Calala Battery Energy Storage System

Biodiversity Development Assessment Report

FINAL REPORT

Prepared for Equis Energy (Australia) Projects (Ngumi 4) Pty Ltd as trustee for the Equis Energy (Australia) Ngumi 4 Holding Trust

8 May 2024

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- NSW Department of Primary Industries for access to indicative mapping of freshwater threatened species and fish populations.
- Biosis staff involved in this project were:
- Brendon True (reporting and fieldwork)
- Felicity Edwards and Kaisha Edwards (reporting
- Jenny Beckius (mapping)

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Glossary

Assessment Area	All land within 500 m of a linear development or 1500 m of a site based development
AUD	Australian dollar
BAM	NSW Biodiversity Assessment Method
BAM-C	BAM Calculator
BC Act	*Biodiversity Conservation Act 2016*
BCS	Biodiversity Conservation and Science
BDAR	Biodiversity Development Assessment Report
Biosecurity Act	*Biosecurity Act 2015*
BOS	Biodiversity Offsets Scheme
CEEC	Critically Endangered Ecological Community
CEMP	Construction Environmental Management Plan
Cth DCCEEW	Australian Government Department of Climate Change, Energy, the Environment and Water
DBH	Diameter at Breast Height
DCDB	Digital cadastral database
Development footprint	The area of land that is directly impacted by the proposal
DoIW	Directory of Important Wetlands
DP	Deposited Plan
DPHI	Department of Planning, Housing and Infrastructure, formally NSW Department Planning and Environment
DPI	NSW Department of Primary Industries
DTDB	Digital topographic databases
Ecosystem credits	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
Ecosystem credit species	Threatened species whose occurrence can generally be predicted by vegetation surrogates and/or landscape features, or that have a low probability of detection using targeted surveys. A targeted survey is not required to identify or confirm the presence of ecosystem credit species.
EEC	Endangered Ecological Community
EHG	Environment and Heritage Group of the NSW Department of Planning and Environment.
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
GDE	Groundwater Dependent Ecosystem
GIS	Geographic Information System

IBRA	Interim Biogeographic Regionalisation of Australia
LEP	Local Environmental Plan
LGA	Local Government Area
Locality	Area located within 10 kilometres radius from the subject land
LPI	NSW Land and Property Information
MNES	Matters of National Environmental Significance protected by a provision of Part 3 of the EPBC Act
MW	Megawatt
MWh	Megawatt hours
NPW Act	*National Parks and Wildlife Act 1974*
NSW DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water
PCT	Plant Community Type
SAII	Serious and Irreversible Impact
SALIS	NSW Soil and Land Information System
SEPP	NSW State Environmental Planning Policy
Species credits	A class of biodiversity credits required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates
Species credit species	Threatened species for which vegetation surrogates and/or landscape features cannot reliably predict the likelihood of their occurrence or components of their habitat. A targeted survey or an expert report is required to confirm the presence of these species on the subject land. Alternatively, the proponent may elect to assume the species is present for development/clearing projects only
SSD	State Significant Development
Subject land	A buffered area beyond the development footprint including areas of any potential indirect and prescribed impacts., based on biodiversity values present, to which the BAM has been applied
TEC	Threatened Ecological Community
TBDC	Threatened Biodiversity Data Collection

Certification and Declarations

I, Brendon True, certify that this report has been prepared on the basis of the requirements of, and information provided under the Biodiversity Assessment Method (DPIE 2020) and s6.15 of the *Biodiversity Conservation Act 2016*.

In preparing this assessment I have acted in accordance with the Accredited BAM Assessor Code of Conduct.

I declare that I have considered the circumstances and there is no actual, perceived or potential conflict of interest.

Signature: 

Date: 08/05/2024

BAM Assessor Accreditation Number: BAAS18155

Summary

Background

Equis Energy (Australia) Projects (Ngumi 4) Pty Ltd as trustee for the Equis Energy (Australia) Ngumi 4 Asset Holding proposes to develop land at 474 Calala Lane, Calala, New South Wales (NSW) (Figure 1) as a Battery Energy Storage System (BESS) (the Project). The Project will involve the construction and operation of a large-scale BESS with a capacity of up to 300 Megawatts will provide up to 600 Megawatt hours of battery storage capacity or up to 2 hours of storage duration. The BESS will connect to the nearby TransGrid Tamworth 330 kV substation via an underground transmission line.

Since lodgement of the State Significant Development Application, it is noted the Project has been amended and this report will supplement and Amendment Report to be submitted to the Department of Planning, Housing and Infrastructure (DPHI). It is understood the Project incorporates the following amendments:

- Battery footprint reduction.
- Noise attenuation walls reduced as a result of the reduced battery footprint.
- Minor realignment of internal access roads.
- Transmission line marginally shifted north within the BESS land only.
- Site substation economised.
- Increased landscape features along west and south interface.
- Construction laydown area consolidated and repositioned.
- Temporary stockpile area identified.
- Benching and soil removing economised.

The Project is considered a State Significant Development (SSD) and will be assessed under Part 4 NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). SSDs are subject to the requirements of Biodiversity Offsets Scheme (BOS), and an assessment is required in accordance with the NSW *Biodiversity Assessment Method* (BAM) (DPIE 2020a) and the *Biodiversity Conservation Act 2016* (BC Act). This Biodiversity Development Assessment Report (BDAR) has been prepared by Brendon True, an Accredited Assessor (BAAS18155), to accompany the SDD Application. This BDAR describes the outcome of the development assessment case (00034966/BAAS18155/22/00034967/Revision 5) conducted consistent with the BAM.

Threatened species overview

Field investigation, undertaken in accordance with the BAM, recorded 14.2 hectares of native vegetation within the subject land, representing two plant community types (PCT) and two threatened ecological communities (TECs):

- PCT 84: River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion.
- PCT 599: Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion.
  - Listed under the BC Act as *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South,*

Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered).

- Listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (Critically Endangered).

Impact summary

Avoidance of native vegetation, threatened ecological communities and threatened species habitat have been undertaken to restrict impacts to:

- 0.16 hectares of PCT 84.
- 1.63 hectares of PCT 599 (including 1.63 hectares of BC Act listed TEC and 1.31 hectares of associated EPBC Act listed TEC).

Consideration has been given to avoiding and minimising impacts to biodiversity where possible during the assessment and preliminary and concept design. Mitigation and management measures will be put in place to adequately address impacts associated with the Project, both direct, indirect and prescribed.

Offset requirements

In accordance with Section 10 of the BAM, offsets are required to be secured for the Project for impacts to PCTs 84 and 599 as follows:

- PCT 84 –2 credit.
- PCT 599 – 33 credits.

The Project is not considered likely to result in a significant impact to species or communities listed under the EPBC Act, and as such a referral to the Commonwealth Minister of Climate Change, Energy, the Environment and Water is not deemed necessary.

STAGE 1 – BIODIVERSITY ASSESSMENT

1 Introduction

Equis Energy (Australia) Projects (Ngumi 4) Pty Ltd as trustee for the Equis Energy (Australia) Ngumi 4 Holding Trust (the proponent) is proposing to develop a stand-alone 300 megawatt (MW) 600 MW-hour battery energy storage system (BESS) at 474 Calala Lane (the Project).

The Project will be able to support and firm the NSW grid system by supplying electricity to homes and businesses during peak times of electricity demand. The Project has an estimated capital investment value exceeding (AUD) $ 30 million and is classified as State Significant Development (SSD) under *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP).

Biosis Pty Ltd (Biosis) was commissioned by Mecone Group Pty Limited (Mecone) to prepare a Biodiversity Development Assessment Report (BDAR) prepared in accordance with the NSW Biodiversity Assessment Method (BAM) (DPIE 2020a). The BDAR is to be submitted to the approval authority as part of a SSD application, under Part 4 of the of the *Environmental Planning and Assessment Act 1979* (EP&A Act), for the Project.

1.1. Project description

The Project involves the construction and operation of a large-scale BESS at 474 Calala Lane, Calala NSW (Lot 17 DP 629969) (Figure 1).The BESS will have a capacity up to 300 MW and will provide up to 600 MWh of battery storage capacity or up to 2 hours of storage duration. The Project will comprise the following:

- Large-scale BESS including battery enclosures, inverters, DC and AC combiner boxes, transformers and auxiliary components.
  - 33/330 kilovolt (kV) switchyard.
  - Underground transmission line connection between the BESS and the nearby TransGrid Tamworth 330 kV substation across Lots 16-17 DP 629969, Lots 3-4 DP244399, underneath Burgess Lane then connecting to the substation at Lot 6 DP219993.
- Ancillary elements including site access from Calala Lane, internal access roads and parking, control room and staff amenities, warehouse, stormwater and fire management infrastructure, utilities, signage, fencing, security systems, noise attenuation walls and landscaping.

Biosis was previously engaged by Equis to prepare a constraints assessment for the Project (Biosis 2022) to inform citing of the BESS and transmission line connection to avoid areas of highest biodiversity value.

1.2. Purpose of this assessment

This BDAR will:

- Address the BAM (DPIE 2020a) and the NSW Biodiversity Offset Scheme (BOS).
- Identify how the proponent has avoided and minimised impacts to biodiversity.
- Identify any potential impact that could be characterised as serious and irreversible (SAII).
- Describe the offset obligations required to compensate for any unavoidable biodiversity impacts resulting from the Project.

- Consider and assess the proposal in accordance with other relevant legislation such as the Commonwealth *Environmental Protection Biodiversity Conservation Act 1999* (EPBC Act).

All biodiversity assessments have been undertaken in accordance with the BAM, and this BDAR has been prepared and reviewed by Accredited Assessor Brendon True (BAAS18155). This BDAR describes the outcome of the development assessment case (00034966/BAAS18155/22/00034967) conducted consistent with the BAM.

1.3. The subject land, development footprint and assessment area

The terms subject land, development footprint and assessment area are used throughout this BDAR and are defined below.

- The development footprint comprises the BESS footprint, access road, easements and underground transmission line.
- The subject land - The area of on-ground assessment for this BDAR and where the BAM has been applied. The subject land is located in the Tamworth Council Local Government Area (LGA) and the North West Local Land Services (LLS) Region and is zoned RU4: Primary Production Small Lots under the Tamworth Local Environmental Plan 2010 (LEP).
- The assessment area includes the subject land and the area of land within 1500 metres surrounding the subject land.
- Category 1 exempt land - within the meaning of Part 5A of the *Local Land Services Act 2013* (LLS Act), has been mapped across significant portions of the subject land, within Lots 16-17 DP 629969 and Lot 6 DP219993. See Section 2.2 for details.

1.4. Sources of information

Sources of information used in the assessment included relevant databases, spatial data, literature and previous site reports.

In order to provide a context for the assessment area, records of flora and fauna from within 10 kilometres (the locality) were collated from the following databases and datasets were reviewed:

- Commonwealth Department of Climate Change, Energy, the Environment and Water (Cth DCCEEW) Protected Matters Search Tool for matters protected by the EPBC Act.
- NSW BioNet - the database for the Atlas of NSW Wildlife, NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW), for species, populations and ecological communities listed under the *Biodiversity Conservation Act 2016* (BC Act).
- NSW BAM Calculator (BAM-C).
- Biodiversity values map (DPE 2023a).
- Native vegetation regulatory map.
- BAM Important Areas maps (DPE 2023b).
- PlantNET (The Royal Botanic Gardens and Domain Trust).
- BirdLife Australia, the New Atlas of Australian Birds 1998-2015.

Other sources of biodiversity information relevant to the assessment area were sourced from:

- The NSW Plant Community Types (PCTs), as held within the BioNet Vegetation Classification (Veg-C) database (NSW DCCEEW 2024a).
- Relevant vegetation mapping, such State Vegetation Type Map: Border Rivers Gwydir / Namoi Region Version 2.0 VIS_ID 4467 (DPIE 2015).

The following reports were also reviewed and relied on to provide additional information:

- Ecological constraints and opportunities assessment, 474 Calala Lane, Calala) NSW (Biosis 2022)
- Scoping Report - Calala Battery Energy Storage System (Mecone 2022).

Basemap data was obtained from NSW Land and property information (LPI) 1:25,000 digital topographic databases with cadastral data obtained from LPI digital cadastral database.

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

- Mitchell Landscapes Version 3.0.
- Interim Biogeographic Regionalisation of Australia (IBRA) Version 7.
- Directory of Important Wetlands (DoIW).
- NSW Soil and Land Information System (SALIS).
- Mapping has been produced using a Geographic Information System (GIS). The following maps and data have been provided:
  - Digital mapping with aerial photography showing 1:1000 or finer.
  - Site map as described in subsection 3.1.1 of the BAM (DPIE 2020a).
  - Location map as described in subsection 3.1.2 of the BAM (DPIE 2020a).
  - Landscape map with features including 1,500 metre buffer, as described in section 3.1.3 of the BAM (DPIE 2020a).

1.5. Legislative requirements

The Project has been assessed against relevant biodiversity legislation and government policy, including:

- EPBC Act.
- EP&A Act.
- BC Act.
- *Fisheries Management Act 1994* (FM Act).
- *Biosecurity Act 2015* (Biosecurity Act).

1.6. Response to submissions – Biodiversity Conservation and Science (BCS)

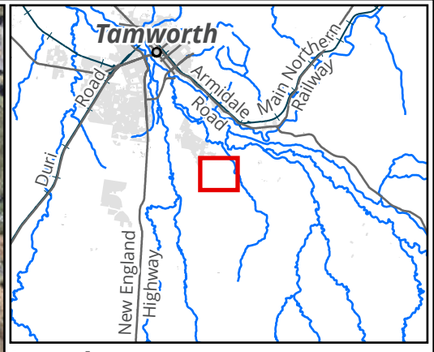
Following submission of the EIS and the accompanying BDAR, BCS requested further information in a Response to Submission (RTS) on the 15 December 2023. A summary of RTS by BCS with further details and reference to the relevant section of the BDAR is provided in Table 1. It should be noted that post BCS submissions the development footprint has been updated, as well as further plot data collected and targeted survey undertaken in February 2024.

Table 1 Response summary to BCS submissions

Reference	Summary	Concern	Biosis response
BCS			
1	*The land categorisation assessment must demonstrate compliance with legislation*	The Biosis land categorisation makes some small deviations from both the draft NVR map and the published transitional NVR map without explanation. a) Land mapped as Category 2 – vulnerable regulated on the transitional NVR map cannot be designated as Category 1 – exempt in the land categorisation for the project. b) Evidence supporting designation of Category 1 – exempt land at the entrance from Calala Lane is needed.	• Biosis undertook a review of land categorisation. Boundaries of Category 1 and Category 2 land were adjusted to ensure all Category 2 – vulnerable regulated on the transitional NVR map has been designated as such. • Land at the entrance to the subject land off Calala Lane has been mapped as Category 2 land containing non-native vegetation or native vegetation.
2	*Presence or absence of the White box, Yellow box, Blakely's red gum Critically Endangered Ecological Community*	The method used to determine the presence or absence of the White box, Yellow box, Blakely's red gum Critically Endangered Ecological Community (Box Gum Woodland) woodland requires clarification.	• Table 3 in Section 3.1.6 has been updated to further detail how PCT 599 satisfies the NSW Scientific Committee Final Determination of ecological community. This includes analysis of plot data collected within PCT 599. • Additional plot data was collected and land categorisation mapping was updated accordingly to reflect the distribution of Box Gum Woodland within the subject land. • All Box Gum Woodland has been mapped as Category 2 land. • All figures, SAII, spatial data, and BAM-C calculations were updated as necessary.
3	*Landscape context factors and threatened flora survey requirements need review to ensure correct application of the BAM and confirm the predicted species list and species polygons*	Native vegetation cover percentage should be reviewed	• Details of the methods used to calculate native vegetation cover have been updated in Section 2.1.1. • Native vegetation cover has increased from 6% to 18%. • All additional ecosystem credit species and species credit species have been assessed.
4	*Landscape context factors and threatened flora survey requirements need review to ensure correct application of the BAM and confirm the predicted species list and species polygons*	The BDAR has underestimated the patch size for vegetation zone 'PCT_599_Woodland'	• Section 4.2.1 Patch size for PCT_599_Woodland was recalculated to reflect the updated vegetation mapping within the subject land mapping of native vegetation cover. • All vegetation zones are now considered to have a patch size of ≥100 ha.

Reference	Summary	Concern	Biosis response
			• All additional ecosystem credit species and species credit species have been assessed.
5	*Suitability of survey conditions for two threatened flora species is not addressed*	Reliable detection of two of the five threatened flora species targeted is influenced by preceding rainfall (Threatened Biodiversity Data Collection): • Hawkweed (*Picris evae*) – the recommended survey window is November to February, more than two months after soaking rain. • Bluegrass (*Dichanthium setosum*) – the recommended survey window is November to May, three to four weeks after effective rainfall.	• Section 4.2.1 has been updated to detail the suitability of survey conditions for these two species. Broadly, the timing of both survey rounds (February 2023 and February 2024) is considered suitable for detection of Bluegrass and Hawkweed. Noting that only the 2024 survey need be relied upon for survey within the development footprint. • Species polygons for all targeted flora species have been updated to reflect the results of targeted survey undertaken in February 2024.
6	*BCS recommends revisions to mitigation measures for the box gum woodland CEEC*	Revision of Section 7 'Mitigation and management of impacts' is required to meet the BAM requirements	• Section 7 has been updated to include provision of a Biodiversity Management Plan (BMP) to guide rehabilitation works for Box Gum Woodland. • The area that is proposed to be subject to rehabilitation works has been added to Figure 10.

