Regeneration is inhibited by pasture grass and crop weed germination. The linear nature of the patches allows for increased edge effect and weed encroachment. In the broader assessment area, this PCT has a similar species composition and level of disturbance. With the exception that the canopy is generally more intact.

Vegetation zone 2 – *Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)*	
Characteristic species used for identification of PCT	According to the NSW VIS: Classification Version 2.1, the overstorey species recorded within the development site that align with the dominant species listed as characterising for this PCT include Black Box. Aligning mid-storey and ground layer species recorded include Climbing Saltbush, Black Rolypoly, Lignum, and Grey Copperburr.
Justification of evidence used to identify the PCT	Apart from the species composition, the stated landscape position on inner floodplains and alluvial plains mostly in depressions that are frequently flooded is consistent with the landscape positioning. Other diagnostic features that are stated as woodland, open forest or open woodland averaging 15 metres high. Occurs on clay or clay loam, often gilgaied, soils. These are consistent with the structure and soils found within the development site and broader assessment area.
Status	Commonwealth EPBC Act: Not listed NSW TSC Act: Not listed
Estimate of percent cleared value of PCT in the major catchment area	60%
Plate 3 Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion) in the development site (Plot Q7)	

Vegetation zone 2 – *Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)*	
Plate 4 Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion in the broader assessment area (Q8), this area has had the canopy layer partially removed.	

Vegetation zone 3 – *Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)*	
PCT ID	15
Biometric vegetation type ID	LA110
Common name	Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Condition	Moderate/good (development site) Moderate/good, Other (broader assessment area) Moderate/good, Derived (broader assessment area)
Extent within study area	Development site – 0.5 ha of this PCT was recorded and mapped in one small patch connected to larger linear patches that are outside of the development site along the northern boundary, adjacent to the existing substation infrastructure (Figure 4). These areas show high levels of introduced species cover and low native species diversity. Broader assessment area – 32.68 ha of this PCT was recorded and mapped in linear patches running either side of Kidman Way or adjacent to property or paddock boundaries (Figure 4).
Description	Black Box is the dominant canopy tree to 18 metres tall with Bimble Box also occurring as a canopy tree. Species characteristic of the mid stratum include Warrior Bush, Goathead Burr *Sclerolaena bicornis,* Ruby Saltbush *Enchylaena tomentosa* and Frosted Goosefoot *Chenopodium desertorum* subsp. *desertorum*. The ground cover includes introduced species such as Barley Grass, Wimmera Ryegrass and Indian Hedge Mustard. Native species are

Vegetation zone 3 – *Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)*	
	present in the ground cover and include Spear Grass *Austrostipa nodosa*, Ringed Wallaby Grass, Yellowtails *Ptilotus nobilis*, Pigmy Sunray *Rhodanthe pygmaea* and Common Everlasting *Chrysocephalum apiculatum*. This community is found on brown to orange clay/loam soils on flat plains.
Survey effort	Two plot/transect (Q3 and Q4) were undertaken in the broader assessment area in this PCT (Figure 4). Plot/transect Q3 was used in the credit calculator due to its proximity to the development site in connected vegetation. Plot/transect Q4 was not used.
Condition	In the broader assessment area this PCT can be grouped into three condition states. Within the development site and Road reserve adjacent to the substation (Q3) the PCT is in a medium to high condition with moderate shrub and ground-storey diversity and low introduced species cover. Within the shelterbelt (Q4) the PCT in a medium to low condition with some shrub and understorey diversity and cover but a high cover of introduced species. Within the paddocks the PCT is in a poor condition with an absent or sparse mid-storey shrub layer and low native diversity and cover in the ground layer. This condition state is dominated by introduced pasture species. Regeneration is inhibited by pasture grass and crop weed germination. The linear nature of the patches allows for increased edge effect and weed encroachment.
Characteristic species used for identification of PCT	According to the NSW VIS: Classification Version 2.1, the overstorey species recorded within the study area that align with the dominant species listed as characterising for this PCT include Black Box. Aligning mid-storey and ground layer species recorded include Nitre Goosefoot *Chenopodium nitrariaceum*, Thorny Saltbush *Rhagodia spinescens*, Winged Fissure-weed *Maireana enchylaenoides*, Black Rolypoly, Eastern Flat-top Saltbush *Atriplex lindleyi*, Tarvine *Boerhavia dominii*, Star Copperburr *Sclerolaena stelligera*, Curly Windmill Grass *Enteropogon acicularis* and Grey Germander *Teucrium racemosum*.
Justification of evidence used to identify the PCT	Apart from the species composition, the stated landscape position on floodplain and Lacustrine plains is consistent with the landscape positioning. Other diagnostic features that are stated as occurs on alkaline brown or grey clay soil on alluvial plains are consistent with the structure and soils found within the development site and broader assessment area.
Status	Commonwealth EPBC Act: Not listed NSW TSC Act: Not listed
Estimate of percent cleared value of PCT in the major catchment area	60%

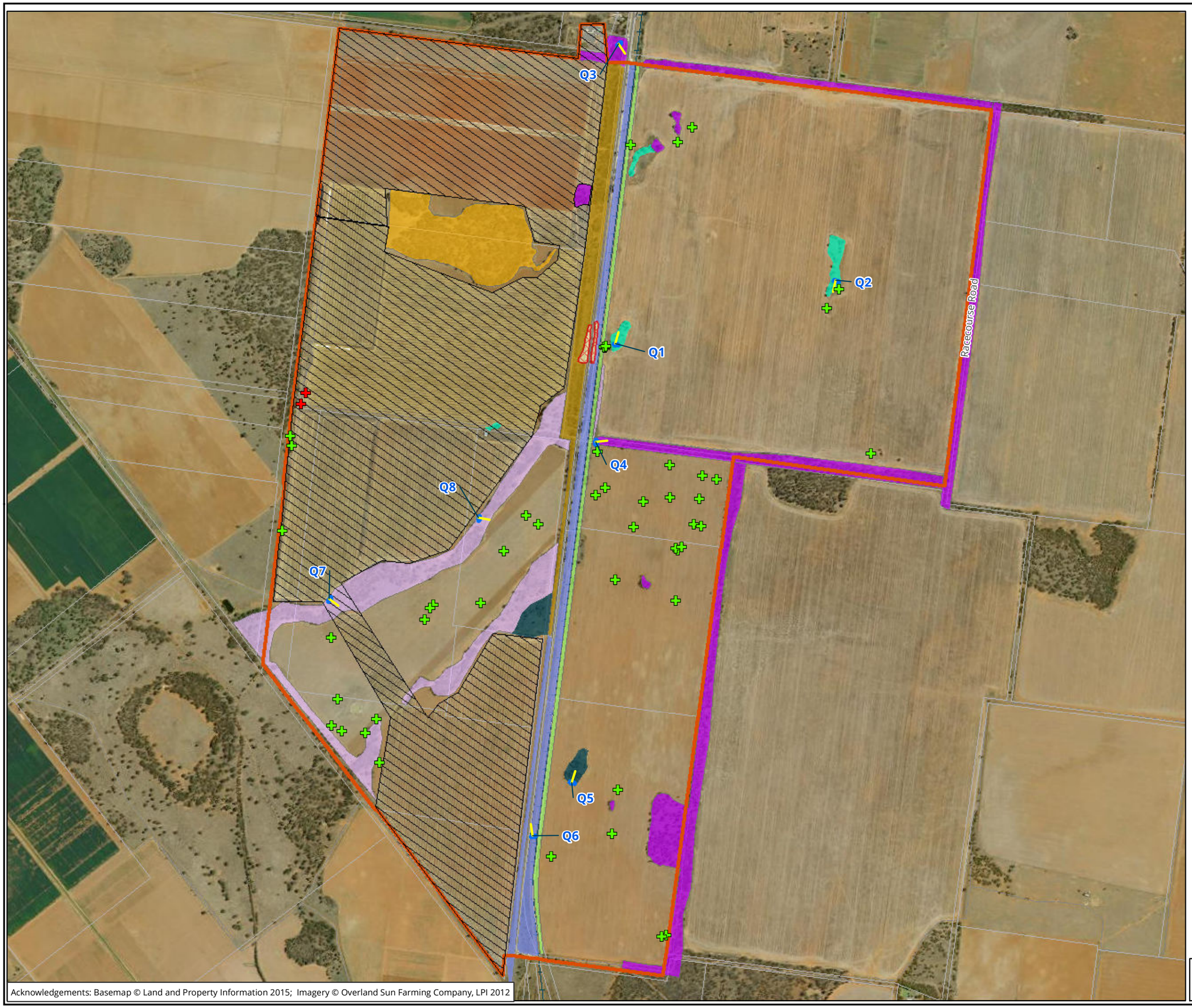
Vegetation zone 3 – *Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)*	
Plate 5 Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion) in the broader assessment area (Plot Q3)	
Plate 6 Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion) in the broader assessment area (Plot Q4)	

4.3.3 Site value scores

For all vegetation to be cleared in the development site plots and transect survey data was entered into the BioBanking credit calculator for major projects to determine site value scores. Plot and transect survey data is presented in Table 15 of Appendix 1. Current site value for each Vegetation Zone is outlined in Table 5.

Table 5 Site value score for Vegetation Zones in the development site

Vegetation zone	Plant community type	Area (ha)	Site value score
VZ1	PCT 57: Belah/Black Oak – Western Rosewood – Wilga woodlands of central NSW including the Cobar Peneplain Bioregion (LA106)	0.09	50.52
VZ2	PCT 13: Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion) (LA108)	1.29	44.79
VZ3	PCT15: Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion) (LA110)	0.5	75.52



Acknowledgements: Basemap © Land and Property Information 2015; Imagery © Overland Sun Farming Company, LPI 2012

Legend

- Broader assessment area
- Development site
- Quadrat
- Transects
- Scattered tree - to be removed
- Scattered tree - to be retained
- Myall Woodland EEC

Plant community types

- PCT 13 Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion), Moderate/good, (LA108)
- PCT 15 Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion), Moderate/good, (LA110)
- PCT 15 Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion), Moderate/good, Other (LA110)
- PCT 15 Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion), Moderate/good, derived (LA110)
- PCT 26 Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion, Moderate/good, (LA212)
- PCT 57 Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion, Moderate/good, (LA106)
- PCT 57 Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion, Moderate/good, Other (LA106)
- PCT 70 White Cypress Pine woodland on sandy loams in central NSW wheatbelt, Moderate/good, (LA223)
- PCT 105 Poplar Box grassy woodland on flats mainly in the Cobar Peneplain Bioregion and Murray Darling Depression Bioregion, Moderate /good, (LA177)

Figure 4: Native vegetation within the broader assessment area, including flora survey effort

0 150 300 450 600 750

Metres

Scale: 1:15,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

Biosis Pty Ltd

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Matter: 23026
Date: 24 March 2017,
Checked by: ABM, Drawn by: JMS, Last edited by: lharley
Location:P:\24000s\24032\Mapping
24032_F4_VegStudyArea

5 Threatened species

5.1 Geographical / habitat features

In order to develop a list of species requiring survey, an assessment of the occurrence of geographic habitat features, in accordance with Section 6.3 of the FBA was undertaken, along with a determination of whether impacts to these habitat features will result from the proposed HSF. The results of this assessment, along with the species generated by the calculator associated with the FBA are outlined in Table 6. Further consideration is given to these species below.

Table 6 Assessment of geographical habitat features within the development site

Common name	Scientific name	Feature	Present in the study area	Justification
Black-breasted Buzzard	*Hamirostra melanosternon*	Land within 40 m of riparian woodland on inland watercourses/waterholes containing dead or dying eucalypts	No	The development site does not contain land within 40 m of riparian woodland on inland watercourses/waterholes containing dead or dying eucalypts.
Grey Falcon	*Falco hypoleucos*	Land containing within 100 m of riparian woodland on inland rivers containing mature living eucalypts or isolated paddock trees overhanging water or dry watercourses	No	The development site is not within 100 m of riparian wood or inland rivers or isolated paddock trees overhanging water or dry watercourses.
Winged Peppercress	*Lepidium monoplocoides*	Land containing seasonally damp or waterlogged sites	Yes	The development site contains seasonally damp or waterlogged sites.
Spike-Rush	*Eleocharis obicis*	Periodically waterlogged sites (including table drains and farm dams)	Yes	Land that may be waterlogged occurs in the development site, but is largely restricted to native vegetation strips along the south and north-eastern boundaries.
Menindee Nightshade	*Solanum karsense*	Periodically flooded depressions with heavy soils	Yes	The development site contains periodically flooded depressions with heavy clay soils along the native vegetation strips along the southern boundary.
Southern Bell Frog	*Litoria raniformis*	Land within 100 m of emergent aquatic or riparian vegetation	No	The development site land is not within 100 m of emergent aquatic or riparian vegetation.
Australasian Bittern	*Botaurus poiciloptilus*	Land containing brackish or freshwater wetlands	No	The development site does not contain brackish or freshwater wetlands.

5.2 Methods

Flora and fauna assessments of the study area were undertaken from 22 to 23 August 2016 and targeted surveys from 9 to 10 November 2016. Weather observations for each survey date are shown in Table 6.