7	*Preliminary 'Serious and Irreversible Impact' (SAII) advice*	Revise the SAII assessment for box gum woodland CEEC as necessary to address:
		a) any revisions to the extent of box gum woodland CEEC identified on the site in response to BCS recommendations in Point 2.
		b) specific and targeted commitments to be implemented pre-, during and post-construction.
			• Appendix 5 has been updated to reflect:
			  • The revised coverage of Box Gum Woodland within the subject land resulting from subject land boundary change and additionally plot data collection.
			  • Revised mitigation measures in Section 7.



Legend

- Subject land
- Development footprint
- Underground

Figure 1 Subject land

0 50 100 150 200

Metres
Scale: 1:5,500 @ A3
Coordinate System:
GDA2020 MGA Zone 56

N

biosis

Matter: 40128, Date: 04 April 2024,
Prepared by: JB, Prepared for: BT, Last edited by: jbeckius
Location: P:\40100s\40128\Mapping\
40128_Calala_BESS_BDAR_Updates_F1-4.aprx
Layout: 40128_F1_SubjectLand

Acknowledgements: Basemap © Land and Property Information 2016; Imagery © NearMap 2023

2. Landscape Context

This chapter describes the landscape and site context of the subject land, describing the landscape features present within the subject land and within a 1500 metre buffer, as required by the BAM (DPIE 2020a). Figure 1 shows the location of the subject land, landscape features within the assessment area are shown in Figure 2 and Figure 3.

2.1. Subject land description

The subject land is located approximately nine kilometres southeast of the Oxley Highway between Tamworth and Westdale in northwest NSW. Current land use is predominantly for primary production, while the remainder of the subject land is comprised of a combination of residential, infrastructure and public recreation.

The subject land is predominantly cleared of native vegetation, where extensive past clearing for agriculture such as cropping, improved pasture and livestock grazing is evident across the landscape. Areas of degraded native vegetation in the form of modified derived grasslands occur to the west of the subject land. Vegetation now consists of scattered trees, a small remnant patch and planted rows of native tree species.

The subject land is within the Fullwoods Hill and Duri soil landscapes of the Tamworth 1:100,000 Sheet mapping report (Banks 2001). The Fullwoods Hill soil landscape is characterised by rocky crests and steep slopes of hills and low hills, on highly variable, complex soils. The vegetation of this landscape has been largely cleared for livestock, but remaining vegetation exits as woodland or open woodland dominated by White Box *Eucalyptus albens* Tumbledown Red Gum *Eucalyptus dealbata* and White Cypress Pine *Callitris glaucophylla.* Soil erosion is common within this landscape due to high level of grazing by livestock and development of crops (Banks 2001). The Duri soil landscape is characterised by rolling to undulating hills and low hills on complex soils often dominated by moderately deep, moderately drained red and brown chromosols. Similarly, this landscape has been extensively cleared for agriculture, but vegetation is typically open woodland and closed grassland typically comprised of a Eucalypt canopy including White Box, Yellow Box *Eucalyptus melliodora,* Blakely's Red Gum *Eucalyptus blakelyi* and River Red Gum *Eucalyptus camaldulensis.* Extensive past cropping and grazing is evident across this landscape, contributing to significant erosion within gullies and across the landscape (Banks 2001).

2.1.1. Native vegetation cover

Vegetation within the assessment area was assessed using the following data sets and aerial photographic interpretation:

- Vegetation mapping for the subject land prepared for this BDAR
- Existing vegetation mapping (DPIE 2015)
- *NSW Landuse 2017 dataset* (DPIE 2020b)
- *NSW Native Vegetation Extent 5m Raster v1.2*

All candidate Category 2 land uses as mapped on the *NSW Landuse 2017 dataset* and all 'Tree cover', 'Tree cover matrix' and 'Forestry Plantations' polygons from the *NSW Native Vegetation Extent 5m Raster v1.2* were included in the mapping of native vegetation cover. After this composite GIS layer was produced, aerial

interpretation was used to detect if any potential areas of native vegetation within the assessment area were not covered by the above process. This was mostly the case for small patches of woody vegetation or single trees and these areas were added manually.

The total area of the assessment area is 1476.6 hectares, with the area of native vegetation mapped being 254.2 hectares. This is a native vegetation cover of 18% (>10–30% class as defined in Section 3.2.3 of the BAM (DPIE 2020a)) and this value was entered into the BAM-C.

2.1.2. IBRA Bioregions and subregions

The subject land occurs within the Nandewar IBRA bioregion and the Peel IBRA subregion. The Nandewar Bioregion extends from northern NSW into Queensland covering 2,701,977 hectares in total. It occupies approximately 2.59% of NSW and is bounded by the North Coast Bioregion in the south, New England Tablelands Bioregion in the east, and the Brigalow Belt South Bioregion in the west. The Nandewar Bioregion is intersected by several major rivers and is characterised by varying topography, formed on Palaeozoic sedimentary rocks on the New England Tablelands and Tertiary basalts of Inverell and Kaputar. Rainfall and climate vary extensively across the landscape depending on the elevation, where the hillier terrain is typically warmer and drier than the tablelands. The Nandewar Bioregion is typically comprised of box woodlands on clay or loam soils, transitioning into Ironbark and Cypress Pine communities with increased topographic relief. Changes in elevation, soils and environment heavily influence the plant communities that are present within this Bioregion, and dominant species may vary between steep mountainous terrain, and riparian habitat. The Nandewar Bioregion comprises the Peel, Kaputar, Nandewar Northern Complex, and the Inverell Basalts subregions (Roshan, S et al. 2003).

2.1.3. Rivers and streams

The subject land is located within the North West Local Land Services (LLS) region and the Namoi catchment. The closest river is the Peel River located approximately 610 metres to the north, with the Cockburn River a further 1150 metres north. The nearest named waterway is Calala Creek which enters the north of the subject land from the east and flows northwest towards the Peel River.

Topographic mapping indicates that two watercourses and three man-made dams are present within the subject land (Spatial Services 2021). A first order (Strahler 1964) tributary of Calala Creek originates in the centre of the subject land and feeds Calala Creek (Figure 1). Calala Creek has been heavily modified over time, where vegetation has been extensively cleared for agriculture and direction has been altered by development of roads. The portion within the subject land is highly ephemeral and characterised by a shallow, damp depression with no clearly defined banks or riparian zone.

There are no Key Fish Habitats (KFH) as mapped by the NSW Department of Primary Industries (DPI) within the subject land (DPI 2013), however, the Peel River to the north, the north-eastern portion of Calala Creek where it joins the Peel River and a man-made dam in the south east are mapped as KFH by NSW DPI.

2.1.4. Wetlands

No wetlands are mapped within the subject land or assessment area. The subject land lies approximately 170 kilometres southwest of the Ramsar wetland Little Llangothlin Nature Reserve. Ramsar wetlands are representative, rare or unique wetlands, or are important for conserving biological diversity. They are included on the List of Wetlands of International Importance developed under the Ramsar convention. The Little Llangothlin Nature Reserve was listed for the following reasons:

- Criterion 1: *A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.*
- Criterion 2: *A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.*
- Criterion 4: *A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.*

As noted in Section 2.1.3, three man-made dams are present within the subject land.

2.1.5. Connectivity

The vast majority of the subject land and assessment area is cleared of woody vegetation such that no clear connectivity features are present. Accordingly, the subject land and assessment area cannot be said to contain linkage or connectivity to larger areas of vegetation in the surrounding landscape. Riparian vegetation along watercourses often provides connectivity corridors that may facilitate the movement of fauna across the landscape, however the portion of Calala Creek within the subject land has been entirely cleared and does not offer any connectivity of wooded vegetation. Calala Creek has been heavily modified, and its natural path has been substantially altered and broken by the establishment of roads and agricultural properties. Given the above, the subject land is highly unlikely to be used as a conduit for fauna that require continuity of woody vegetation for traversal, such as arboreal mammals.

The waterbodies within the subject land are unlikely to provide any significant habitat for fauna species reliant on waterbodies, such as species of microbat for foraging or frog species for reproduction, due to the condition of riparian vegetation and lack of connectivity with surrounding habitat (Figure 2 and Figure 3).

Although cleared areas (open paddock) dominate, however, sporadic trees (natural and planted rows) are present, which provide stepping stone connectivity for avifauna and possibly microbats.

2.1.6. Geological features of significance

There are no recorded karst, caves, crevices, cliffs or other areas of geological significance within the subject land or within the assessment area.

2.1.7. Areas of outstanding biodiversity value

There are no areas of outstanding biodiversity value mapped within the subject land.

2.1.8. NSW (Mitchell) Landscape

The subject land occurs within the Tamworth – Keepit Slopes and Plain Mitchell Landscape. This landscape covers an extensive area, characterised by rolling to undulating slopes and plains, with low hills and low ranges forming part of the New England Plateau. Texture-contrast soils, with colour changing from red brown on upper slopes to yellow with harsh subsoils on lower slopes, are characteristic of this landscape, along with a complex geology of sedimentary and metamorphic rocks with minor volcanics. The Tamworth – Keepit Slopes and Plain Mitchell Landscape has a general elevation of 500-800 metres, where the dominant vegetation may vary with changes in elevation. On lower slopes, grassy woodland communities dominated by White Box are common, along with other Yellow Box, Blakley's Red Rum and species of Acacia. Flats are

dominated by Rough barked apple *Angophora floribunda* and Yellow Box, which River Oak *Casuarina cunninghamiana* is dominant along major waterways with occurrences of River Red Gum increasing to the west. On steeper slopes in the east of the landscapes range, Red Stringybark *Eucalyptus macrorhyncha* and Red Ironbark *Eucalyptus sideroxylon* are common (Department of Environment & Climate Change NSW 2002).

2.1.9. Hydrology

The landscape at and upstream of the subject land has been modified significantly by the installation of graded banks, swales and contours. These are installed as an erosion control measure, typically on farms. They are formed by earthworks to push soils into a bank offset from the contour so that runoff is intercepted and diverted to a stable feature such as a swale, creek or dam. There are graded banks on the subject land property and immediately upstream of it which has modified the local hydrology. Presently, surface water flows generally to the north and north-west towards Calala Creek, unless diverted by said graded banks.

The subject land is not mapped on the Groundwater Dependent Ecosystems (GDE) Atlas as containing Potential Terrestrial GDEs, however small areas of high potential Terrestrial GDEs are mapped within the assessment area (BOM 2023) including vegetation associated with Calala Creek to the south-west.

2.2. Land categorisation assessment

A review of land categorisation under the LLS Amendment Act was undertaken to clarify the native vegetation management regime. Where applicable to do so (land applicable to the LLS Act i.e. rural), the potential for land to be mapped as Category 1 - exempt land (Category 1 land) was evaluated, as land mapped or determined as Category 1 land can be excluded from the BAM and is not required to be assessed, with the exception of prescribed impacts in reference to relevant legislation provided below:

- **BC Act s6.8(3):** The biodiversity assessment method is to exclude the assessment of the impacts of any clearing of native vegetation and loss of habitat on category 1 – exempt land (within the meaning of Part 5A of the LLS Act 2013), other than any impacts prescribed by the regulations under section 6.3.
- **BAM cl1.5**: Biodiversity values not assessed under the BAM include: (d) biodiversity values associated with the assessment of the impacts of any clearing of native vegetation and loss of habitat on category 1-exempt land (within the meaning of Part 5A of the LLS Act), other than the additional biodiversity impacts in accordance with clause 6.1 of the BC regulation; (that being prescribed impacts).

During the transitional period (until the entire Native Vegetation Regulatory (NVR) map is released), accredited assessors may establish the categorisation of land for the consent authority to consider by approximating the method used to make the NVR map under the provisions of the BC Act and the LLS Act. This is done via:

- Historical aerial imagery.
- Land use mapping (NSW Landuse 2017 dataset):
  - The land use layer contributes to identifying land for inclusion in Category 1 in the NVR map. Chapter 4 of the NVR map method statement describes the process for identifying and mapping existing and historical agricultural land use since 1 January 1990. Mapping existing and historical land use focuses on identifying patterns or evidence of agricultural land uses according to high resolution aerial or satellite imagery and classifying land under a national land use classification system.
- Woody extent layer:

  - Contributes to identifying areas for inclusion in category 2 in the NVR map (including individual trees).
  - Latest publicly available is NSW Woody Vegetation Extent and FPC 2011 and 2017 update.
- Boundaries of sensitive regulated and vulnerable regulated land available on the NVR map portal.

The results of the land category assessment confirm that 26.4 hectares of the subject land (within Lots 16-17 DP 629969 and Lot 6 DP219993) contains Category 1 land (Figure 1). Prior to finalising the land category assessment, the draft NVR for the subject land was requested under licence 00042116 from NSW DCCEEW. The draft NVR was largely consistent with Biosis modelled assessment. All Category 2 land identified on the draft NVR has been assessed as such in this BDAR, this includes:

- Roadside vegetation within Burgess Lane, Burgmanns Land and Calala Lane mapped as grazing modified pastures on the NSW Landuse 2017 dataset. These areas have subsequently been determined to contain non-native vegetation (Section 3.1.5, Figure 5) but are nonetheless considered Category 2 land.

Planted vegetation within the Lot 6 DP219993 mapped as managed resource protection on the NSW Landuse 2017 dataset has been mapped as a PCT in accordance with Appendix D Section D1.1.i of the BAM as the species present can reasonable be assigned to a PCT known to occur in the same IBRA subregion as the subject land. The draft NVR suggests the majority of the subject land contains Category 1 land. The land category assessment undertaken by Biosis largely concurs with the draft NVR, however there are two departures whereby Biosis has mapped Category 2 land in place of Category 1 land:

- Open paddocks and one small section of native trees in the south of Lots 3 DP244399 mapped as grazing modified pastures have been mapped as Category 2 land and a PCT. This is due to these areas containing a *Critically Endangered Ecological Community* (CEEC) which must be considered Category 2 land in accordance with Section 60I(2) of the LLS Act.

Planted vegetation within the Lot 6 DP219993 mapped as Utilities on the NSW Landuse 2017 dataset which has been mapped as Category 2 land and a PCT. This is because the planted vegetation resembles that of a CEEC which must be considered Category 2 land in accordance with Section 60I(2) of the LLS Act. In accordance with Appendix D Section D1.1.i of the BAM, a PCT was assigned as the species present can occur within a PCT known to occur in the same IBRA subregion as the subject land.

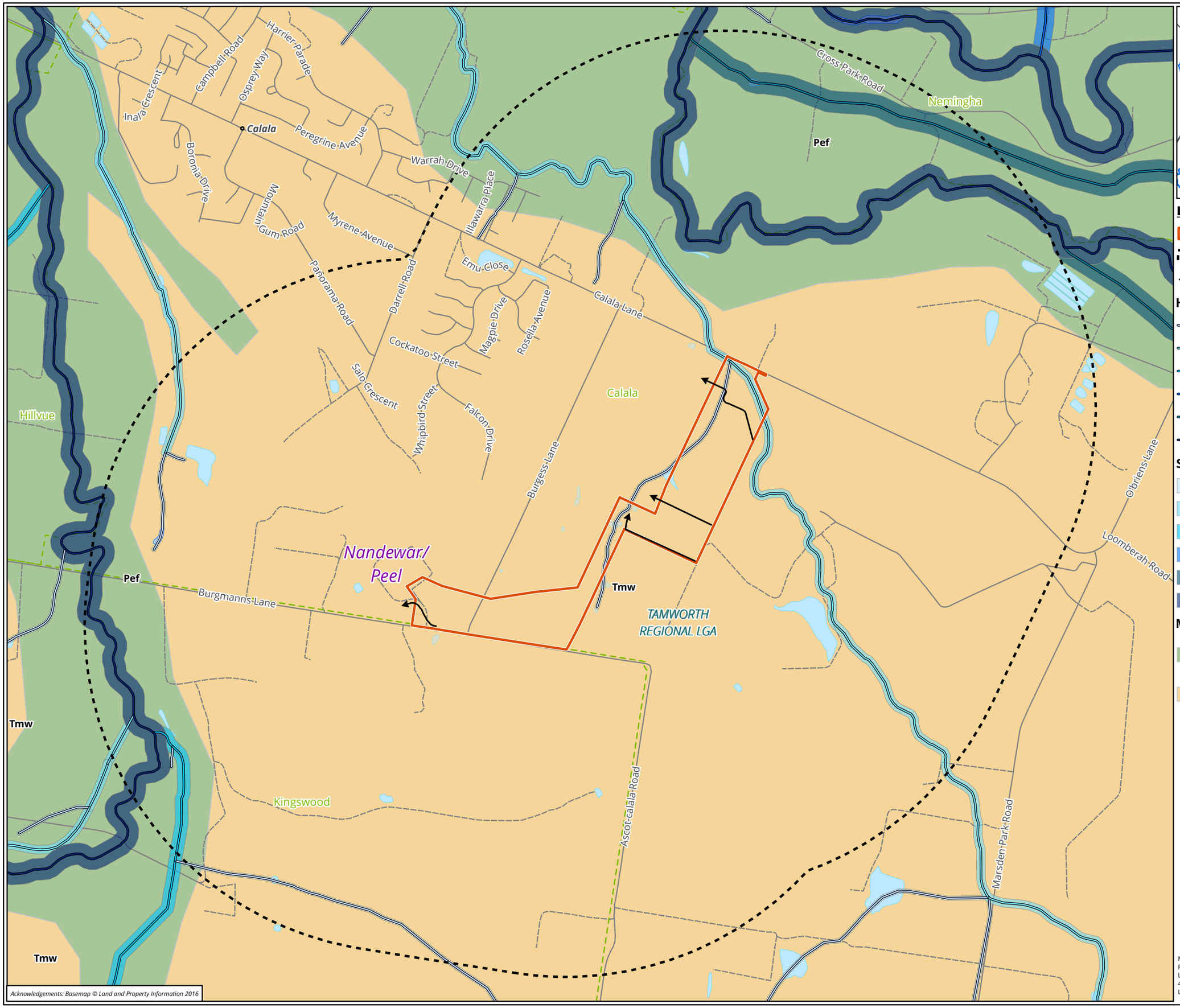
Areas mapped as Category 1 land on the NVR that have been converted to Category 2 land for this BDAR have been done so given the presence of the BC Act listed CEEC *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions*. Further information regarding the presence of the CEEC within the subject land is provided in Section 3.1.6.