Table 7 Weather observations during flora and fauna surveys (Hillston Airport, Hillston NSW)

Survey date	Temperature (°C)		Rain (mm)
	Minimum	Maximum	
22 August 2016	9.2	13.2	0.2
23 August 2016	6.6	13.5	9.2
09 November 2016	10.5	28	0
10 November 2016	10.4	31	0

Flora survey methods are outlined below, included mapping of vegetation and condition assessment and targeted surveys.

A list of flora species requiring targeted survey was obtained from the BioBanking credit calculator. Targeted threatened flora surveys were undertaken for the following biota:

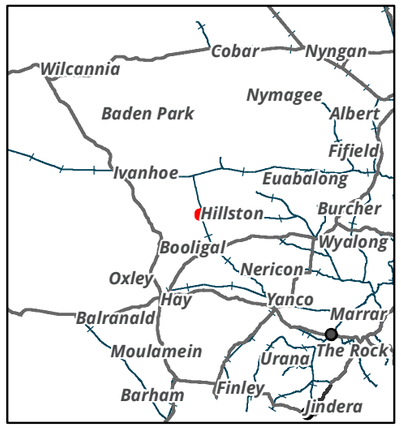
- Lanky Buttons *Leptorhynchos orientalis*
- Menindee Nightshade *Solanum karsense*
- Mossgiel Daisy *Brachyscome papillosa*
- Slender Darling Pea *Swainsona murrayana*
- Spike Rush *Eleocharis obicis*
- Winged Peppercress *Lepidium monoplocoides*
- Nelia Shrublands.

Targeted flora surveys involved walking parallel transects approximately 5 to 10 metres apart through all native vegetation within the development site (see Figure 5).

Fauna assessment was habitat-based and targeted, seeking to identify the following fauna habitat features of the study area:

- Habitat trees including large hollow-bearing trees, availability of flowering shrubs and feed tree species.
- Waterbody condition.
- Quantity of ground litter and logs.
- Searches for indirect evidence.

The credit calculator did not identify any threatened fauna species as requiring survey. No targeted fauna surveys were undertaken.



Legend

- Broader assessment area
- Development site
- Survey track 1
- Survey track 2

Acknowledgements: Basemap © Land and Property Information 2015; Imagery © Overland Sun Farming Company, LPI 2012

Figure 5: Targeted survey effort

0 150 300 450 600 750

Metres

Scale: 1:15,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

Biosis Pty Ltd

Ballarat, Brisbane, Canberra, Melbourne, Newcastle, Sydney, Wangaratta & Wollongong

Matter: 24032
Date: 24 March 2017,
Checked by: ABM, Drawn by: LH, Last edited by: lharley
Location:P:\24000s\24032\Mapping
24032_F5_TargetedSurvey

5.3 Fauna habitat assessment results

The development site and broader assessment area have an extensive history of use for agricultural purposes, and have recently been used for extensive cropping. Areas of native vegetation are present within the development site and may provide habitat for large mammals or highly mobile avian species capable of disbursing across the fragmented landscape.

Fauna habitat features were limited to areas of remnant patch vegetation, as outlined above, scattered trees and mistletoe. No permanent or semi-permanent wetlands are present within the development site. The development footprint contains two scattered hollow bearing trees proposed to be removed and these trees contain small to large hollows. The development site contains limited habitat for woodland birds but in the context of the broader assessment there is suitable habitat and populations of Major Mitchell's Cockatoo *Lophochroa leadbeateri* and Grey-crowned Babbler (eastern subspecies) *Pomatostomus temporalis temporalis*.

5.4 Targeted survey results

No threatened flora species were recorded within the development site during the targeted November 2016 survey.

Two TSC Act listed woodland birds, Major Mitchell's Cockatoo and Grey Crowned-babbler, were recorded close to the development site and in the broader assessment area during flora and fauna surveys. White-browed Treecreeper and Black Falcon were not recorded in the development site during surveys in August and November 2016. If these species do occur the small areas of woodland and two scattered trees to be removed are unlikely to significant impact their persistence in the local landscape.

5.5 Ecosystem credit species

A list of ecosystem credit species predicted to occur within the development site, based on the PCTs present and generated by the calculator associated with the FBA, along with an assessment of whether they occur within the development site, is provided in Table 8. The potential for these species to occur within development site was assessed in accordance with Section 6.3 of the FBA.

Table 8 Assessment of ecosystem credit species within the study area

Scientific name	Common name	TS offset multiplier	Habitat on site
Australian Bustard	*Ardeotis australis*	2.6	Yes
Australian Painted Snipe	*Rostratula australis*	1.3	Yes
Barking Owl	*Ninox connivens*	3	Yes
Brolga	*Grus rubicunda*	1.3	Yes
Bush Stone-curlew	*Burhinus grallarius*	2.6	Yes
Diamond Firetail	*Stagonopleura guttata*	1.3	Yes
Freckled Duck	*Stictonetta naevosa*	1.3	Yes
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis subsp. temporalis*	1.3	Yes
Hooded Robin (south-eastern	*Melanodryas cucullata subsp. cucullata*	1.7	Yes

Scientific name	Common name	TS offset multiplier	Habitat on site
form)			
Little Eagle	*Hieraaetus morphnoides*	1.4	Yes
Little Pied Bat	*Chalinolobus picatus*	2.1	Yes
Magpie Goose	*Anseranas semipalmata*	1.3	Yes
Major Mitchell's Cockatoo	*Lophochroa leadbeateri*	1.9	Yes
Painted Honeyeater	*Grantiella picta*	1.3	Yes
Pied Honeyeater	*Certhionyx variegatus*	1.3	Yes
Speckled Warbler	*Chthonicola sagittata*	2.6	Yes
Spotted Harrier	*Circus assimilis*	1.4	Yes
Square-tailed Kite	*Lophoictinia isura*	1.4	Yes
Varied Sittella	*Daphoenositta chrysoptera*	1.3	Yes
Western Blue-tongued Lizard	*Tiliqua occipitalis*	1.3	Yes
White-browed Treecreeper Endangered Population	*Climacteris affinis - endangered population*	2	Yes
Yellow-bellied Sheath tail-bat	*Saccolaimus flaviventris*	2.2	Yes

The presence of these species could not be discounted using the methodology outlined in Section 6.3 of the FBA (OEH 2014b). It was therefore assumed that these species may occur within the development site.

The Barking Owl has the lowest Tg value and therefore the highest threatened species offset multiplier. No adjustment of the TS offset multiplier value has been undertaken.

5.6 Species credit species

A list of species credit species predicted to occur within the development site, based on the PCTs present, along with an assessment of whether the development site provides suitable habitat and whether the species will be impacted by the development is provided in Table 9. The potential for a species to occur within the development was assessed in accordance with Section 6.5 of the FBA).

Table 9 Species credit species and status within the study area

Scientific name	Common name	Habitat present in the study area	Recorded during field surveys	Impacted by development	Justification
Flora					
Brachyscome papillosa	Mossgiel Daisy	Yes	No	No	There are a number of records in the Lachlan IBRA subregion. The species is a perennial herb that grows to 40 cm tall, which grows in a variety of vegetation types on clay based soils. Flowers appear between June and December. Suitable habitat is present in the study area; however, the species was not recorded during targeted surveys.
Eleocharis obicis	Spike-Rush	Yes	No	No	There are no records of the species in the IBRA Subregion; however the species is predicted to occur. The species is a small (30 cm) tufted perennial sedge which grows in ephemerally wet situations such as roadside mitre drains and depressions, usually in low-lying grasslands. NSW specimens have been found along depressions with heavy clay soils on the Lachlan River floodplain. Recorded as flowering in November. Habitat is present in the development site; however, the species was not recorded during targeted surveys.
Lepidium monoplocoides	Winged Peppercress	Yes	No	No	There are a number of records in the Lachlan IBRA subregion. The species is an erect annual herb or perennial forb (15-20 cm) which grows on seasonally moist to waterlogged sites, on heavy fertile soils. This species usually occurs on open woodland dominated by Black Box and Poplar Box. The species is highly dependent on seasonal conditions. The number of plants at each site varies greatly with seasonal conditions tending to be small in area with local concentrations of the plant. Habitats present in the development site; however, the species was not recorded during targeted surveys.

Scientific name	Common name	Habitat present in the study area	Recorded during field surveys	Impacted by development	Justification
Leptorhynchos orientalis	Lanky Buttons	Yes	No	No	There are several records in the Lachlan IBRA subregion. The species is an erect annual forb (30 cm) which grows in woodland or grassland, sometimes on the margins of swamps. This species is known to occur on red-brown soil and red clay to clay-loams. The species has been recorded in several southern Riverina localities; including Willanthry east of Hillston, Zara-Wanganella via Hay, McKinley Road southwest of Hillston and a large population have most recently been recorded from Cowl Cowl Station also southwest of Hillston. Habitat is present in the development site; however, the species was not recorded during targeted surveys.
Solanum karsense	Menindee Nightshade	Yes	No	No	There are a number of records in the Lachlan IBRA subregion. The species is a Grey-green downy forb to 0.3m high which grows in occasionally flooded depressions with heavy soil, including level river floodplains of grey clay with Black Box and Old Man Saltbush. Habitats are generally lake beds or floodplains of heavy grey clays with a highly self-mulching surface. This species tolerates disturbance and will often appear after such activities as grading, ploughing and flooding for irrigation. Flowers chiefly in spring. Habitat is present in the development site; however, the species was not recorded during targeted surveys.
Swainsona murrayana	Slender Darling Pea	Yes	No	No	There are several of records in the Lachlan IBRA subregion. The species is a slender prostrate to erect perennial forb to 25 cm which grows in a variety of vegetation types on clay based soils. The species is known to occur in paddocks that have been moderately grazed or occasionally cultivated. Suitable habitat is present in the development site; however, the species was not recorded during targeted surveys.

Stage 2 – Impact assessment (biodiversity values)

6 Impact assessment (biodiversity values)

This section identifies the potential impacts of proposed HSF on the biodiversity values of the development site and includes measures taken to date and additional recommendations to assist Overland to design a development that avoids and minimises impacts on biodiversity.

6.1 Impact summary

6.1.1 Potential impacts

Potential direct and indirect impacts arising from the development are outlined below. Potential direct impacts arising from the project include:

- Removal of 1.88 hectares of native vegetation within the development site.
- Removal of two scattered paddock trees containing hollows.
- Impacts to connectivity values due to removal of vegetation.

Potential indirect impacts arising from the project include:

- Decreased viability of retained vegetation due to edge effects and use of retained areas of native vegetation due to disturbance and degradation of habitat, including erosion and/or compaction of soils, as well as damage to seedlings and new growth.
- Further encroachment of invasive exotic weeds species, leading to loss of habitat and suppression of native seedling establishment resulting in changes to vegetation communities over time.
- Temporary increased noise levels from construction equipment, leading to disturbance of fauna, especially during breeding seasons.

6.1.2 Recommendations to avoid, minimise and mitigate impacts

The principal means to reduce impacts on biodiversity values within the study area has been to avoid and minimise removal of native vegetation and fauna habitat. Additional recommendations include measures to mitigate residual impacts after all measures to avoid and minimise impacts have been considered.

Recommendations are broken down into site selection and planning, construction and operation.

Site selection and planning

The site has been selected due to its suitability, previous disturbance and location adjacent to an electricity substation.

During the design of the HSF, Overland has considered all biodiversity values identified by Biosis (2016) and have designed the layout of the HSF to avoid, where possible, direct impacts to the identified values. As a result, removal of native vegetation is limited to paddock trees, small patches isolated within cropped paddocks or small corridors through previously disturbed areas. The footprint of the HSF will be restricted to the development site identified in Figure 4.

Site access for construction and operation will be from the Kidman Way. In identifying access points, Overland has located access to minimise vegetation removal. Access points will be through existing farm gates and along existing tracks currently used for agricultural purposes. To connect the PV array to the substation, 0.5 hectares of native vegetation will be removed for overhead lines or trenches.

Construction

No additional direct impacts are expected to occur as a result of the construction phase. However, indirect impacts may result to retained biodiversity values. Additional mitigation measures to avoid and minimise impacts should be outlined in a Construction Environmental Management Plan (CEMP) and include:

- Installation of appropriate exclusion fencing around trees and vegetation to be retained in, or directly adjacent to, the development site:
  - The radius of the tree protection zone (TPZ) is calculated for each tree by multiplying its diameter at breast height (DBH) by 12 (i.e. *TPZ = DBH x 12*) in accordance with the Standards Australia Committee (2009).
  - A TPZ should not be less than 2 metres or greater than 15 metres, except where crown protection is required (Standards Australia Committee 2009).
  - Appropriate signage such as 'No Go Zone' or 'Environmental Protection Area' should be installed.
  - Identify the location of any 'No Go Zones' in site inductions.
  - Fencing should be star pickets with high visibility bunting.
- All material stockpiles, vehicle parking and machinery storage will be located within cleared areas or areas proposed for clearing, and not in areas of retained native vegetation.
- A licenced ecologist should be on-site during vegetation removal to catch and relocate (if appropriate) any wildlife encountered in vegetation or hollow-bearing trees.
- Where practical, all scattered hollow-bearing trees to be removed should be placed in areas of retained vegetation to provide additional fauna habitat.
- Where appropriate native vegetation cleared from the development site should be mulched for re-use on the site, to stabilise bare ground.
- Dust suppression measures should be implemented during construction.
- Implementation of temporary stormwater controls during construction if necessary to ensure that discharges to the drainage channels are consistent with existing conditions.
- Sediment and erosion control measures should be implemented prior to construction works commencing (e.g. silt fences, sediment traps), to protect drainage channels to the west and to the south. These should conform to relevant guidelines, should be maintained throughout the construction period and should be carefully removed following the completion of works.