Final areas identified as Category 1-exempt land (Figure 5) within this BDAR are consistent with those shown on the draft NVR provided to Biosis. Analysis of three floristic plots (20m x 20m) (Figure 5) undertaken within identified Category 1 land using the Interim Grassland and other Groundcover Assessment Method (IGGAM) revealed these areas to contain low conservation value grasslands.

The BAM has been applied to all areas mapped as Category 2 land.

Figure 2 Site map

Matter: 40128, Date: 04 April 2024,
Prepared by: JB, Prepared for: BT, Last edited by: jbeckius
Location: P:\40100s\40128\Mapping\
40128_Calala_BESS_BDAR_Updates_F1-4.aprx
Layout: 40128_F2_Sitemap



Legend

- Subject land
- Assessment area
- Habitat connectivity

HydroLine stream order

- 1
- 2
- 3
- 4
- 6
- 7

Strahler stream order buffers

- 1
- 2
- 3
- 4
- 6
- 7

Mitchell landscapes

- Pef,Peel Channels and Floodplain
- Tmw,Tamworth - Keepit Slopes and Plains

Figure 3 Location map

0 200 400 600

Metres

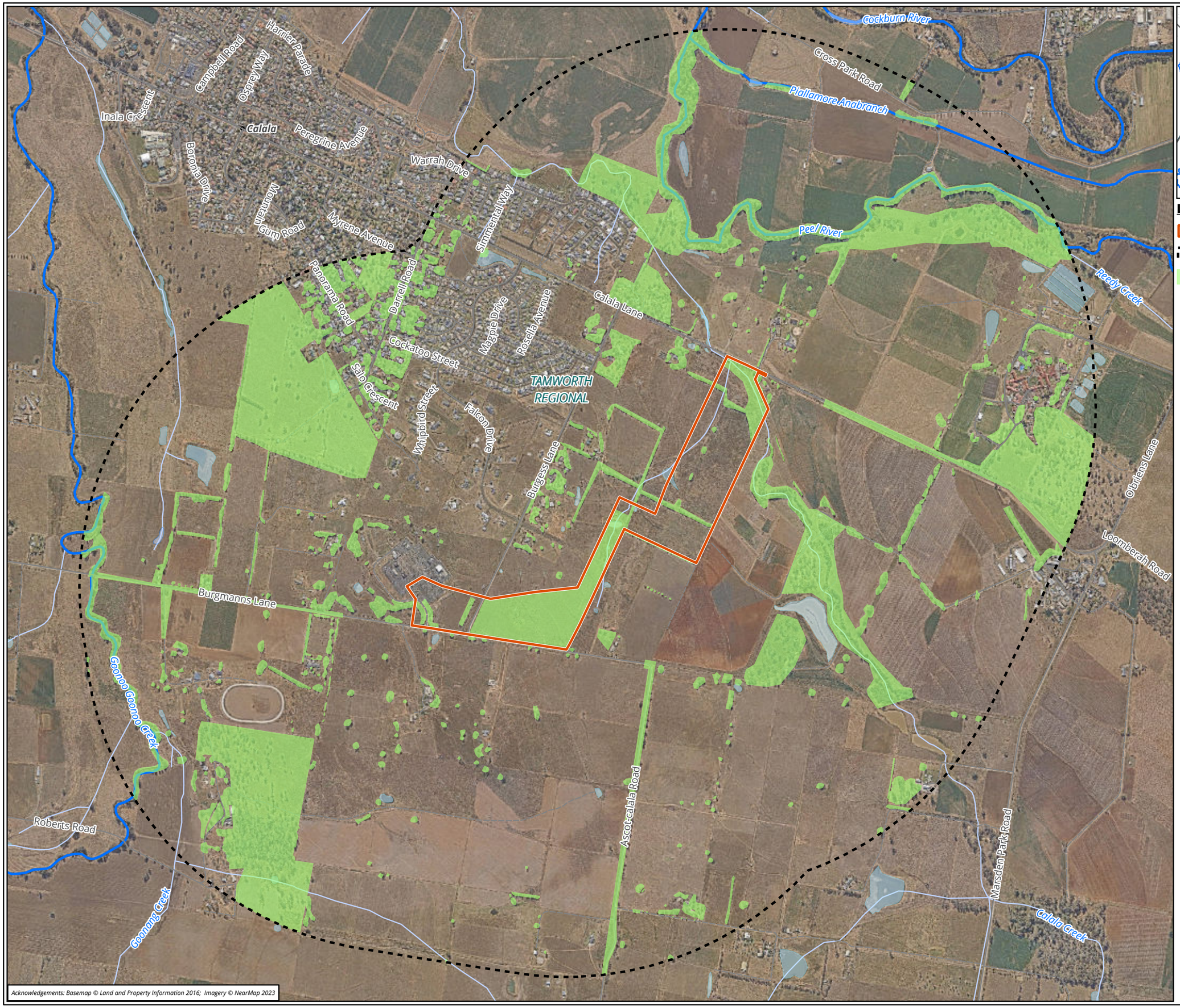
Scale: 1:16,000 @ A3

Coordinate System: GDA2020 MGA Zone 56

N

biosis

Matter: 40128, Date: 04 April 2024,
Prepared by: JB, Prepared for: BT, Last edited by: jbeckius
Location: P:\40100s\40128\Mapping\
40128_Calala_BESS_BDAR_Updates_F1-4.aprx
Layout: 40128_F3_Location



Legend

- Subject land
- Assessment area
- Native vegetation

Figure 4 Native vegetation cover

0 200 400 600

Metres

Scale: 1:16,000 @ A3

Coordinate System: GDA2020 MGA Zone 56

N

biosis

Matter: 40128, Date: 04 April 2024,
Prepared by: JB, Prepared for: BT, Last edited by: jbeckius
Location: P:\40100s\40128\Mapping\
40128_Calala_BESS_BDAR_Updates_F1-4.aprx
Layout: 40128_F4_NativeVeg

3. Native vegetation

The subject land supports 14.2 hectares of native vegetation. This predominantly takes the form of cleared areas that will once have contained a grassy woodland, however, small areas of woody vegetation occur as natural regeneration or planted rows of locally native species (Lot 6 DP219993 only).

3.1. Native vegetation and habitat assessment

3.1.1. Native vegetation extent

The extent of native vegetation, threatened ecological communities, and vegetation integrity within the subject land was determined using the results of site investigations, previous studies undertaken at the site (Biosis 2022) and Section 4 of the BAM (DPIE 2020a).

Figure 5 provides a map of the native vegetation extent recorded within the subject land and development footprint, as assessed during field investigations undertaken in May 2022, November 2022, February 2023, June 2023 and February 2024. The figure includes all areas of native vegetation (native ground cover and areas with canopy) within the subject land. Areas not shown as native vegetation cover within Figure 5, are considered cleared / non-native vegetation or Category 1 land, and are addressed further below.

3.1.2. Review of existing information

Existing information regarding native vegetation was reviewed to inform field investigations including:

- Regional vegetation mapping, namely the State Vegetation Type Map: Border Rivers Gwydir / Namoi Region Version (DPIE 2015).
- Existing site reports (Biosis 2022).

Based on the results of the background review and the requirements of the BAM with respect to this BDAR, appropriate surveys were designed for the subject land and development footprint.

3.1.3. Field investigation of biodiversity values

A field investigation of the subject land was carried out across May 2022, November 2022, February 2023, June 2023 and February 2024 under the terms of Biosis' Scientific Licence issued by the Environment and Heritage Group (EHG) under the *National Parks and Wildlife Act 1974* (SL100758, expiry date 31 May 2024).

Assessment in accordance with the BAM was planned and carried out by Accredited Assessor Brendon True (BAAS18155).

- The subject land was surveyed in accordance with the BAM (DPIE 2020a), which involved:
- The identification and mapping of PCTs according to the structural definitions held in the Veg-C database.
- Undertaking floristic plots within each vegetation zone in accordance with Section 4 of the BAM (DPIE 2020a), considering varying condition states and avoidance of ecotones, areas of disturbance, and edges.

- The identification of native and exotic plant species, according to the Flora of NSW (Harden 1992, 1993, 2000, 2002) with reference to recent taxonomic changes.
- Targeted searches for plant species of conservation significance according to *Surveying Threatened Plants and Their Habitats* (DPIE 2020c).
- Incidental observations using the "random meander" method (Cropper 1993).
- Identification of previous and current factors threatening the ecological function and survival of native vegetation within and adjacent to the subject land.
- An assessment of the natural resilience of the vegetation of the site.
- Identifying and mapping fauna habitats (e.g., hollow-bearing trees, rock outcropping etc.), assessing their condition and value to threatened fauna species, and considering threatened species' habitat constraints.
- Observations of animal activity and searches for indirect evidence of fauna (such as scats, nests, burrows, tracks, scratches and diggings).

The conservation significance of plant species and plant communities was determined according to:

- BC Act for significance within NSW
- EPBC Act for significance within Australia.

Detailed field mapping and collection of GPS point locations were conducted using hand-held (uncorrected) tablet units (Samsung Galaxy Tab X) running the ArcGIS Field Maps application, using the inbuilt GPS, and aerial photo interpretation. Spatial locations are therefore considered to have an accuracy of generally ±5 metres.

Areas of native vegetation for which a PCT could validly be assigned were identified and delineated in the field, and their condition determined and assigned. Identification of PCTs within the subject land was confirmed with reference to the community profile descriptors held within the Veg-C (NSW DCCEEW 2024a).

Further details of targeted survey for threatened species are provided in Section 4.2.1 below.

3.1.4. Local data

No local data was used in the preparation of this BDAR.

3.1.5. Non-native vegetation

Non-native vegetation has been mapped within the road corridors of Burgess Lane, Burgmanns Lane and Calala Lane. Burgess Lane is dominated by introduced flora such as Fennel *Foeniculum vulgare* and Guinea Grass *Megathyrsus maximus* var. *maximus* (Photo 1), whereas Burgmanns Lane contains patches of Century Plant *Agave americana* (Photo 2). Calala lane contains exotic groundcover such as Guinea Grass as well as planted introduced tree (*Fraxinus* sp.) (Photo 3).

Areas not shown as native vegetation cover within Figure 5, and which do not provide habitat for threatened species, are not included for further assessment in accordance with Section 5.1.1.5 of the BAM (DPIE 2020a). Non-native vegetation which does provide habitat for threatened species is required to be assessed.

Further to areas of non-native vegetation, the subject land has been assessed as containing Category 1 land (Section 2.2). Category 1 land is also shown on Figure 5.

Photo 1 **Non-native vegetation within the Burgess Land road corridor.**

Photo 2 **Century plant within the Burgmanns Lane road corridor.**

Photo 3 Exotic groundcover and plantings at Calala Lane.

3.1.6. Plant community types

The following PCTs were assessed as present within the subject land:

- PCT 84: River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion (Table 2)
- PCT 599: Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion (Table 3).

Table 2 to Table 3 provide detailed descriptions of the two PCTs recorded within the subject land. PCTs recorded within the subject land are shown in Figure 5.

Table 2 PCT 84 River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion

PCT 84: River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion	
Common name	River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
Vegetation formation	Forested Wetlands
Vegetation class	Eastern Riverine Forests
Extent within subject land	1.1 ha
Condition	This community within the subject land was recorded in a low condition, derived native grassland (DNG) state, lacking in any overstory or midstory. Cover and abundance of exotic species is high, and although a reasonable number of native grasses and forbs are present, cover of these species is low other than for Couch *Cynodon dactylon*, which is typical of sites with a history of agricultural land use.
Description	Naturally, PCT 84 is a woodland or open forest to 30 m high dominated by River Oak *Casuarina cunninghamiana* subsp. *cunninghamiana* often with Rough-barked Apple *Angophora floribunda*, River Red Gum *Eucalyptus camaldulensis*, Yellow Box *E. melliodora,* Blakely's Red Gum *E. blakelyi* and occasionally White Box *E. albens*. This community has been substantially cleared in some regions and it is subject to weed invasion by exotic forbs and grasses. The occurrence of PCT 84 within the subject land (termed a DNG) is an example of such historical clearing. It is associated with the path of Calala Creek in the north of the subject land, which once is likely to have contained a riparian community. Exotic and native cover of grasses or low growing shrubs is present, however, there is little resemblance to the PCTs natural state.
Survey effort	One BAM plot was collected over the course of the field assessment. (Figure 5)
Justification of PCT	The basis for assigning PCT 84 with the subject land largely resides on a review of regional vegetation mapping (DPIE 2015), and observation of remnant vegetation present along Calala Creek, a short distance to the east of the subject land. It was evident from such observation that River Oak and River Red Gum were present, both diagnostic characters of PCT 84. Furthermore, PCT 84 is mapped along Calala Creek to the east of the subject land and further north by regional vegetation mapping. Therefore, it is reasonable to assume that without historical clearing and heavy modification of Calala Creek, PCT 84 would once have existed where Calala Creek occurs within the subject land.
TEC Status	**NSW BC Act:** No associated TEC. **Commonwealth EPBC Act:** No associated TEC.
Estimate of percent cleared value of PCT (BioNet)	40% (NSW DCCEEW 2024a).

PCT 84: River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion

PCT 84 – DNG condition	

Table 3 PCT 599 Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion

PCT 599: Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	
Common name	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Vegetation formation	Grassy Woodlands
Vegetation class	Western Slopes Grassy Woodlands
Extent within subject land	13.1 ha (12.1 ha as DNG)
Condition	This community within the subject land at the subject land was recorded in two condition states; • PCT 599_DNG: Areas cleared of woody vegetation which now contain a DNG. • PCT 599_Woodland: A woodland condition where either seemingly natural canopy or planted rows of trees (Lot 6 DP219993) is present. – In accordance with Appendix D of the BAM, planted native vegetation is required to be allocated to a 'most likely' PCT if the planted native vegetation is known to occur within a PCT in the same IBRA subregion as the proposal.
Description	PCT 599 typically exists as a tall woodland dominated by Blakely's Red Gum and Yellow Box, often with Rough-barked Apple on flats or White Box on hills. Within the subject land, PCT 599 has been heavily modified. Within Woodland areas (both natural and planted), White Box is the dominant trees species, with other planted characteristic species including Yellow Box and Blakley's Red Gum. Woodland areas, though all modified and lacking a midstory, harbour a range of understory species characteristic of PCT 599, predominantly grasses, including Red Grass *Bothriochloa macra*, Weeping Grass *Microlaena stipoides*, Purple Wiregrass *Aristida ramosa*, Native Geranium *Geranium solanderi* and Rock fern *Cheilanthes sieberi*. DNG areas, devoid of canopy and midstory, contain a myriad of characteristic understory species including those listed above as well as others including Tall *Chloris ventricosa*, *Lachnagrostis filiformis*, Corrugated Sida *Sida corrugata* and Shorthair Plumegrass *Dichelachne micrantha*. A high abundance and cover of St Jons Wort *Hypericum perforatum* occurs in this zone.
Survey effort	Four BAM plots (three DNG, one Woodland) were collected over the course of the field assessment. (Figure 5).
Justification of PCT	PCT 599 within the subject land meets the PCT description via the following: • Landform – valley flat or low hills. • Structure - open woodland with absent midstorey and grassy understorey. • Dominant species - canopy dominated by White Box and Yellow Box, a predominantly grassy understorey containing numerous characteristic species. • IBRA region and subregion – Nandewar region and Peel subregion.
TEC Status	**NSW BC Act:** All condition states were determined to meet the criteria for *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions* (Box Gum Woodland CEEC). This finding was reached by comparing the nature of PCT 599 within the subject land to the characteristic descriptors contained with the NSW Scientific Committee's Final Determination of the CEEC (NSW Scientific Committee 2020). Key to this was analysis of the floristic data recorded within PCT 599 (Plots 1, 3 and 4). Said

PCT 599: Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	
	analysis found that the percentage of species recorded within PCT 599 that are characteristic of Box Gum Woodland CEEC ranged from 52.6% (Plot 2) to 87.5% (Plot 4). Collectively, 23 of the 29 (79.3%) native species recorded within PCT 599 are characteristic of the CEEC. This is considered strong affinity to the CEEC and supports the finding that PCT 599 aligns with Box Gum Woodland CEEC. Other characteristic features detailed in the Final Determination that PCT 599 shares include: • Occurs within the Nandewar IBRA region • The canopy may be completely absent in areas of derived native grassland where tree removal has occurred (PCT 599_DNG) • Understorey shrubs are typically sparse or absent • The canopy can be dominated by White Box The portion of PCT 599_Woodland within Lot 6 DP219993 is both constructed (planted) and regenerative. As the Final Determination does not preclude such conditions states from being considered the CEEC and 78.9% of the species recorded are characteristic, this portion of woodland has been included with the mapped distribution of the CEEC. Given the presence of remnant and regenerative White Box within the subject land and immediate surrounds (in particular, Burgmanns Lane), as well as the suite of characteristic groundcover species present, PCT 599 is considered to align with Box Gum Woodland CEEC with high confidence. **Commonwealth EPBC Act:** This PCT is associated with the EPBC Act listed CEEC *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland. White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland*. For PCT 599 to be considered the listed community it must satisfy the minimum condition threshold detailed in the Listing Advice for the listed community (TSSC 2009). Meaning a patch of PCT 599 must have a predominantly native understory and either: • Be 0.1 ha or more and contain 12 or more non-grass native species including one important species, or • Be 2 ha or more and contain over 20 or more mature trees per hectare or eucalypt regeneration. The patch of PCT 599 within the subject land has a predominantly native understory and is over 2 hectares, however due to its highly cleared nature, there is not 20 or more mature trees per hectare. No plot data collected within PCT 599 satisfies the requirement for 12 or more non-grass native species including one important species. However, all but one (Plot 5) of the four plots undertaken within PCT 599 are outside the development footprint (see Section 3.2.2). Given this uncertainty, the precautionary principle has been applied and all areas of PCT 599 0.1 ha or more in size and where plot data is lacking are considered to constitute the EPBC Act listed community. This has excluded the section of PCT 599_DNG at Plot 5 and the small section of PCT 599_Woodland containing a single Yellow Box adjacent Calala Lane. State and Commonwealth TECs are mapped on Figure 7.
Estimate of percent cleared value of PCT (BioNet)	80% (NSW DCCEEW 2024a).

PCT 599: Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	
PCT 599_DNG with high cover of St John's wort	
PCT 599_Woodland (Lot 6 DP219993)	

PCT 599: Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	
PCT 599_Woodland (Lot 4 DP244399)	

3.1.7. Threatened ecological communities

Vegetation within the subject land was found to represent one TEC listed under the BC Act and one listed under the EPBC Act, as outlined in Table 4 and below and illustrated on Figure 7.

Table 4 Summary of TECs within the subject land

TEC	Listing status	Subject land (Ha)
White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions **(BC Act)**	Critically Endangered	15.3
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland **(EPBC Act)**	Critically Endangered	13.1

3.2. Vegetation integrity assessment

3.2.1. Vegetation zones and patch size class

PCTs within the subject land were assessed and stratified, based on broad condition state, into vegetation zones in accordance with Section 4.3 of the BAM, and as described in Table 2 to Table 3 above. This resulted in three vegetation zones being identified within the development footprint across two PCTs with and without woody vegetation.

Table 5 describes each of the zones, and provides details on the numbers of BAM floristic plots undertaken in each zone.

Patch size classes for each vegetation zone present within the subject land were assessed as per Section 4.3.2 of the BAM (DPIE 2020a) using a select process in ArcGIS. All native vegetation with a gap of less than 100 metres from the next area of native vegetation (or ≤30 metres for non-woody ecosystems), is considered a single patch, with a patch able to extend onto adjoining land. Native vegetation within the subject land was mapped sequentially utilising the mapping of native vegetation cover within the assessment area (Section 2.1.1), This process found that each vegetation zone forms part of a large, albeit sparsely connected, patch of native vegetation that falls within the largest patch size class (≥100 ha) under the BAM.

Patch size classes for each vegetation zone are also outlined in Table 5 below and shown on Figure 6.

Table 5 Vegetation zones within the subject land

Vegetation zone	Plant Community Type	Condition	BAM plots completed	Area (ha)	Patch size class
1	84	DNG	1	1.98	≥100 ha
2	599	DNG	2	14.3	≥100 ha
3	599	Woodland	1	1.0	≥100 ha

3.2.2. Vegetation integrity

Vegetation integrity, or condition, was assessed using data obtained from undertaking BAM plots within the vegetation zones, as per Section 4.3.4 of the BAM (DPIE 2020a). Plot data was collected via:

- A 20 metre x 50 metre quadrat and 50 metre transect for assessment of site attributes and function.
- A 20 metre x 20 metre quadrat, nested within the larger quadrat for full floristic survey to determine composition and structure of the PCT.

The minimum number of BAM plots per vegetation zone was determined using Table 3 of the BAM (DPIE 2020a). In total, four BAM plots have been completed within the vegetation zones present development footprint, details are provided in Table 6 and shown on Table 7. All of these BAM plots included in the assessment are no longer located within the final development footprint as a result of design refinements over the course of the Project. The reasoning behind their retention is twofold; they are considered to be representative of the vegetation present within the development footprint, and the alternative would have been to collect plot data within the development footprint during June 2023, timing which is likely to have underestimated the cover and abundance of native species flora present. As such, the decision to use existing data collected from November 2022 and February 2023 was made.

Table 6 BAM plots completed within the subject land

BAM plot reference	Vegetation zone
37994_01	599_DNG
37994_02	84_DNG
37994_03	599_Woodland
37994_04	599_DNG
37994_05	599_DNG

Assessment of vegetation integrity was undertaken using standard benchmark data as outlined in the BAM and held in the BioNet Vegetation Classification database. A list of flora species was compiled for each BAM

plot completed and is included in Appendix 3. Records of all flora species will be submitted to EHG for incorporation into the Atlas of NSW Wildlife.

3.2.3. Vegetation integrity score

Plot data was entered into the BAM calculator to determine vegetation integrity score. Plot data are presented in Appendix 3, with vegetation integrity scores for each vegetation zones provided in Table 7.

Table 7 Vegetation zone integrity scores

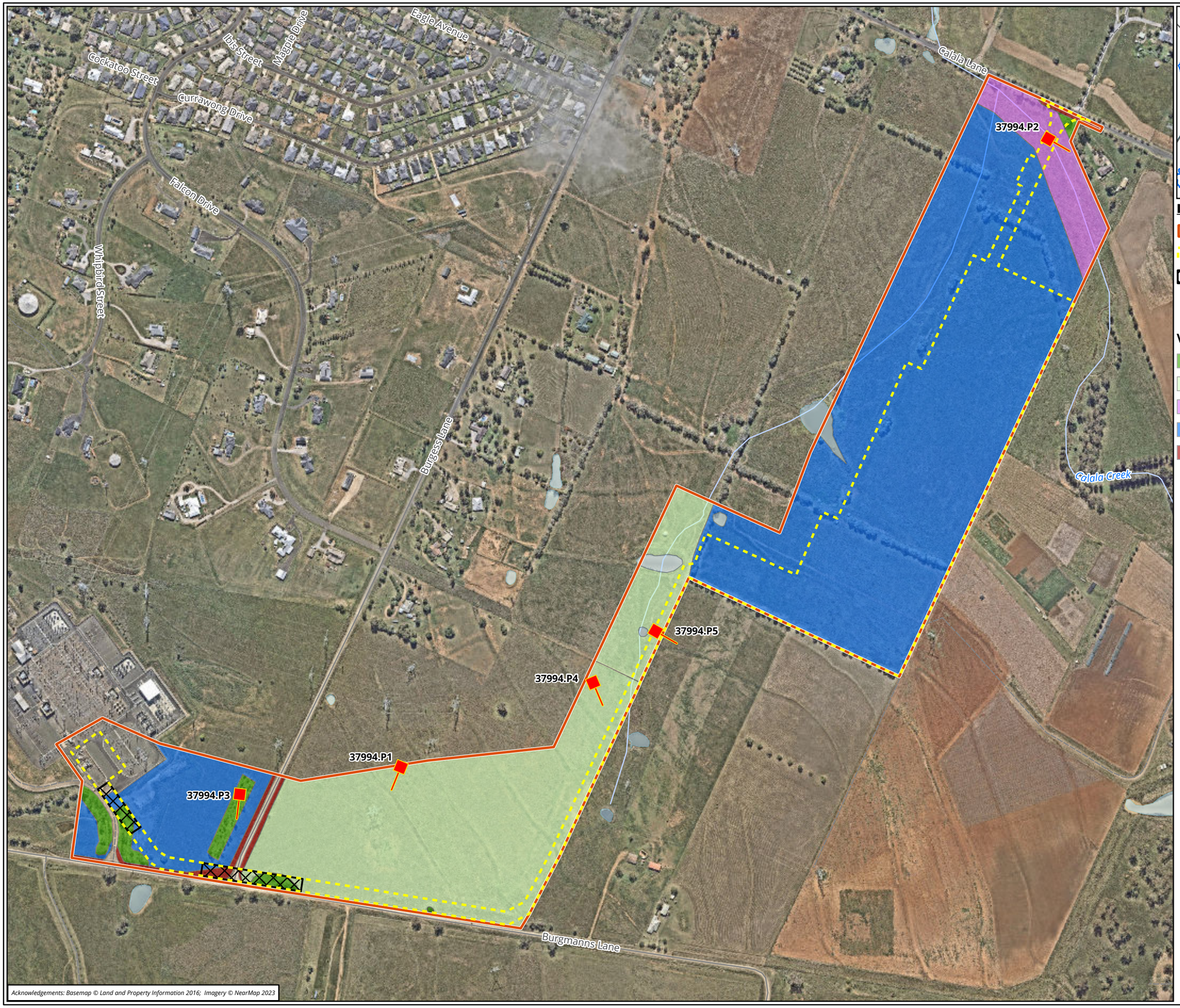
Vegetation zone	Composition score	Structure score	Function score	VI score*	Hollow-bearing trees present
84_DNG	55.4	58.4	15	36.5	No
599_DNG	33.2	67.2	14.8	32.1	No
599_Woodland	59.8	96.3	45	63.8	No

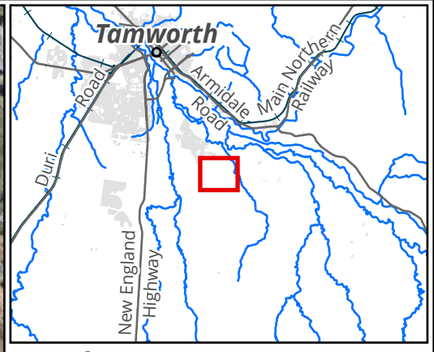
**Benchmark (pristine) condition vegetation would receive a VI score of 100.*

As outlined in Section 9.2.1 of the BAM (DPIE 2020a), an offset is required for impacts on native vegetation where the vegetation integrity score is:

- ≥15 where the PCT is representative of an endangered or critically endangered ecological community.
- ≥17 where the PCT is associated with threatened species habitat (as represented by ecosystem credits) or is representative of a vulnerable ecological community.
- ≥20 where the PCT is not representative of a TEC or associated with threatened species habitat.

As such, ecosystem credit offsets are required for all vegetation zones.





Legend

- Subject land
- Development footprint
- Underground
- NSW BAM Site V6

Vegetation zone

- 599_Woodland
- 599_DNG
- 84_Low
- Category 1 Land
- Non-native vegetation

Figure 5 Vegetation zone and plot locations

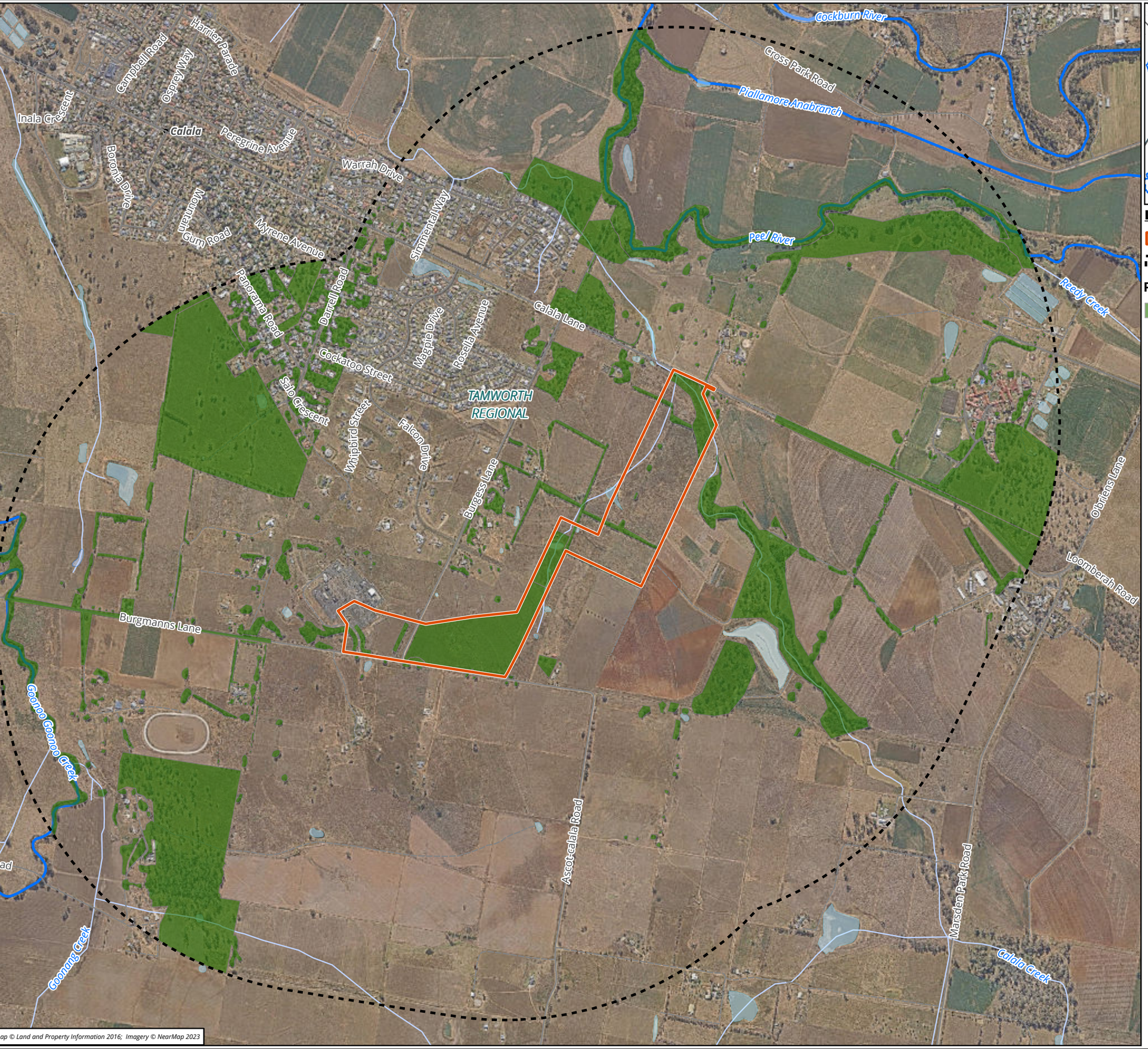
0 50 100 150 200

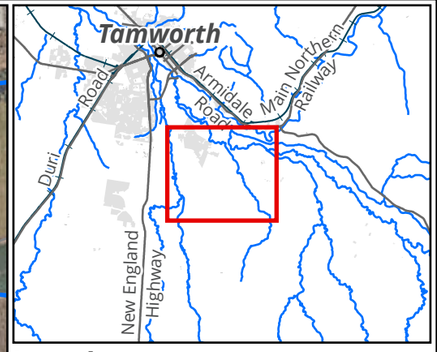
Metres
Scale: 1:5,500 @ A3
Coordinate System: GDA2020 MGA Zone 56

N

biosis

Matter: 40128, Date: 04 April 2024,
Prepared by: JB, Prepared for: BT, Last edited by: jbeckius
Location: P:\40100s\40128\Mapping\
40128_Calala_BESS_BDAR_Updates_F5-10.aprx
Layout: 40128_F5_VZs





Legend

- Subject land
- Assessment area

Patch size

- ≥100ha

Figure 6 Patch size locations

0 200 400 600

Metres

Scale: 1:16,000 @ A3

Coordinate System: GDA2020 MGA Zone 56

N

biosis

Matter: 40128, Date: 04 April 2024,
Prepared by: JB, Prepared for: BT, Last edited by: jbeckius
Location: P:\40100s\40128\Mapping\40128_Calala_BESS_BDAR_Updates_F5-10.aprx
Layout: 40128_F6_PatchSize