Operation

The impacts arising from the operation of the HSF are expected to be negligible.

6.1.3 Residual impacts

Residual impacts arising from the HSF include loss of 1.88 hectares, and further fragmentation, of native vegetation and species habitat, loss of scattered paddock trees, potential for species, including TSC Act listed species Major Mitchell's Cockatoo and Grey-crowned Babbler, to no longer be resident in or utilise the area.

6.2 Thresholds for assessment and offsetting

This section outlines the thresholds for assessment and offsetting in accordance with Section 9 of the FBA.

6.2.1 Impact requiring further consideration

This section provides an assessment of impacts requiring further consideration in accordance with Section 9.2 of the FBA.

Landscape features

The development site does not support any 4th, 5th or 6th order streams, estuarine areas, important wetlands, or state or regional biodiversity links. The development site does not support any important wetlands.

There are no impacts to landscape features requiring further consideration.

Native vegetation

One EPBC Act and TSC Act listed endangered ecological community, Weeping Myall Woodland, has been mapped in the broader assessment area along the Kidman Way road reserve. One TSC Act listed endangered ecological community, *Acacia melvillei shrubland in the Riverina and Murray-Darling Depression bioregions*, has also been mapped in the broader assessment area along the Kidman Way road reserve. Both communities are outside the development site and will be avoided. No other endangered ecological communities nominated in the SEARs were mapped in the development site.

Species and populations

The development site does not include any areas of critical habitat.

No impacts to critically endangered or endangered species will result from the proposed HSF.

There are no impacts to species or populations requiring further consideration.

6.2.2 Impacts requiring offsets

Impacts to native vegetation

This section provides an assessment of the impacts to native vegetation requiring offset in accordance with Section 9.3.1 of the FBA.

The proposed infrastructure will result in removal of the following:

- 0.09 hectares of the PCT 57 *Belah/Black Oak – Western Rosewood – Wilga woodlands of central NSW including the Cobar Peneplain Bioregion* (LA106).
- 1.29 hectares of the PCT13 *Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)* (LA108).
- 0.5 hectares of the PCT 15 *Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)* (LA110).

No impacts requiring further consideration were identified. Impacts to these three communities will require offsetting. The remainder of the development site supports non-native vegetation and disturbed land. No further consideration of these areas is required.

Impacts to species and populations

This section provides an assessment of the impacts to species and populations requiring offsets in accordance with Section 9.3.2 of the FBA. The project will not result in removal of habitat for threatened species and populations. No offsets for species or populations are required.

7 Biodiversity credits

This section provides a summary of biodiversity credits required from impacts on the biodiversity values within the development site, following consideration of measures to avoid, minimise and mitigate impacts.

Table 10 provides a summary of ecosystem credits resulting from the proposed development. The full credit profile is provided in Appendix 2.

Table 10 Summary of ecosystem credits for all management zones.

Vegetation Zone	PC type code	Plant community type name	Management zone area (ha)	Loss in landscape value	Loss in site value score	EEC offset multiplier	Credits req for TS	TS with highest credit req	TS offset multiplier	Ecosystem credits required
VZ1	LA106	Belah/Black Oak – Western Rosewood – Wilga woodlands of central NSW including the Cobar Peneplain Bioregion	0.09	14.60	50.52	1.0	3	Yellow-bellied Sheath tail-bat	2.2	3
VZ2	LA108	Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone mainly Riverina Bioregion	1.29	14.60	44.79	1.0	48	Barking Owl	3.0	48
VZ3	LA110	Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW mainly Riverina Bioregion	0.5	14.60	75.52	1.0	30	Barking Owl	3.0	30

8 Assessment of biodiversity legislation

8.1 Environment Protection and Biodiversity Conservation Act 1999

An assessment of the impacts of the proposed development on Matters of NES, against heads of consideration outlined in Commonwealth of Australia (2013) was prepared to determine whether referral of the project to the Commonwealth Minister for the Environment is required. Matters of NES relevant to the project are summarised in Table 11.

Table 11 Assessment of the project against the EPBC Act

Matter of NES	Project specifics	Potential for significant impact
Threatened species	Three flora species and 11 fauna species have been recorded or are predicted to occur in the locality. The majority of these species have the potential to occur in moderate quality remnant woodland, including adjacent road/rail reserves, however they are considered unlikely to occur in the development site.	Significant impact unlikely to result from the proposed development.
Threatened ecological communities	Weeping Myall Woodland Threatened Ecological Community was mapped outside the development site in the Kidman Way road reserve. The proposed development will not result in any impacts to this community.	Significant impact unlikely to result from the proposed development.
Migratory species	Thirteen migratory species have been recorded or are predicted to occur in the locality. The development site does not provide important habitat for an ecologically significant proportion of any of these species.	Significant impact unlikely to result from the proposed development.
Wetlands of international importance (Ramsar sites)	The development site does not flow directly into a Ramsar site and the development is not likely to result in a significant impact.	Significant impact unlikely to result from the proposed development.

8.2 Environmental Planning and Assessment Act 1979

8.2.1 Carrathool LEP

The project will result in the removal of 1.88 hectares native vegetation. However, by avoiding impacts on other better quality vegetation in the broader assessment area the project is consistent with the biodiversity related objectives of the RU1 Primary Production zoning in the Carrathool LEP.

8.2.2 SEPP No. 44

Bimble Box, a Koala feed tree species as defined in Schedule 1 of the SEPP, was identified within the development site. However, this feed tree species does not make up 15 per cent of the total number of trees in the upper or lower strata of the tree component.

Therefore, the vegetation within the development site would not be considered potential Koala habitat as defined under the SEPP.

8.3 Noxious Weeds Act 1993

The NW Act was enacted to provide for the identification, classification and control of noxious weeds. Plants declared as noxious weeds are currently listed under Weed Control Order No. 28 Declaring Certain Plants to be Noxious Weeds published in the New South Wales Government Gazette No. 97 (Department of Premier and Cabinet 2011).

Declared noxious weeds identified in the study area, their control class and legal requirements for each are outlined in Table 12. Treatment for the noxious weeds listed below is recommended within NSW DPI (2011).

Table 12 Noxious weeds recorded within the development site.

Scientific name	Common name	Control class	Legal requirement
Lycium ferocissimum	African Boxthorn	4	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread

9 Biodiversity Offset Strategy

Eighty one (81) ecosystem credits are required to offset the impacts arising from the Hillston Sun Farm.