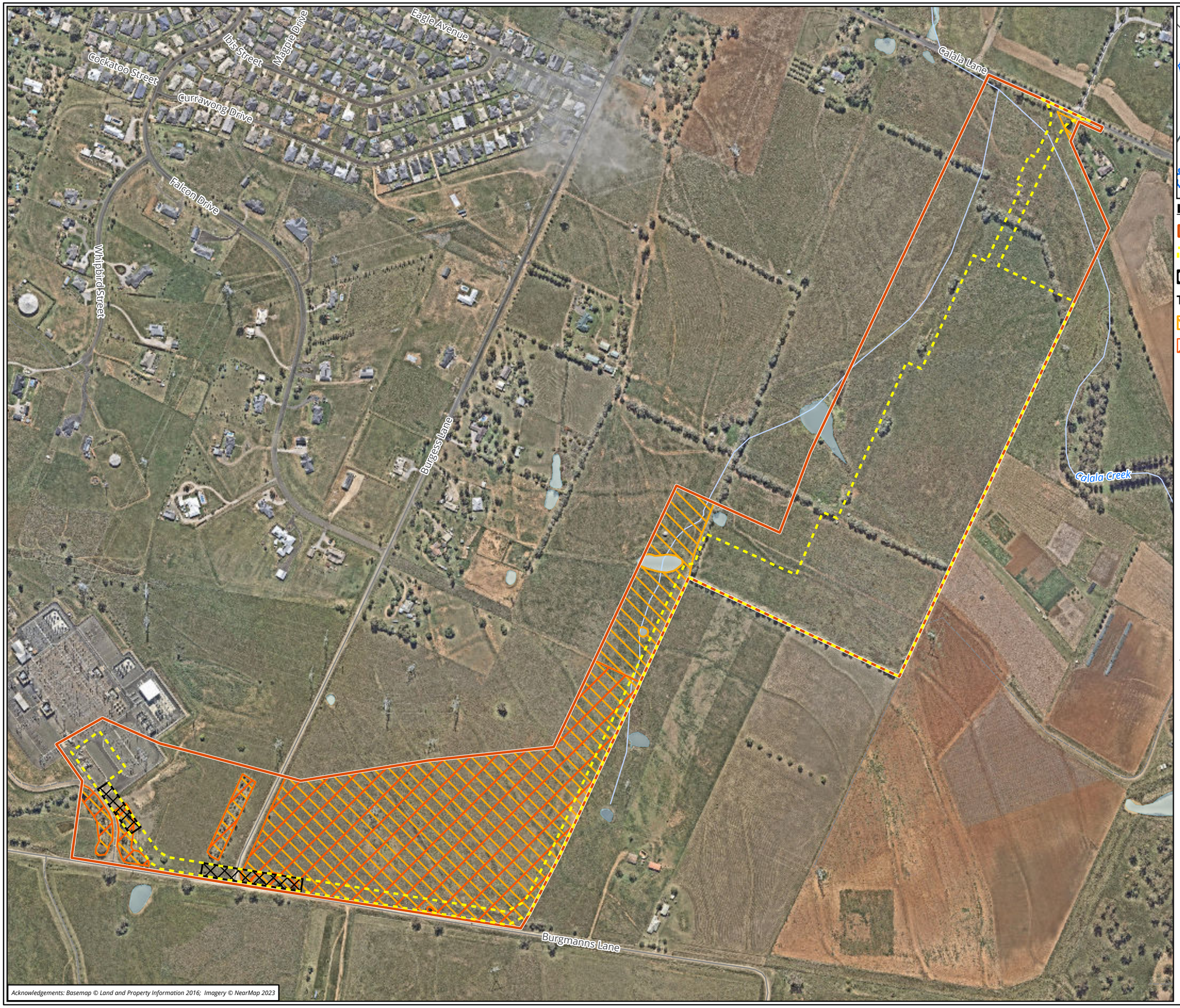


Figure 7 Threatened ecological communities within the subject land

4. Threatened species

4.1. Ecosystem credit species

A list of predicted species (ecosystem credit species) expected to occur within the subject land was generated as per Section 5 of the BAM (DPIE 2020a). Impacts to these species require assessment, however targeted survey is not required as these species are assumed to occur, based on the occurrence of the PCTs, habitat constraints, native vegetation cover in the landscape and calculated patch sizes. These species are identified as ecosystem credit species in the Threatened Biodiversity Data Collection (TBDC). Table 8 lists the ecosystem credit species that could not be discounted, based on geographical restrictions or a lack of suitable habitat, from using the subject land on occasion.

These species were considered when prescribing management and mitigation measures for the Project, and a number have been specifically considered as part of the assessment under the Commonwealth EPBC Act.

Table 8 Ecosystem credit species (predicted species) with potential to occur

Common name	Species name
Black Falcon	*Falco subniger*
Black-breasted Buzzard	*Hamirostra melanosternon*
Black-chinned Honeyeater (eastern subspecies)	*Melithreptus gularis gularis*
Black-necked Stork	*Ephippiorhynchus asiaticus*
Black-striped Wallaby	*Macropus dorsalis*
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*
Corben's Long-eared Bat	*Nyctophilus corbeni*
Diamond Firetail	*Stagonopleura guttata*
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*
Flame Robin	*Petroica phoenicea*
Glossy Black-Cockatoo	*Calyptorhynchus lathami*
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis temporalis*
Grey-headed Flying-fox	*Pteropus poliocephalus*
Hooded Robin (south-eastern form)	*Melanodryas cucullata cucullata*
Large Bent-winged Bat	*Miniopterus orianae oceanensis*
Little Eagle (Foraging)	*Hieraaetus morphnoides*
Little Lorikeet	*Glossopsitta pusilla*
Little Pied Bat	*Chalinolobus picatus*
Painted Honeyeater	*Grantiella picta*
Regent Honeyeater	*Anthochaera phrygia*
Scarlet Robin	*Petroica boodang*
Speckled Warbler	*Chthonicola sagittata*

Common name	Species name
Spotted Harrier	*Circus assimilis*
Spotted-tailed Quoll	*Dasyurus maculatus*
Square-tailed Kite (Foraging)	*Lophoictinia isura*
Swift Parrot	*Lathamus discolor*
Turquoise Parrot	*Neophema pulchella*
Varied Sittella	*Daphoenositta chrysoptera*
White-bellied Sea-Eagle (Foraging)	*Haliaeetus leucogaster*
White-throated Needletail	*Hirundapus caudacutus*
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*

4.2. Species credit species

Species credit species are threatened species for which vegetation surrogates and/or landscape features cannot reliably predict the likelihood of their occurrence, or components of their habitat. These candidate species are identified as species credit species in the TBDC. A targeted survey or an expert report is required to confirm the presence of these species on the subject land, or alternatively the species can be assumed to be present (DPIE 2020a).

Appendix 2 provides the lists of species credit species predicted to occur within the subject land based on the IBRA subregion on which the Project occurs, the native vegetation cover present within the assessment area, the PCTs present within subject land, and patch sizes listed in Table 5.

The potential for a species to occur within the subject land was assessed in accordance with Section 5.2 of the BAM (DPIE 2020a) and species with geographical restrictions, or habitat constraints not present, were not required to be assessed. Many species credit species have been excluded from occurring within the subject land based on a lack of suitable habitat or substantial degradation of existing potential habitat.

A detailed assessment of potential for occurrence, and potential for impact, for all species credit species predicted to occur within the subject land is provided in Appendix 2. Species credit species considered to potentially occur within the subject land, and thus considered 'candidate species credit species' have been either assumed present or the subject of the target of threatened species surveys.

All candidate species credit species considered as part of this assessment, and their associated method of assessment, are listed in Table 9 (flora species) and Table 10 (fauna species).

Threatened flora

Habitats for threatened flora species within the subject land are largely considered degraded due to the high degree of modification (clearing) and historical management. Threatened flora habitat is considered spatially limited to PCT 599_DNG and PCT_599_Woodland and restricted to those species most likely to be present based on known distribution and habitat associations and which can persist in paddock/disturbed environments.

Table 9 provides a list of flora species credit species considered in this assessment, each species' required survey period and the relevant method of assessment. Further detail of the targeted surveys undertaken are provided in Section 4.2.1 below.

Table 9 Candidate flora species credit species

Species	Survey period	Method of assessment
Acacia atrox **Myall Creek Wattle**	All year	Excluded – habitat degraded such that species is considered unlikely to occur.
Asterolasia beckersii **Dungowan Starbush**	All year	Excluded – habitat degraded such that species is considered unlikely to occur. Associated with PCT 84 only and this PCT has few natural characters.
Callistemon pungens	September - February	Excluded - Habitat degraded such that species is considered unlikely to occur. The subject land has been extensively cleared and managed.
Dichanthium setosum **Bluegrass**	November - May	Targeted survey - part of the subject land in February 2023 and February 2024. Assumed present – areas not covered by the targeted survey in February 2023 and February 2024.
Digitaria porrecta **Finger Panic Grass**	January - February	Targeted survey - part of the subject land in February 2023 and February 2024. Assumed present – areas not covered by the targeted survey in February 2023 and February 2024..
Euphrasia arguta	November - March	Excluded - Habitat degraded such that species is considered unlikely to occur. The subject land has been extensively cleared and managed. The species has a very limited distribution and is currently known only from a few locations.
Haloragis exalata **subsp. *velutina*** **Tall Velvet Sea-berry**	All year	Excluded – habitat degraded such that species is considered unlikely to occur. This species is associated with PCT 84 only and this PCT has few natural characters.
Homopholis belsonii **Belson's Panic**	December - April	Targeted survey - part of the subject land in February 2023 and February 2024.

Species	Survey period	Method of assessment
		Assumed present – areas not covered by the targeted survey in February 2023 and February 2024.
Picris evae **Hawkweed**	December - February	Targeted survey - part of the subject land in February 2023 and February 2024. Assumed present – areas not covered by the targeted survey in February 2023 and February 2024.
Prasophyllum sp. Wybong	September - October	Excluded - Habitat degraded such that species is considered unlikely to occur. The subject land has been extensively cleared and managed.
Swainsona sericea **Silky Swainson-pea**	September - November	Excluded - Habitat degraded such that species is considered unlikely to occur. The subject land has been extensively cleared and managed.
Thesium australe **Austral Toadflax**	November - February	Targeted survey - part of the subject land in February 2023 and February 2024. Assumed present – areas not covered by the targeted survey in February 2023 and February 2024..
Tylophora linearis	October - May	Excluded - the subject land is beyond the eastern limit of this species known distribution and does not contain sedimentary flats where the species is commonly found. Habitat for this species is considered absent within the subject land.

Threatened fauna

Fauna habitat assessment was undertaken to determine whether the vegetation to be impacted by the proposed development contained microhabitats suitable to support the candidate fauna species credit species, as outlined in Appendix 2.

Due to the historical modification and almost complete clearing of the subject land, habitat for species credit fauna is absent, such as specific habitat constraints, or degraded (lack of connectivity or foraging/breeding resources) such that those requiring consideration do not require further assessment. These species are detailed in Table 10 below.

Table 10 Candidate fauna species credit species

Species	Survey period	Method of assessment
***Adelotus brevis* - endangered population** **Tusked Frog population in the Nandewar and New England Tableland Bioregions**	October - February	Excluded - habitat for this species is absent within the subject land. The artificial dams present are considered unlikely to support a population of this species.
Anthochaera phrygia **Regent Honeyeater**	NA	Excluded – habitat constraints - the subject land is not within the important area mapping for this species. No foraging or nesting resources area present.
Aprasia parapulchella **Pink-tailed Legless Lizard**	September - November	Excluded – habitat constraints – subject land does not contain or is within 50 m of rocky areas.
Burhinus grallarius **Bush-stone Curlew**	All year	Excluded – habitat constraints – the subject land, given the general lack of woody vegetation, does not contain fallen/standing dead timber including logs.
Calyptorhynchus lathami **Glossy Black-Cockatoo**	January-September	Excluded - habitat constraint (Living or dead tree with hollows greater than 15cm diameter and greater than 8m above ground) for this species is not present within the subject land.
Cercartetus nanus **Eastern Pygmy-possum**	October-March	Excluded – habitat degradation – woody vegetation within the subject land is lacking and that that is present, does not contain the diversity and structure of flowering species required to sustain this species. Nor is the subject land connected to such an area.
Chalinolobus dwyeri **Large-eared Pied Bat**	November – January	Excluded – habitat constraints – the subject land is not within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels.
Haliaeetus leucogaster **White-bellied Sea-Eagle**	July-December	Excluded following habitat assessment – no potential nest trees present.
Hamirostra melanosternon **Black-breasted Buzzard**	September - November	Excluded – habitat constraints – subject land is not within 40 m of riparian woodland on inland watercourses/waterholes containing dead or dying eucalypts.
Hieraaetus morphnoides **Little Eagle (Breeding)**	August - October	Excluded following habitat assessment – no potential nest trees present.
Hoplocephalus bitorquatus	November – March	Excluded – Habitat degraded. The subject land does suitable riparian habitat which is preferred. No

Species	Survey period	Method of assessment
Pale-headed Snake		hollow-bearing trees which are used for shelter are present. Foraging resources would be scarce.
Lathamus discolor **Swift Parrot**	NA	Excluded – habitat constraints - the subject land is not within the important area mapping for this species.
Litoria booroolongensis **Booroolong Frog**	October - December	Excluded – habitat absent – subject land lacks permanent streams.
Lophoictinia isura **Square-tailed Kite (Breeding)**	September - January	Excluded following habitat assessment – no potential nest trees present.
Miniopterus orianae oceanensis **Large Bent-winged Bat**	December - February	Excluded – habitat constraint - the breeding habitat constraint (Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding) is not satisfied by the subject land.
Ninox connivens **Barking Owl**	May - December	Excluded – habitat constraints – no suitable hollow-bearing trees present.
Ninox strenua **Powerful Owl**	May – August	Excluded – habitat constraints – no suitable hollow-bearing trees present.
Petaurus norfolcensis **Squirrel Glider**	All year	Excluded – suitable habitat for this species is considered absent within the subject land as patches of woody vegetation are very small and not connected to any areas likely to contain suitable habitat.
Petrogale penicillata **Brush-tailed Rock-wallaby**	All year	Excluded – habitat constraints – the subject land is not within 1 km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or clifflines.
Phascolarctos cinereus **Koala**	All year	Excluded – habitat degraded – a small number of feed trees are present, however, such small patches in a heavily cleared landscape are unlike to be part of any home ranges for the species. Foraging and breeding habitat for this species is considered absent within the subject land.
Pteropus poliocephalus **Grey-headed Flying-fox**	October - December	Excluded following habitat assessment during required season – no breeding camps present. Given the lack of small amount.
Tyto novaehollandiae **Masked Owl**	May – August	Excluded – habitat constraints – the subject land does not contain hollow-bearing trees.

Species	Survey period	Method of assessment
Uvidicolus sphyrurus **Border Thick-tailed Gecko**	November - March	Excluded – habitat absent – this species prefers areas with dense tree canopy, boulders, rock slabs, fallen timber and deep leaf litter. The subject land lacks these microhabitats.
Vespadelus troughtoni **Eastern Cave Bat**	November – January	Excluded – habitat constraints

4.2.1. Threatened species survey details

Targeted threatened species surveys of the subject land were undertaken February 2023. Weather observations for each survey date are shown in Table 11.

Table 11 Weather observations during targeted flora and fauna surveys (Tamworth, NSW. Station no. 055325)

Survey undertaken	Survey date	Temperature (°C)		Rain (mm)
		Min.	Max.	
Threatened flora	08/02/23	12.3	32.7	0
	01/02/24	18.8	36.0	0

Information from the Australia Government Bureau of Meteorology website.

Details of surveys undertaken as part of the current assessment are provided below.

Threatened Flora

Survey method and effort

Targeted surveys for threatened flora were undertaken across a portion of the subject land (PCT 599) in accordance with *Surveying threatened plants and their habitats* (DPIE 2016), that is parallel field traverses with a separation distance of 10 metres were walked. Two surveys were conducted, one in February 2023 and one in February 2024. This was due to design refinements following the February 2023 survey and the need to survey the transmission line development footprint in full during the optimum survey season. There is some spatial crossover between the two surveys, however this is limited to a small section of the transmission line corridor. Areas of PCT 599 not covered in either round of survey are either outside the development footprint or not considered to contain suitable habitat such as PCT 599_Woodland at the entrance to the subject land off Calala Lane. This area contains a single mature Yellow Box Eucalyptus melliodora over a highly disturbed and maintained (mown) ground cover.

Survey tracks are shown on Figure 8.

Justification of survey method and effort

Survey effort followed the relevant BAM survey guide, *Surveying threatened plants and their habitats* (DPIE 2016).

Timing of survey

The timing of both surveys was broadly in accordance with the seasonal requirements stipulated by the TBDC for each target species. However, in the case of Hawkweed and Bluegrass, reliable detection of these two species is influenced by preceding rainfall (NSW DCCEEW 2024b). Specifically, survey for Hawkweed is recommended more than two months after soaking rain and survey for Bluegrass is recommended three to four weeks after effective rainfall.

According to data from the Tamworth Airport weather station (station no. 055325) (BOM 2024), November 2023 (two months prior to the 2024 survey) recorded 135.8 mm of rain with 20 to 26 November recording 92.4 mm (68%) of this rainfall. This is considered to qualify as soaking rain, therefore the timing of survey for Hawkweed is considered suitable. Furthermore, whilst members of the Asteraceae family, including Hawkweed, are not uncommon in derived grassland and disturbed areas generally, the native daisies recorded within BAM plots were smaller burr daises (*Calotis* spp.) and are unlikely to be confused with much larger Hawkweed, were the target species not yet in flower.

Preceding the 2023 survey, 13 mm of rain fell between 17 and 23 January. The timing of this rain is suitable to aid detection of Bluegrass and heavy falls later in the month may have also spurned growth. During this survey, the survey area was found to have consistent cover of a closely related species (*Dichanthium sericeum*) in active seeding as well as other native grasses generally, indicating conditions were suitable for Bluegrass reproduction and aided detection.

Prior to the 2024 survey, 9 mm of rain fell across 9 to 11 January 2024, followed by 46.6 mm of rain across 18 and 19 February 2024. Given the timing of rainfall to detectability (production of a seed head) would be variable, and survey area again contained consistent coverage of the closely related *Dichanthium sericeum*), the targeted survey for Bluegrass in February 2024 is considered valid.

Survey personnel and relevant experience

Targeted flora surveys were undertaken by the Biosis ecologists listed in Table 12.

Table 12 Targeted flora survey personnel and relevant experience

Staff member	Role	Relevant experience
Brendon True	Senior Botanist/Accredited Assessor	Over 12 years' of botanical survey experience, including numerous surveys within the Nandewar bioregion for the species targeted.

Results

Table 13 provides a summary of the results of the targeted flora surveys completed. Note, that as only a small portion of the suitable habitat present within the subject land was covered, each species has been assumed present in non-surveyed areas and a species polygon has been prepared accordingly.

Table 13 Summary of targeted flora survey method and results

Species	Survey method	Survey results	Species polygon (ha)
Dichanthium setosum **Bluegrass**	10m parallel field traverses within a portion of 599_DNG and 599_Woodland	Not recorded	5.90

Species	Survey method	Survey results	Species polygon (ha)
Digitaria porrecta **Finger Panic Grass**	10m parallel field traverses within a portion of 599_DNG and 599_Woodland	Not recorded	5.90
Homopholis belsonii **Belson's Panic**	10m parallel field traverses within a portion of 599_DNG and 599_Woodland	Not recorded	5.90
Picris evae **Hawkweed**	10m parallel field traverses within a portion of 599_DNG and 599_Woodland	Not recorded	5.90
Thesium australe **Austral Toadflax**	10m parallel field traverses within a portion of 599_DNG and 599_Woodland	Not recorded	5.90

Limitations

Despite optimal timing, local flowering of these species could not be confirmed prior to the survey. Detection of the above species is aided by the presence of an inflorescence.

Fauna habitat assessments

A fauna habitat assessment was undertaken to determine the presence of microhabitats and other critical habitat components (habitat constraints) suitable for all fauna species outlined in Table 10 and Appendix 2. Habitat assessments focussed on the presence of the following features within the subject land:

- Habitat trees including large and/or hollow-bearing trees, stick nests, availability of flowering shrubs and canopy/understorey feed tree species.
- Soil type and presence of cliffs, overhangs and other rocky areas.
- Condition and type of native vegetation and the presence of exotic species.
- Presence and condition of pools and waterways.
- Quantity of ground litter and woody debris.
- Searches for indirect evidence of fauna (i.e. feathers, tracks and scats).
- General degradation of the site as a result of past and current disturbances such as vegetation clearing and industrial land management practices.
- Topography and landscape morphology.
- Presence of flying-fox camps.

Several habitat features with potential to support threatened species credit species were identified during these habitat assessments. These features have been summarised in Table 14.

Table 14 Habitat features with potential to support threatened species credit species

Habitat feature	Presence within the development footprint
Habitat trees	No hollow-bearing trees were observed within the subject land. Hollow formation is related to tree age and whilst trees are present with PCT 599_woodland, these evidently are not of an age conducive to producing hollows. The subject land did not contain any stick nests.
Feed tree species	The subject land contains low diversity of trees species (all eucalypts) and a low abundance of trees generally. Therefore, the subject land is not considered to contain significant foraging resources for species such as Koala, Eastern Pygmy-possum and Squirrel Glider.
Caves and rocky overhangs	The subject land does not contain any caves or rocky overhangs that may provide potential breeding habitat for threatened microbats including Large-eared Pied Bat and Large Bent-winged Bat.
Rocky outcrops and sandstone crevices	The subject land does not contain any rocky outcrops, embedded surface rock or sandstone crevices that could be habitat for reptiles such as Pink-tailed Legless Lizard and Border Thick-tailed Gecko.
Major and minor watercourses and waterbodies (i.e. dams)	No major or minor watercourses are present. As stated, the portion of Calala Creek within the subject land is highly ephemeral and is little more than a shallow depression that would serve to drain rainwater north. Three artificial waterbodies (dams) are present, however, these are also highly ephemeral, lack or have negligible fringing vegetation and are prone to contaminants relating to surrounding land use (stock grazing). These waterbodies are not considered suitable habitat for any species credit amphibians.
Woody debris and leaf litter	As it has been extensively cleared, the subject land contains very little woody debris and leaf litter.
Human-made structures	The subject land contains one human made structure, a single transmission line tower. This tower is not considered to present notable habitat for any species credit fauna species assessed.

Following habitat assessment, all species credit fauna species generated by the BAM-C were excluded from further assessment (Table 9).

4.2.2. Local data

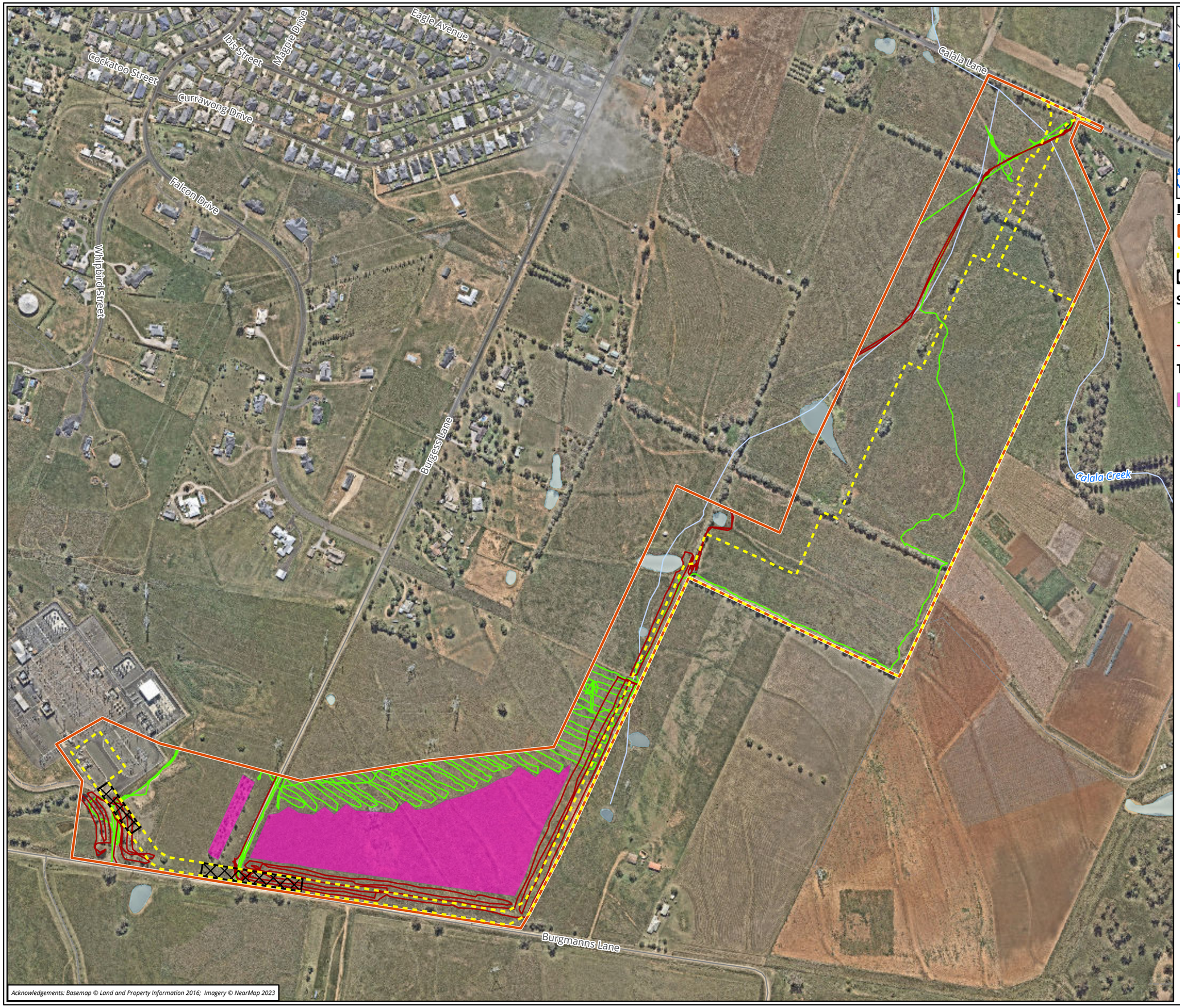
No local data was used in the preparation of this BDAR.

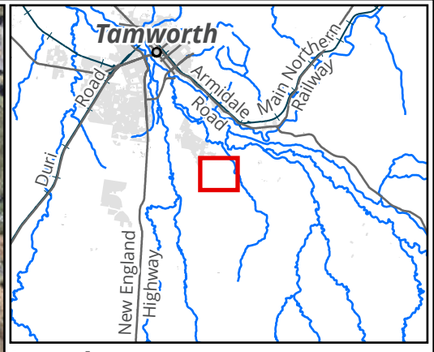
4.2.3. Threatened species summary and polygons

Table 15 provides details of threatened species impacted by the Project and outlines the attributes that comprise the threatened species polygons. The presence of threatened species impacted by the Project is illustrated in Figure 8.

Table 15 Threatened species polygons within the subject land and development footprint

Threatened species	Subject land (ha)	Development footprint (ha)	Unit of measure	Biodiversity risk weighting	Polygon attributes
Flora					
Bluegrass	5.90	0	Area	High	PCT 599_DNG (outside targeted survey area)
Finger Panic Grass	5.90	0	Area	High	PCT 599_DNG (outside targeted survey area)
Belson's Panic	5.90	0	Area	High	PCT 599_DNG (outside targeted survey area)
Hawkweed	5.90	0	Area	High	PCT 599_DNG (outside targeted survey area)
Austral Toadflax	5.90	0	Area	Moderate	PCT 599_DNG (outside targeted survey area)





Legend

- Subject land
- Development footprint
- Underground

Survey tracks

- February 2023
- February 2024

Threatened species polygon

- Bluegrass, Belson's Panic, Austral Toadflax, Finger Panic Grass

Figure 8 Targeted species survey and species polygons

0 50 100 150 200

Metres
Scale: 1:5,500 @ A3
Coordinate System: GDA2020 MGA Zone 56

N

biosis

Matter: 40128, Date: 04 April 2024,
Prepared by: JB, Prepared for: BT, Last edited by: jbeckius
Location: P:\40100s\40128\Mapping\
40128_Calala_BESS_BDAR_Updates_F5-10.aprx
Layout: 40128_F8_TrgSpecies

STAGE 2 — IMPACT ASSESSMENT (BIODIVERSITY VALUES)

5. Avoid and minimise impacts

The principal means to reduce a projects potential impacts on biodiversity values is to avoid and/or minimise the 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. How this has been achieved during the conception and design phases of the Project, in accordance with the BAM, is discussed below.

5.1. Actions to avoid/minimise project impacts

5.1.1. Alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location.

The Project location has been selected, in part, to minimise impacts to the native vegetation and flora and fauna habitats present within the broader subject land, as much as engineering and constructability constraints will allow. The location of the Project is heavily disturbed and contextually contains limited environmental value, within close proximity to the TransGrid Tamworth 330 kV substation. Siting of the BESS location has been prioritised to occur on Category 1 land.

5.1.2. Alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site.

Given the extent of past clearing and/or modified native vegetation within the subject land, opportunities to site the Project in areas to avoid or minimise impacts to biodiversity values is achievable and has been prioritised. This process, in regards to the BESS site, was informed by the constraints assessment prepared for the Project by Biosis (Biosis 2022). The development footprint of the BESS has been designed in a way to utilise previously cleared areas to the maximum extent.

No constraints assessment was completed for the transmission line connection as discussions of constraints and opportunities in this area was a more informal and iterative process. A number of options were considered and discussed. Ultimately, the final option was selected adjacent to the available Lot boundaries as it provides TransGrid with prospective development opportunities for future grid expansion options to facilitate the development of new renewable generation and storage opportunities within the region and New England Renewable Energy Zone.

As this route would impact areas of highest biodiversity value (PCT 599_Woodland), construction methodologies to avoid impacts were investigated (see below).

5.1.3. Modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology

Considering the Project, selection of modes or technologies that will avoid or minimise impacts on biodiversity values are limited. The entirety of the transmission line will be below ground, constructed via trenching, limiting the disturbance to a narrow linear area. Where there is a higher biodiversity value, trenchless construction methods (directional bore) for two sections of the transmission line will be employed, to avoid impacts to the areas of highest biodiversity values (PCT 599_Woodland) within the subject lands.

5.1.4. Routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route.

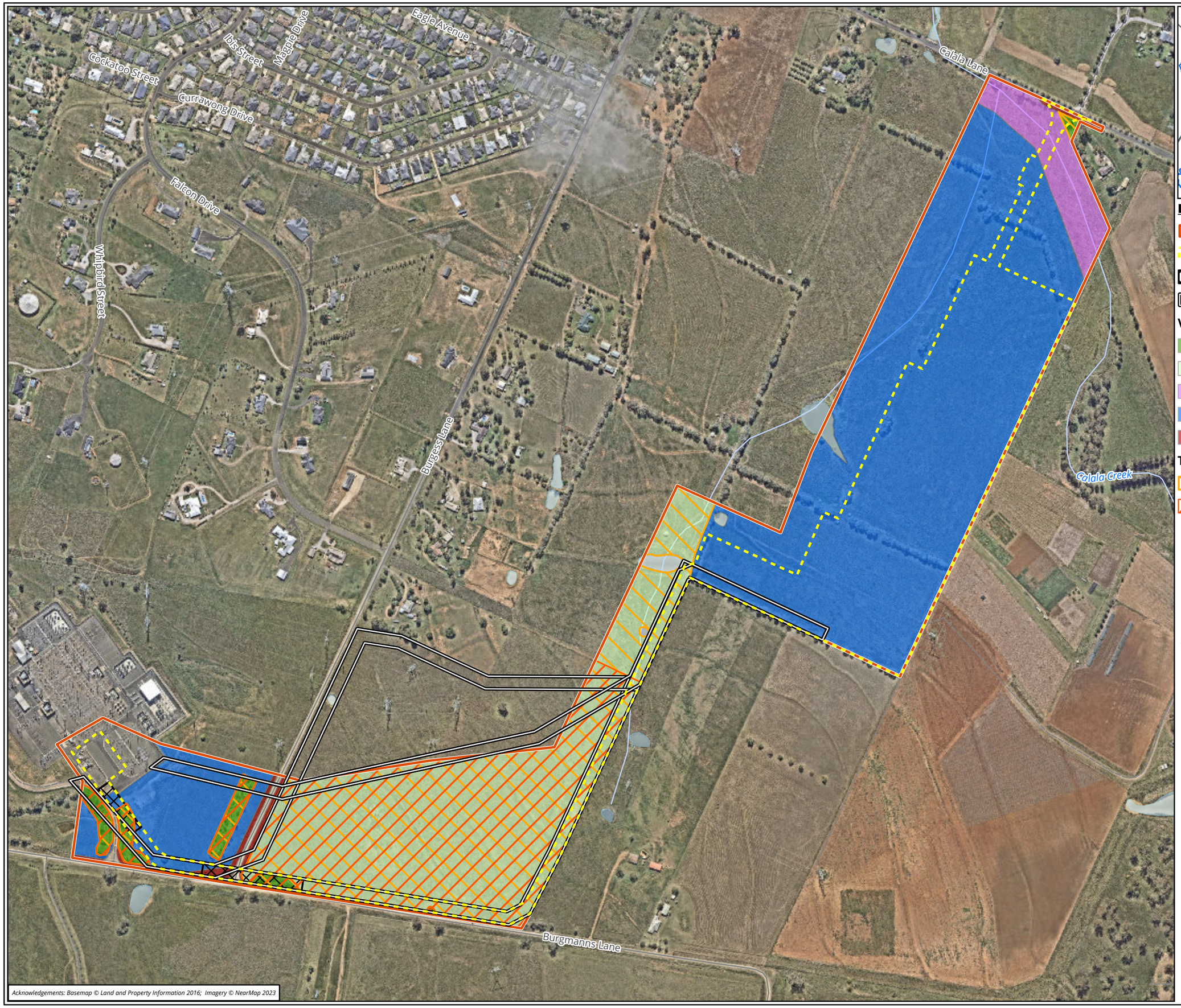
Avenues for selecting routes that will avoid or minimise impacts to biodiversity values are limited due to practical limitations, such as existing transmission lines in the area, and available connection points to the substation. As selection of the transmission line route was constrained in this way, highest biodiversity values along the transmission line corridor will be avoided through trenchless construction methods.

5.1.5. Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design.

Assessment of constraints and opportunities was an ongoing process as the concept design for the Project progressed. A key aspect of this was the choice of transmission line route which was constrained such that only one viable option was available due to practical reasons. This option, however, incurs the areas of highest biodiversity value (PCT 599_Woodland) within the subject land. In order to avoid direct impacts, the design includes trenchless construction methods in these areas.

Components incorporated into the design, such as a sediment basin and use of the current stormwater and wastewater network, will minimize changes in the quantity and quality of water leaving the Project site during construction and operation. This will minimise prescribed impacts relating to hydrological processes and water quality.

Due to access requirements from Calala Lane, one patch of PCT 599_Woodland containing one Yellow Box could not be avoided and this tree is proposed to be removed.