The proposed Biodiversity Offset Strategy will follow Section 7 of the NSW *Biodiversity Offsets Policy for Major Projects* (OEH 2014a). This will include the following steps:

- Try and identify like-for-like offsets. Like-for-like offsets are identified in OEH (2014a) as:
  - The same PCT, or a PCT in the same vegetation class that has been cleared to an equal or greater extent or up to 10 per cent lower if the percent cleared of the PCT is less than or equal to 70 per cent.
  - Offset must be provided in the same IBRA region or an adjacent IBRA subregion.
- If, after undertaking "reasonable steps", a proponent is unable to identify like-for-like credits, then the variation rules may be applied. The variation rules allow:
  - Impacts on a PCT to be offset with a PCT from the same vegetation formation that has been cleared to an equal or greater extent anywhere in NSW (provided the PCT is not a CEEC or threatened.
- Supplementary measures may apply where offsets are not feasible and other options are needed.

Given the small number of credits required, to offset impacts the identification of a suitable offset site from which to obtain the credits, including potential purchase and / or assessment, may not be considered feasible. Overland has elected to seek retirement of the credits by purchasing them on the open market, subject to availability.

In the first instance, every effort to obtain like-for-like offsets will be pursued. In the preparation of this Biodiversity Offset Strategy the BioBanking public register has been checked for the availability of credits of the same PCT as that being impacted or those listed in the credit profile report (Appendix 2). There are no matching credits currently available on the public register.

In line with the recommendations outlined in Appendix A of OEH (2014a), an expression of interest for the required credits was placed on the OEH 'Credits Wanted Register' on 12 April 2017. This can be viewed at http://www.environment.nsw.gov.au/bimsprapp/SearchCWR.aspx?ID=105.

Biosis, on behalf of Overland, will contact OEH and Carrathool Shire Council to ascertain whether any suitable credits or land held by Council are available. As outlined above, given the small number of credits required, acquisition of land or development of a BioBanking agreement is considered unfeasible.

Should a period of six months lapse since the expression of interest was placed on the public register, with no positive outcome, and all other reasonable steps have been exhausted, then a variation of the offset rules will be applied in which credits can be sought from a PCT in the same vegetation formation as the PCT to which the required ecosystem credits relate (OEH 2014b). PCT 57 is from the Semi-arid Woodlands (Shrubby sub-formation) vegetation formation and PCTs 13 and 15 are from the Semi-arid Woodlands (Grassy sub-formation). A review of the credit register shows that, at this stage, there are no credits listed under these vegetation formations.

10 Conclusions

This assessment has been completed in accordance with the NSW *Biodiversity Offsets Policy for Major Projects* (OEH 2014a) and FBA (OEH 2014b) on behalf of Overland.

The site assessment identified three PCTs within the development site:

- PCT 57: Belah/Black Oak – Western Rosewood – Wilga woodlands of central NSW including the Cobar Peneplain Bioregion (LA106).
- PCT 13: Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion) (LA108).
- PCT15: Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion) (LA110).

These PCTs do not represent any endangered ecological communities listed under NSW TSC Act and Commonwealth EPBC Act.

Through an iterative design process, which considered the biodiversity and Aboriginal cultural heritage values, the impact of the solar farm layout and ancillary infrastructure will be limited to removal of 1.88 hectares of native vegetation and two scattered paddock trees.

Measures to avoid and minimise impacts to vegetation were considered during the design and planning stage of the project, resulting in significant minimisation of impacts on native vegetation. Additional recommendations to mitigate any minor residual impacts are provided in Section 6.

Residual impacts to native vegetation will require retirement of 81 biodiversity credits, as outlined in Table 13.

Table 13 Summary of ecosystem credits.

PCT code	Plant community type name	Ecosystem credits required
LA106	Belah/Black Oak – Western Rosewood – Wilga woodlands of central NSW including the Cobar Peneplain Bioregion	3
LA110	Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW mainly Riverina Bioregion	30
LA108	Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone mainly Riverina Bioregion	48
Total		81

Residual impacts will be offset in accordance with the Biodiversity Offset Strategy.

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Appendices

Appendix 1 Native vegetation data (BioBanking)

A.1 Plot and transect field data

Table 14 Flora species recorded from the study area and Biobanking plot

Notes to table:

*	Indicates an exotic species, including non-indigenous to NSW
Cover	Recorded according to FBA (2014)
Stratum	O = Overstorey; G = Ground layer
Growth form	T = Tree; S = Shrub; H = Herb; G = Grass
Numerous species native to NSW, including those that are locally native in the above list, have been artificially planted on site.	

Family	Scientific Name	Common Name	BioBanking Plot	Cover	Abundance	Stratum	Growth Habit
Aizoaceae	*Tetragonia tetragonioides*	New Zealand Spinach	1	1	100	GC	HB
			2	2	100	GC	HB
			6	1	20	GC	HB
			7	10	50	GC	HB
Amaranthaceae	*Ptilotus nobilis*	Yellowtails	3	1	1	GC	HB
			5	1	1	GC	HB
Asphodelaceae	*Bulbine semibarbata*	Wild Onion	3	1	50	GC	HB
Asteraceae	*Arctotheca calendula**	Capeweed	3	1	1	GC	HB

Family	Scientific Name	Common Name	BioBanking Plot								Cover	Abundance	Stratum	Growth Habit
Asteraceae							5				1	5	GC	HB
	Bidens spp.*						5				1	5	GC	HB
	Calotis lappulacea	Yellow Burr-daisy								8	1	1	GC	HB
	*Carthamus lanatus**	Saffron Thistle								8	1	20	GC	HB
	*Centaurea melitensis**	Maltese Cockspur					5				1	5	GC	HB
	*Conyza bonariensis**	Fleabane	1								1	20	GC	HB
				2							1	50	GC	HB
								6			1	5	GC	HB
									7		1	10	GC	HB
	*Lactuca serriola**	Prickly Lettuce	1								1	10	GC	HB
				2							1	50	GC	HB
					3						2	100	GC	HB
						4					2	50	GC	HB
							5				1	10	GC	HB
									7		1	20	GC	HB
	Leiocarpa websteri				3						1	20	GC	HB
	Minuria cunninghamii	Bush Minuria								8	1	1	GC	HB
	Rhodanthe corymbiflora	Small White Sunray			3						2	100	GC	HB
								6			1	5	GC	HB
	*Sonchus asper**	Prickly Sowthistle			3						1	20	GC	HB