Legend

- Subject land
- Development footprint
- Underground
- Transmission line options

Vegetation zone

- 599_Woodland
- 599_DNG
- 84_Low
- Category 1 Land
- Non-native vegetation

Threatened ecological communities

- Box Gum Woodland (BC Act)
- Box Gum Woodland (EPBC Act)

Figure 9 Transmission line options

0 50 100 150 200

Metres
Scale: 1:5,500 @ A3
Coordinate System:
GDA2020 MGA Zone 56

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biosis

Matter: 40128, Date: 05 April 2024,
Prepared by: JB, Prepared for: BT, Last edited by: jbeckius
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Layout: 40128_F9_TL_Options

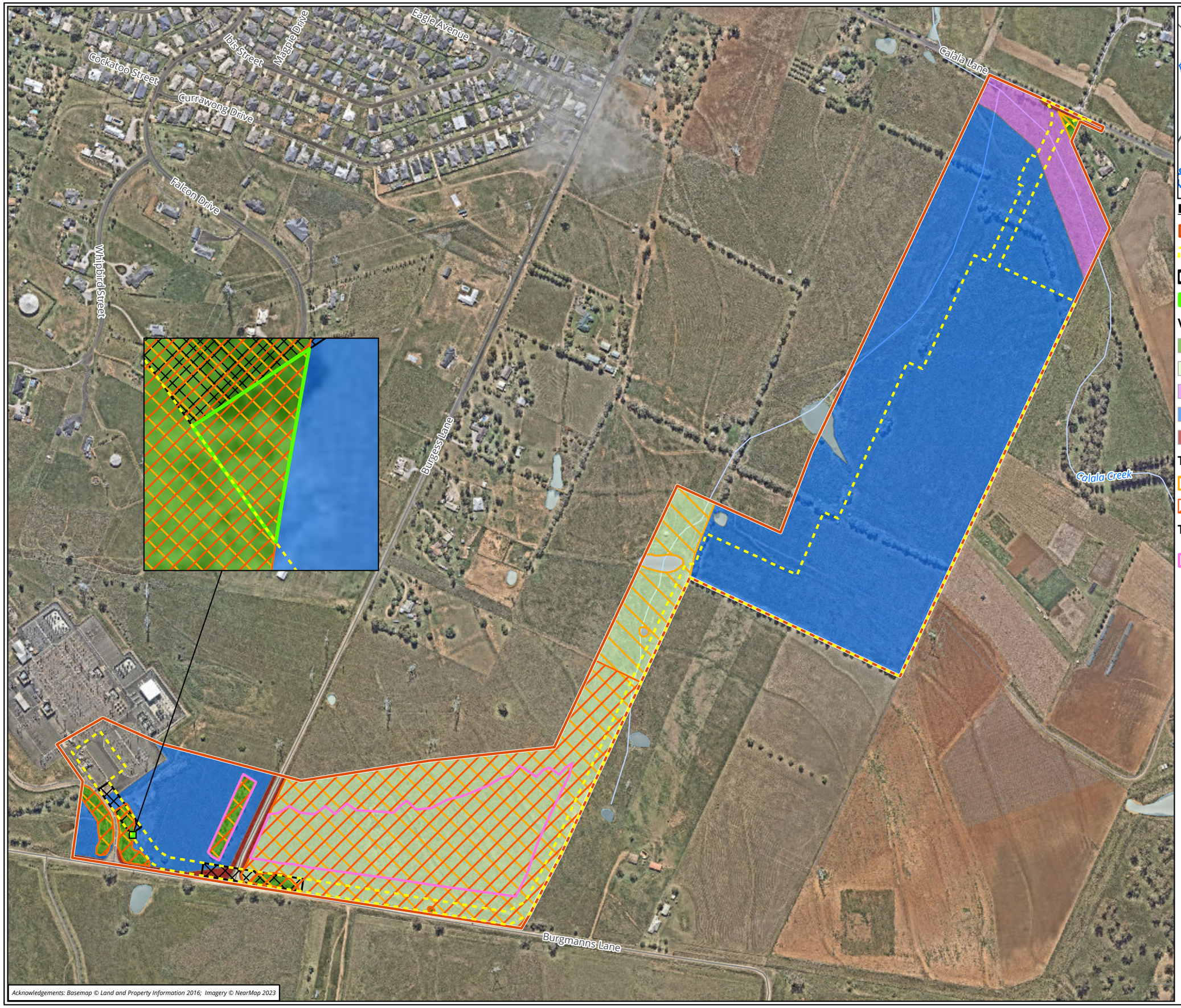


Figure 10 Final development footprint

Matter: 40128, Date: 05 April 2024,
Prepared by: JB, Prepared for: BT, Last edited by: jbeckius
Location: P:\40100s\40128\Mapping\
40128_Calala_BESS_BDAR_Updates_F5-10.aprx
Layout: 40128_F10_Final_DF

6. Impacts that are unable to be avoided

Assessment of direct and indirect impacts unable to be avoided has been undertaken in accordance with the BAM (DPIE 2020a). The following direct and indirect impacts are unable to be avoided in progressing the proposed development.

6.1. Direct impacts

Direct impacts include vegetation clearing calculated from the area of proposed lot boundaries, roads and easements for service infrastructure.

Direct impacts arising from the Project include:

- Removal of 1.63 ha of *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions* (BC Act) and 1.31 ha of *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (EPBC Act).
- Removal of 0.16 ha of native vegetation comprising PCT 84_DNG.

These impacts will be permanent and will occur from the outset of the development. Mitigation measures outlined in Section 7 below will help to minimise the potential impacts to biodiversity values that remain present within the subject land.

A summary of PCTs/zones directly impacted is demonstrated in Table 16. No direct impacts to species credit species habitat or individuals is proposed.

Table 16 Summary of direct impacts to vegetation

Zone	PCT	TEC	Area within subject land (ha)	Area impacted (ha)	VI Score
1	84: River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion	-	1.98	0.16	36.5
2	599: Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion (DNG)	*White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions* (BC Act)	14.25	1.60	32.1

Zone	PCT	TEC	Area within subject land (ha)	Area impacted (ha)	VI Score
		White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act)			
3	599: Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion (Woodland)	*White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions* (BC Act) *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (EPBC Act)	1.00	0.03	63.8

6.1.1. Loss of hollow bearing trees

The Project will not remove any hollow-bearing trees.

6.2. Indirect impacts

Potential indirect impacts arising from the Project are outlined and addressed in Table 17. Generally, the potential for the Project to cause substantial indirect impacts to vegetation and habitats adjacent or further afield from the development footprint is very low. Construction will be contained within clearly defined boundaries and trenchless construction methods will be employed where the subject land contains the highest degree of native vegetation and biodiversity values (PCT 599_Woodland). Inadvertent impacts, such as clearing to PCT 599_Woodland are considered a low likelihood, however, indirect impacts such as noise, light spill and dust spill may occur to varying degrees during construction and operation of the Project as applicable.

Note, land deemed Category 1 land is not included in assessment of indirect impacts.

Table 17 Assessment of indirect impacts

Indirect impact	Impacted entities	Extent	Frequency	Duration	Project phase/ timing of impact	Likelihood and consequences
Inadvertent impacts on adjacent habitat or vegetation	• PCT 84 • PCT 599 • Bluegrass habitat • Finger Panic Grass habitat • Belson's Panic habitat • Hawkweed habitat • Austral Toadflax habitat • Habitat for all ecosystem credit species	Unpredictable	Unknown	Possibly long-term	Construction	It is anticipated that there is sufficient flexibility within the transmission line corridor that impacts to tree roots can be avoided. Above ground impacts to this vegetation during construction can be prevented or minimised through appropriate exclusion fencing, implementation of a Construction Environmental Management Plan (CEMP) detailing best practice environmental protection measures, strict water quality practices and stormwater controls, and by ensuring any lighting is directed towards the development footprint, rather than towards the adjacent retained habitats.
Reduced viability of adjacent habitat due to edge effects	• PCT 84 • PCT 599 • Bluegrass habitat • Finger Panic Grass habitat • Belson's Panic habitat • Hawkweed habitat • Austral Toadflax habitat • Habitat for all ecosystem credit species	Unpredictable	Unknown	Possibly long-term	Construction	Adjacent habitats are currently subject to a high degree of edge effects due to prior clearing and surrounding existing residential and agricultural land use. Since little native vegetation (1.63 ha) is to be removed from the subject land, an increase to edge effects is not expected to occur to the remnant vegetation surrounding the subject land, as a result of the proposed development.
Reduced viability of adjacent habitat due to noise, dust or light spill	• PCT 84 • PCT 599 • Bluegrass habitat • Finger Panic Grass habitat	Unpredictable	Unknown	Possibly long-term	Construction and operation	It is predicted that the adjacent habitat will be slightly impacted by noise, dust and light spill, during construction and operation of the future development of the subject land. However, this will be managed via best

Indirect impact	Impacted entities	Extent	Frequency	Duration	Project phase/ timing of impact	Likelihood and consequences
	• Belson's Panic habitat • Hawkweed habitat • Austral Toadflax habitat • Habitat for all ecosystem credit species					practices outlined in a CEMP. The subject land also already occurs as a residential area, and light and noise pollution is most likely moderate. This will likely not substantially increase due to the proposed future development.
Transport of weeds and pathogens from the site to adjacent vegetation	• PCT 84 • PCT 599 • Bluegrass habitat • Finger Panic Grass habitat • Belson's Panic habitat • Hawkweed habitat • Austral Toadflax habitat • Habitat for all ecosystem credit species	Unpredictable	Unknown	Possibly long-term	Construction and operation	Weeds occurring within the subject land are common with those occurring within adjacent vegetation to be retained, particularly the road corridor of Burgess Lane. Increased transport of pathogens and weeds is unlikely to occur but will be managed by biosecurity measures outlined in the CEMP.
Increased risk of starvation, exposure and loss of shade or shelter	• PCT 599_Woodland • Habitat for all ecosystem credit species	One tree within PCT 599_Woodland	Unknown	Possibly long-term	Construction and operation	Removal of woody vegetation on Category 2 land is restricted to one small White Box within PCT 599_Woodland. This tree is considered to represent habitat, albeit negligible for all ecosystem credit species. However, its removal will not result in an increased risk of starvation, exposure and loss of shade or shelter to native species due to the small total area of vegetation being removed, and it very small proportion of commensurate habitats available in the assessment area.
Loss of breeding habitats	Nil	Nil	Nil	Nil	Nil	No specialist breeding habitat will be impacted by the Project.

Indirect impact	Impacted entities	Extent	Frequency	Duration	Project phase/ timing of impact	Likelihood and consequences
Trampling of threatened flora species	Nil	Unknown	Unknown	Possibly long-term	Construction and operation	Although Bluegrass, Finger Panic Grass, Hawkweed, Belson's Panic and Austral Toadflax have been assumed present in a portion of the subject land outside the development footprint, no threatened flora species are considered likely to occur within the subject land, and thus trampling of threatened flora species outside of the development footprint is unlikely.
Inhibition of nitrogen fixation and increased soil salinity	Nil	Nil	Nil	Nil	Nil	Any future excavations or soil disturbance resulting from the Project will be largely restricted to areas having undergone significant previous disturbance. As such it is not considered likely that the future development of the subject land will result in substantial changes to the level of nitrogen fixation or soil salinity within the subject land or surrounds.
Fertiliser drift	Nil	Nil	Nil	Nil	Nil	The Project does not include the use of fertilisers, therefore there is no potential for this impact to occur.
Rubbish dumping	Nil	Nil	Nil	Nil	Nil	Potential for this impact to occur is considered negligible. Appropriate measures for the management of construction related rubbish will be detailed in the CEMP.
Wood collection	Nil	Nil	Nil	Nil	Nil	Potential for this direct impact to occur is considered negligible.
Removal and disturbance of rocks, including bush rock	Nil	Nil	Nil	Nil	Nil	The subject land does not support bush rock, therefore there is no potential for this indirect impact to occur.

Indirect impact	Impacted entities	Extent	Frequency	Duration	Project phase/ timing of impact	Likelihood and consequences
Increase in predators	Nil	Nil	Nil	Nil	Nil	There is no potential for the Project to result in an increase in predators.
Increase in pest animal populations	Nil	Nil	Nil	Nil	Nil	Potential for this indirect impact to occur is considered negligible. The Project occurs in an urbanised industrial area with pest animals such as Rats *Rattus rattus* and European Rabbit *Oryctolagus cuniculus* likely to be already present. Rats do inhabit the built environment, including structures, however, an increase in Rat abundance is unlikely to occur. Waste and pest management will be in place for the life of the Project.
Changed fire regimes	Nil	Nil	Nil	Nil	Nil	Potential for this indirect impact to occur is considered negligible, and the requirements for legislated bushfire hazard reduction and asset protection will be implemented during construction and operation of the Project.
Disturbance to specialist breeding and foraging habitat, e.g. Beach nesting for shorebirds	Nil	Nil	Nil	Nil	Nil	The subject land does not contain any areas of mapped Important Habitat.
Fragmentation of movement corridors	Nil	Nil	Nil	Nil	Nil	As discussed in Section 2.1.5, the subject land does not contain, nor is part of, any noteworthy movement corridors. The vast majority of woody vegetation within PCT 599_Woodland will be avoided to maintain the 'stepping stone' connectivity present. Furthermore, although the BESS will be fenced, the BESS is situated such that passage of ground dwelling fauna will still be possible to the east and west of the BESS.

6.3. Prescribed impacts

Identification and assessment of prescribed biodiversity impacts are outlined and addressed in Table 18. Areas deemed Category 1 land are required to be assessed for prescribed impacts under the BAM.

Table 18 Identification of prescribed impacts

Prescribed impact	Description of relevant habitat features associated with prescribed impacts	Threatened species likely to utilise habitat features associated with prescribed impact	Importance of habitat feature to impacted species
Karst, caves, crevices, cliffs, rocks and other geological features of significance	The subject land does not contain any karst, caves, crevices, cliffs, rocks and other geological features of significance.	NA	NA
Occurrences of human-made structures and non-native vegetation	The subject land contains one human-made structure, a transmission line tower, which will not be impacted by the Project. The subject land does contain non-native vegetation (primarily cleared areas and landscaping/visual amenity planting).	Non-native vegetation is not in sufficient quantities, nor contains a particular resource to be considered habitat for threatened species.	NA
Corridors or other areas of connectivity linking habitat for threatened entities	As discussed in Section 2.1.5, the subject land does not contain, nor is part of, any noteworthy movement corridors that link habitat for threatened species. PCT 599_Woodland and the planted rows or Eucalypts deemed Category 1 land could be said to be part of small scale local connectivity in a 'stepping stone' fashion, however, removal of much of PCT 599_Woodland is not proposed and similarly not all planted rows will be impacted. As such, the Projects impact on the current level of connectivity is considered negligible.	Ecosystem credit species predicted to occur.	The diffuse habitat connectivity that intersects the subject land is not considered to be important to any threatened species. Furthermore, any that may use the area are likely to be highly mobile and traverse cleared landscapes commonly.
Water bodies or any hydrological processes that sustain threatened entities	Three waterbodies (artificial dams) are present within the subject land. Calala Creek is also present, but is highly modified and ephemeral. The drainage patterns of surface water across the subject land are to the north-west towards Calala Creek. However, graded banks may redirect water into artificial waterbodies- within and surrounding the subject land. Overall, these processes can be said to be contributing factors to sustaining the native vegetation and habitats present.	• Ecosystem credit species predicted to occur • Box Gum Woodland • Bluegrass (assumed present) • Finger Panic Grass (assumed present) • Belson's Panic (assumed present) • Hawkweed (assumed present) • Austral Toadflax (assumed present) • Habitat for all ecosystem credit species	The present water quality and hydrological process contribute to sustaining the native vegetation recorded within the subject land, including Box Gum Woodland. The areas of native vegetation, in turn, may contribute to the persistence of the ecosystem credit species predicted to occur and those threatened flora assumed to be present outside the development footprint. The development footprint, primarily of the BESS,

Prescribed impact	Description of relevant habitat features associated with prescribed impacts	Threatened species likely to utilise habitat features associated with prescribed impact	Importance of habitat feature to impacted species
			will directly impact two dams, and others indirectly by redirecting water that will otherwise flow into said dams. However, these dams cannot be said to be important or significant habitat for any of the threatened entities recorded or assumed present within the subject land at the bioregional scale. Other impacts to hydrology are generally considered benign as: • The transmission line will be underground and is not expected to impact groundwater directly. • Pollution (erosion and sediment) control measures will be in place during construction and operation for surface water, which should afford groundwater protection. • Construction of the BESS will introduce an impermeable surface which may increase, albeit minimally, surface water flow towards Calala Creek. Operational phase run-off will be managed using sediment traps and a sediment basin and overflow swale. These measures will further filter sediment from run-off before it enters the receiving environment and drainage patterns that direct water towards Calala Creek. • Where the access road intersects Calala Creek, a culvert will be constructed such that no change to the hydrology of Calala Creek is anticipated.