Family	Scientific Name	Common Name	BioBanking Plot	Cover	Abundance	Stratum	Growth Habit
	*Sonchus oleraceus**	Common Sowthistle	1	1	50	GC	HB
			2	1	100	GC	HB
			4	2	100	GC	HB
			5	1	20	GC	HB
			6	1	10	GC	HB
			7	1	10	GC	HB
			8	1	20	GC	HB
	Vittadinia cervicularis		3	1	100	GC	HB
			4	1	20	GC	HB
			5	1	5	GC	HB
			8	1	5	GC	HB
Boraginaceae	*Echium plantagineum**	Patterson's Curse	1	5	100	GC	HB
			2	10	500	GC	HB
			4	2	500	GC	HB
			5	1	20	GC	HB
			6	5	20	GC	HB
			7	1	20	GC	HB
			8	3	50	GC	HB
Brassicaceae	*Carrichtera annua**	Ward's Weed	1	1	100	GC	HB
			2	1	50	GC	HB

Family	Scientific Name	Common Name	BioBanking Plot								Cover	Abundance	Stratum	Growth Habit
						4					1	50	GC	HB
							5				1	5	GC	HB
								6			1	10	GC	HB
	*Lepidium africanum**	Common Peppercress					5				1	5	GC	HB
	Menkea australis	Fairy Spectacles		2							1	100	GC	HB
					3						1	10	GC	HB
	*Rapistrum rugosum**	Turnip Weed					5				1	5	GC	HB
	*Sisymbrium erysimoides**	Smooth Mustard	1								2	100	GC	HB
				2							20	1000	GC	HB
					3						2	100	GC	HB
								6			1	20	GC	HB
									7		20	500	GC	HB
	*Sisymbrium irio**	London Rocket			3						2	50	GC	HB
						4					3	500	GC	HB
	*Sisymbrium officinale**	Hedge Mustard								8	5	50	GC	HB
Campanulaceae	*Wahlenbergia communis*	Tufted Bluebell			3						1	20	GC	HB
	Wahlenbergia gracilis	Sprawling Bluebell					5				1	20	GC	HB
								6			1	5	GC	HB
Capparaceae	*Apophyllum anomalum*	Warrior Bush							7		1	1	M	S

Family	Scientific Name	Common Name	BioBanking Plot								Cover	Abundance	Stratum	Growth Habit
Chenopodiaceae	*Atriplex leptocarpa*	Slender-fruit Saltbush					5				1	10	GC	HB
							5				1	1	M	S
							5				1	1	GC	HB
									7		1	10	GC	HB
	Atriplex lindleyi	Eastern Flat-top Saltbush				4					1	20	GC	SHRUB
								6			1	10	GC	HB
	*Chenopodium album**	Fat Hen							7		1	1	GC	HB
	Chenopodium desertorum	Desert Goosefoot			3						1	50	GC	SHRUB
							5				1	2	GC	HB
								6			1	5	GC	HB
	Chenopodium nitrariaceum	Nitre Goosefoot				4					3	50	S	S
	Einadia nutans	Climbing Saltbush			3						2	50	GC	S
						4					1	50	GC	HB
							5				1	10	GC	HB
								6			1	20	GC	HB
									7		1	20	GC	HB
										8	1	10	GC	HB
	Einadia polygonoides	Knotweed Goosefoot	1								1	2	GC	HB
				2							1	10	GC	HB

Family	Scientific Name	Common Name	BioBanking Plot								Cover	Abundance	Stratum	Growth Habit
	Enchylaena tomentosa	Ruby Saltbush	1								1	100	GC	HB
				2							1	20	GC	HB
					3						10	500	GC	HB
						4					3	500	GC	HB
							5				1	10	GC	HB
								6			2	20	GC	HB
									7		1	20	GC	HB
										8	2	50	GC	HB
	Salsola tragus	Buckbush,Soft Rolpoly, Saltwort	1								1	50	GC	HB
						4					1	50	S	HB
	Salsola tragus subsp. *tragus*	Buckbush,Soft Rolpoly, Saltwort						6			1	5	GC	HB
	Sclerolaena bicornis	Goathead Burr						6			1	10	GC	S
	Sclerolaena birchii	Galvinized Burr	1								1	50	GC	S
				2							1	100	GC	S
						4					1	50	GC	S
							5				1	5	GC	S
									7		1	2	GC	S
	Sclerolaena diacantha	Grey Copperburr			3						2	100	GC	S
	Sclerolaena muricata var.	Black Rolypoly	1								1	20	GC	S

Family	Scientific Name	Common Name	BioBanking Plot								Cover	Abundance	Stratum	Growth Habit
	muricata			2							1	50	GC	S
	Sclerolaena muricata var. *villosa*	Black Rolypoly					5				1	2	GC	S
									7		1	20	GC	S
Convolvulaceae	*Convolvulus erubescens*	Pink Bindweed	1								1	10	GC	HB
					3						1	1	GC	HB
							5				1	5	GC	HB
										8	1	1	GC	HB
Crassulaceae	*Crassula* sp				3						1	100	GC	HB
	Crassula sp							6			1	20	GC	HB
Cupressaceae	*Callitris glaucophylla*	White Cypress Pine					5				60	20	O	T
Fabaceae (Caesalpinioideae)	*Senna artemisioides nothosubsp. coriacea*							6			1	1	M	S
	Senna artemisioides subsp. *zygophylla*				3						2	5	M	S
							5				1	1	M	S
								6			2	2	M	S
Fabaceae (Faboideae)	*Medicago polymorpha**	Burr Medic	1								10	1000	GC	HB
				2							10	1000	GC	HB
					3						10	1000	GC	HB
						4					3	500	GC	HB
							5				5	500	GC	HB

Family	Scientific Name	Common Name	BioBanking Plot								Cover	Abundance	Stratum	Growth Habit
								6			2	50	GC	HB
									7		10	100	GC	HB
										8	10	100	GC	HB
	*Medicago truncatula**	Barrel Medic			3						2	500	GC	HB
						4					5	500	GC	HB
Fabaceae (Mimosoideae)	*Acacia* spp.	Wattle						6			30	20	O	T
Geraniaceae	*Erodium crinitum*	Blue Crowfoot	1								1	20	GC	HB
						4					1	50	GC	HB
Lamiaceae	*Marrubium vulgare**	White Horehound	1								1	20	GC	HB
						4					3	100	GC	HB
									7		1	20	GC	HB
	Teucrium racemosum	Grey Germander								8	1	1	GC	HB
Loranthaceae	*Lysiana exocarpi* subsp. *exocarpi*		1								1	1	O	S
Malvaceae	*Malva parviflora**	Small-flowered Mallow	1								1	50	GC	HB
						4					1	50	GC	HB
	Sida corrugata	Corrugated Sida			3						1	1	GC	HB
						4					1	10	GC	HB
	Sida cunninghamii	Ridge Sida			3						1	50	GC	HB
							5				1	1	GC	HB

Family	Scientific Name	Common Name	BioBanking Plot							Cover	Abundance	Stratum	Growth Habit
								7		1	5	GC	HB
									8	1	20	GC	HB
	Sida spp.*				3					1	5	GC	HB
Myoporaceae	*Eremophila longifolia*	Emu bush			3					1	2	M	S
						4				1	1	M	S
									8	2	7	M	S
Myrtaceae	*Eucalyptus largiflorens*	Black Box			3					2	2	O	T
						4				20	10	O	T
								7		10	2	O	T
	Eucalyptus populnea	Bimble Box			3					15	8	O	T
						4				5	2	O	T
								7		40	10	O	T
Nyctaginaceae	*Boerhavia dominii*	Tarvine	1							1	20	GC	HB
Oxalidaceae	*Oxalis perennans*						5			1	5	GC	HB
Poaceae	*Aristida behriana*	Bunch Wiregrass					5			2	50	GC	G
	Austrostipa nitida		1							1	20	GC	G
				2						1	100	GC	HB
						4				1	50	GC	G
							5			10	100	GC	G
	Austrostipa scabra subsp.	Rough Speargrass			3					1	100	GC	G

Family	Scientific Name	Common Name	BioBanking Plot								Cover	Abundance	Stratum	Growth Habit
	scabra						5				10	100	GC	G
								6			1	20	GC	G
										8	20	100	GC	G
	*Avena fatua**	Wild Oats	1								1	50	GC	G
				2							5	1000	GC	G
					3						1	50	GC	G
						4					3	500	GC	G
							5				2	50	GC	G
								6			1	5	GC	G
										8	5	500	GC	G
	*Bromus rubens**	Red Brome			3						1	10	GC	G
							5				1	20	GC	G
								6			1	20	GC	G
	Enteropogon acicularis	Curly Windmill Grass			3						1	10	GC	G
							5				1	20	GC	G
								6			1	10	GC	G
									7		1	1	GC	G
	Hordeum spp.*	A Barley Grass	1								70	1000	GC	G
				2							60	1000	GC	G
						4					40	1000	GC	G

Family	Scientific Name	Common Name	BioBanking Plot								Cover	Abundance	Stratum	Growth Habit
							5				40	500	GC	G
									7		25	500	GC	G
										8	75	1000	GC	G
	*Lolium rigidum**	Wimmera Ryegrass	1								1	100	GC	G
				2							1	1000	GC	G
					3						1	100	GC	G
						4					10	1000	GC	G
							5				1	20	GC	G
								6			1	10	GC	G
									7		1	20	GC	G
										8	1	10	GC	HB
	Paspalidium gracile	Slender Panic			3						1	10	GC	G
										8	1	1	GC	HB
	Rytidosperma caespitosum	Ringed Wallaby Grass		2							1	10	GC	G
					3						5	500	GC	G
	Rytidosperma setaceum	Small flower Wallaby Grass					5				2	20	GC	G
	*Schismus barbatus**	Arabian Grass						6			1	20	GC	G
	Sporobolus caroli	Fairy Grass			3						1	10	GC	G
	*Vulpia bromoides**	Squirrel Tail Fesque			3						2	500	GC	G

Family	Scientific Name	Common Name	BioBanking Plot								Cover	Abundance	Stratum	Growth Habit
						4					2	500	GC	G
								6			2	100	GC	G
	Whalleya proluta					4					None	None	None	None
Polygonaceae	*Muehlenbeckia florulenta*	Lignum			3						5	50	M	S
						4					5	50	M	S
									7		1	1	M	S
										8	1	1	M	S
Portulacaceae	*Calandrinia* sp.							6			1	50	GC	HB
Rutaceae	*Geijera parviflora*	Wilga	1								10	5	O	T
				2							5	3	O	T
Sapindaceae	*Dodonaea viscosa*	Sticky Hop-bush					5				1	1	M	S
Solanaceae	*Lycium ferocissimum**	African Boxthorn		2							1	5	GC	S
						4					1	10	S	S
							5				1	1	GC	S
									7		10	50	S	S
	Solanum esuriale	Quena						6			1	5	GC	HB

A.2 Plot and transect summary

Table 15 Plot scores for each vegetation zone within the development site

Plot name	Native plant species	Native over-storey cover	Native mid-storey cover	Native ground cover (grass)	Native ground cover (shrubs)	Native ground cover (other)	Exotic plant cover	Number of trees with hollows	Over-storey regen	Total length of fallen logs
Plot 1	12	7	0	0	0	10	88	0	1.0	55
Plot 2	9	17	0	0	0	2	100	0	1.0	3
Plot 3	24	27	3	18	20	42	46	2	1.0	56
Plot 4	15	4	0	4	20	22	94	0	1.0	26
Plot 5	22	8	0	62	12	26	98	0	0.0	0
Plot 6	15	0	6	10	60	32	58	0	1.0	0
Plot 7	12	7	0	2	4	30	100	6	1.0	12
Plot 8	12	0	3	0	22	28	92	0	None	0

Appendix 2 Credit profile report

Credit profile report

Biodiversity credit report

This report identifies the number and type of biodiversity credits required for a major project.

Date of report: 23/03/2017 Time: 4:45:14PM Calculator version: v4.0

Major Project details

Proposal ID:	0103/2016/4029MP
Proposal name:	Hillston Solar Farm
Proposal address:	Kidman Way Hillston NSW 2675
Proponent name:	Overland Sun Farming Company Pty Ltd
Proponent address:	PO Box 589 Burwood VIC 3125
Proponent phone:	+61 428 327 372
Assessor name:	Nathan Garvey
Assessor address:	8 Tate Street WOLLONGONG NSW 2500
Assessor phone:	4229 5222
Assessor accreditation:	0103

Summary of ecosystem credits required

Plant Community type	Area (ha)	Credits created
Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion	0.09	3.00
Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	1.29	48.00
Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	0.50	30.00
Total	1.88	81

Credit profiles

1. Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion), (LA108)

Number of ecosystem credits created	48
IBRA sub-region	LA - Lachlan

Offset options - Plant Community types	Offset options - IBRA sub-regions
Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion), (LA108) Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion), (LA109) Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion), (LA110)	LA - Lachlan and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

2. Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion), (LA110)

Number of ecosystem credits created	30
IBRA sub-region	LA - Lachlan

Offset options - Plant Community types	Offset options - IBRA sub-regions
Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion), (LA110) Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion), (LA108) Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion), (LA109)	LA - Lachlan and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

3. Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion, (LA106)

Number of ecosystem credits created	3
IBRA sub-region	LA - Lachlan

Offset options - Plant Community types	Offset options - IBRA sub-regions
Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion, (LA106)	LA - Lachlan and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

Summary of species credits required