Prescribed impact	Description of relevant habitat features associated with prescribed impacts	Threatened species likely to utilise habitat features associated with prescribed impact	Importance of habitat feature to impacted species
Where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community	The subject land is dissected and surrounded by roadways that pose a potential vehicle strike risk to resident fauna. The Project is certain to result in increased vehicle traffic during the construction phase of the Project and to a far less extent, than the operational phase of the BESS. This increased vehicle traffic has the potential to impact upon native fauna species that are active during the day, and generally with a higher potential for impact in areas where refuge/forage habitat exists immediately adjacent to areas where vehicle movements will occur.	• Construction hours are limited to the day time, so possible vehicle strike of nocturnal fauna is not anticipated. • Commonly occurring fauna, including birds and macropods.	Non-threatened, ground dwelling fauna known to inhabit the general area, particularly macropods such as Eastern Grey Kangaroo *Macropus giganteus*, are notoriously prone to vehicle strike. Vehicle strike of macropods is likely to be an impact already in place, which may be exacerbated during construction.

6.4. Impacts considered uncertain

Impacts considered uncertain are generally those that cannot be quantified using GIS software and are difficult to predict. This includes many of the indirect and prescribed impacts discussed in Sections 6.2 and 6.3 above, such as:

- Inadvertent impacts to native vegetation adjacent the development footprint.
- Introduction of pests, pathogens and weeds to native vegetation adjacent the development footprint and further afield.
- Degradation of downstream habitats via worsening of water quality or alteration to hydrological processes.
- Vehicle strikes.

Impacts considered uncertain are generally managed to negligible or satisfactory levels through the application of a CEMP and its sub-plans. Monitoring, adaptive management and adequate response are the key components that will be in place to successfully mitigate potential uncertain impacts to biodiversity.

6.5. Impacts to Groundwater Dependent Ecosystems (GDE)

Assessment of the potential for the subject land to support groundwater dependant ecosystems (GDEs) was undertaken using the Australian Government's Bureau of Meteorology Groundwater Dependant Ecosystems Atlas (BOM 2023). The subject land is not mapped as supporting GDEs associated with an aquifer in Appendix 8 of the Risk Assessment Guidelines for Groundwater Dependent Ecosystems (DPI 2012). Furthermore, use of groundwater for the Project is not proposed and pollution controls for surface water will afford the groundwater protection.

7. Mitigation and management of impacts

Identification of measures to mitigate or manage impacts has been undertaken in accordance with the BAM (DPIE 2020a), including considerations such as:

- Techniques, timing, frequency and responsibility.
- Identification of measures for which there is risk of failure.
- Evaluation of the risk and consequence of any residual impacts.
- Documentation of any adaptive management strategy proposed.

Identification of measures for mitigating impacts related to:

- Displacement of resident fauna.
- Indirect impacts on native vegetation and habitat.
- Mitigating prescribed biodiversity impacts.
- Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain.

Table 19 Measures to mitigate and manage impacts

Measures to mitigate and manage impacts	Action	Outcome	Timing	Responsibility
Displacement of resident fauna	• Prescriptions for mitigation of potential impacts of construction activities on retained native vegetation and habitat should be addressed in a site-specific CEMP. • Pre-clearing surveys, including nocturnal surveys for amphibians, are to be undertaken. Resident fauna are to be relocated to areas of suitable habitat outside the development footprint. • All open trenches should be inspected prior to back filling to ensure no animals are present.	No direct impact to resident fauna during vegetation removal.	Up to 24 hours prior to vegetation removal.	Construction contractor.
Indirect impacts on native vegetation and habitat	• Prescriptions for mitigation of potential impacts of construction activities on retained native vegetation and habitat should be addressed in a site-specific CEMP. • Ensure all works areas and access routes are clearly delineated and sign-posted from the outset of the Project construction phase. • Implementation of hygiene protocols for plant and equipment entering and exiting the construction site. • Preparation of a Stormwater Management Plan (SWMP) and Erosion Sediment Control Plan (ESCP) in accordance with the Blue Book (DECC 2008).	No impacts to neighbouring vegetation and habitat including the aquatic environment.	Construction and Operation.	The proponent and construction contractor.

Measures to mitigate and manage impacts	Action	Outcome	Timing	Responsibility
	• No discharge of wastewater to the receiving environment. • Standard stormwater management features (including sediment detention) will be incorporated into the design of the Project to meet stormwater quality management requirements. • Preparation of a Biodiversity Management Plan (BMP) detailing measures to mitigate impacts to Box Gum Woodland, including: – Erection of temporary fencing to protect retained CEEC where it abuts the development footprint. – Revegetation of the disturbed transmission line corridor with groundcover species characteristic of the CEEC with the aim of reinstating grasslands with a similar or higher vegetation integrity to that of surrounding, retained CEEC. – Planting densities and desired success rates. – Replacement of failed planting. – Ongoing weed control and management for 3 years post construction, or until the transmission line			

Measures to mitigate and manage impacts	Action	Outcome	Timing	Responsibility
	resembles surrounding CEEC condition. – Monitoring and reporting.			
Mitigating prescribed biodiversity impacts	• Demarcation of the limit of clearing prior to vegetation removal. • Preparation of a SWMP and ESCP in accordance with the Blue Book (DECC 2008). • No discharge of wastewater to the receiving environment. • Standard stormwater management features (including sediment detention) will be incorporated into the design of the Project to meet stormwater quality management requirements.	No impacts to neighbouring vegetation and habitat including the aquatic environment.	Construction and operation.	Construction contractor.
Transport of weeds and pathogens to/from the site to/from adjacent vegetation	• A biosecurity management plan prepared as part of the Project's CEMP is recommended and will prevent the spread of weeds and pathogens, and other biosecurity items into or out of the impact area upon implementation.	Implementation of the detailed mitigation measures will ensure residual impact are considered of a low likelihood and severity.	Construction.	Construction contractor.

7.1. Adaptive management strategy

Construction and operational management plans will all contain an adaptive management component. Adaptive management strategies will be receptive to any new and relevant data that may arise through ongoing assessment and monitoring and are key to the successful implementation of crucial objectives, yet also allow flexibility to changing dynamics and ongoing feedback and results. This includes measures to monitor predicted and uncertain impacts which will trigger adaptive management actions and allow for effective and quick responses.

8. Impact summary

This section outlines the impact summary for the Project which has identified and assessed impacts on TECs and threatened species that are at risk of a SAII including:

- Addressing all criteria for each TEC listed as at risk of an SAII present on the subject lands.
- Addressing all criteria for each threatened species at risk of an SAII present on the subject lands.
- Documenting assumptions made and/or limitations to information.
- Documenting all sources of data, information, references used or consulted.
- Clearly justifying why any criteria could not be addressed.
- Identification of impacts requiring offset.
- Identification of impacts not requiring offset.
- Identification of areas not requiring offset.

Figure 11 shows the extent of TECs at risk of an SAII within the subject lands. Figure 12 shows the location of impacts requiring offset, impacts not requiring offset and areas not requiring assessment.

8.1. Serious and irreversible impacts

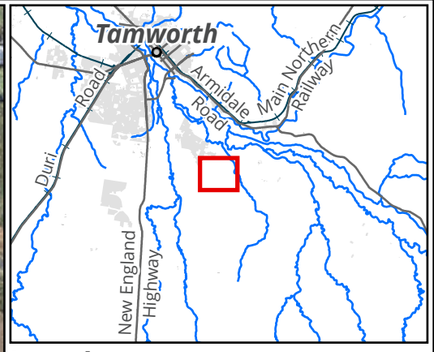
In accordance with Clause 6.7 of the BC Regulation an impact is to be regarded as serious and irreversible if it is likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct because:

(a) Principle 1: It will cause a further decline of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline.
(b) Principle 2: It will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size.
(c) Principle 3: It is an impact on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution.
(d) Principle 4: The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity and therefore its members are not replaceable.

One ecological community and one species considered to meet the above principles and may be impacted by the development include:

- *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions*.

Detailed SAII assessment is provided in Appendix 5.



Legend

- Subject land
- Development footprint
- Underground

SAII Entities

- Box Gum Woodland (PCT 599_DNG, 599_Woodland)

Figure 11 Serious and Irreversible Impacts

0 50 100 150 200

Metres
Scale: 1:5,500 @ A3
Coordinate System: GDA2020 MGA Zone 56

N

biosis

Matter: 40128, Date: 05 April 2024,
Prepared by: JB, Prepared for: BT, Last edited by: jbeckius
Location: P:\40100s\40128\Mapping\40128_Calala_BESS_BDAR_Updates_F5-10.aprx
Layout: 40128_F11_SAII

Acknowledgements: Basemap © Land and Property Information 2016; Imagery © NearMap 2023

8.2. Identification of impacts requiring offset

8.2.1. Impacts to native vegetation (ecosystem credits)

As outlined in Section 9.2.1 of the BAM, the assessor must determine an offset for all impacts of proposals on PCTs that are associated with a vegetation zone that has a vegetation integrity score of:

(a) ≥15, where the PCT is representative of an EEC or a CEEC.
(b) ≥17, where the PCT is associated with threatened species habitat (as represented by ecosystem credits) or represents a vulnerable ecological community.
(c) ≥20, where the PCT does not represent a TEC and is not associated with threatened species habitat.

On this basis, offsets are required for all vegetation zones impacted.

The offset requirement for the Project was calculated using the BAM Calculator. Table 20 provides a summary of the ecosystem credit offsets required for impacts from proposed development at the subject land.

Table 20 Offsets required (ecosystem credits)

Vegetation zone	Area (ha)	Impact	VI score	Offset required	TEC	HBTs	Credit requirement
PCT 84_DNG	0.16	Clearance	36.5	Yes	No	No	2
PCT 599_DNG	1.60	Clearance	33.2	Yes	Yes	No	32
PCT 599_Woodland	0.03	Clearance	63.8	Yes	Yes	No	1

8.2.2. Impacts to threatened species and their habitat

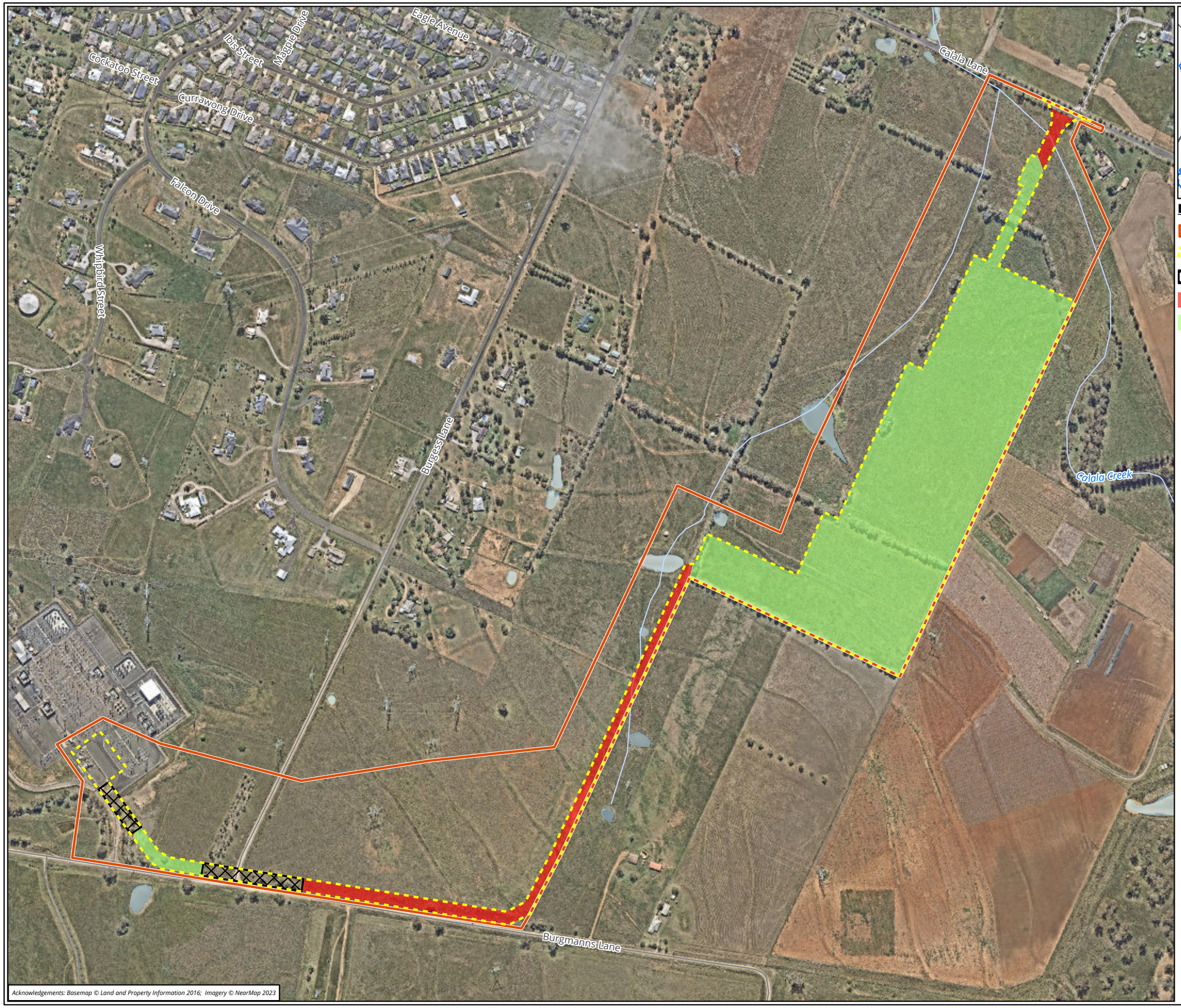
As outlined in Section 9.2.2 of the BAM, an offset is also required for the impacts of the proposals on the habitat of threatened species that require species credits. In this instance, as no species credit species habitat or individuals is considered present within the development footprint, no species credit offsets are required for the Project.

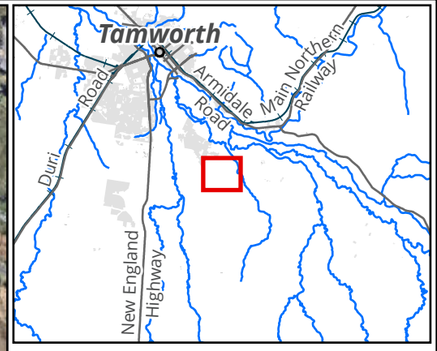
8.3. Identification of impacts not requiring offset

All above ground impacts on land mapped as Category 1 land or non-native vegetation do not require offsets.

8.4. Identification of areas not requiring assessment

All areas within the subject land requires some level of assessment under the BAM.





Legend

- Subject land
- Development footprint
- Underground
- Impacts requiring offset
- Impacts not requiring offset

Figure 12 Impacts requiring offset and impacts not requiring assessment

0 50 100 150 200

Metres
Scale: 1:5,500 @ A3
Coordinate System:
GDA2020 MGA Zone 56

N

biosis

Matter: 40128, Date: 05 April 2024,
Prepared by: JB, Prepared for: BT, Last edited by: jbeckius
Location: P:\40100s\40128\Mapping\
40128_Calala_BESS_BDAR_Updates_F5-10.aprx
Layout: 40128_F12_Offsets

9. Assessment against biodiversity legislation

9.1. Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (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 (MNES) protected under the Act. Under the EPBC Act, activities that have potential to result in significant impacts on MNES must be referred to the Commonwealth Minister for the Environment for assessment.

An assessment of the impacts of the proposed development on MNES, against heads of consideration outlined in Commonwealth of Australia (2013) was prepared to determine whether referral of the proposed development to the Commonwealth Minister for the Environment is required (Appendix 6). MNES relevant to the proposed development are summarised in Table 21.

Table 21 Assessment of the proposed development against the EPBC Act

Matter of NES	Project specifics	Potential for significant impact
Threatened species	Given the general paucity of habitat value within the subject land, no threatened fauna are considered likely to inhabit or frequent the subject land other than very vagrantly. Given records (BioNet) within 10 km of the subject land and marginally suitable conditions, potential habitat for Bluegrass *Dichanthium setosum* is considered present.	Unlikely. Small amount of DNG and treed habitat to be removed. Bluegrass was not detected within suitable habitat within the development footprint. Were a population present in non-surveyed areas, it would not be considered an important population of Bluegrass (Appendix 6).
Threatened ecological communities	The subject land contains *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland*.	Unlikely. A small area of DNG and one tree to be removed from this community.
Migratory species	The subject land is not considered likely to be frequented by any migratory species other than highly vagrantly.	Unlikely.
National Heritage Places	There are no natural heritage places within the subject land.	None.
Wetlands of international importance (Ramsar sites)	The nearest Ramsar site to the subject land is Riverland, located 900 – 1000 km downstream.	None.

9.2. Environmental Planning and Assessment Act 1979/Environmental Planning and Assessment Regulation 2021

An assessment of the Project against the relevant sections of the EP&A Act is provided below.

9.2.1. State Environmental Planning Policies

State Environmental Planning Policy (Biodiversity and Conservation) 2021

Chapter 2: Vegetation in non-rural areas

This chapter aims to protect the biodiversity values of trees and other vegetation in non-rural areas of NSW and to preserve the amenity of non-rural areas through the preservation of trees and other vegetation by ensuring that the BOS will apply to all clearing of native vegetation that exceeds the offset thresholds in urban areas and environmental conservation zones that does not require development consent.

As the proposal requires development consent (and is a State Significant Development), the provisions of this chapter under the SEPP do not apply.

Chapter 3: koala habitat protection 2020

This chapter applies to land zoned RU1, RU2 or RU3 in the Tamworth Regional LGA.

As the Project occurs on land zoned RU4: Primary Production Small Lots, this chapter does not apply.

Chapter 4: Koala habitat protection 2021

This chapter aims to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline.

The study area is zoned RU4: Primary Production Small Lots and Tamworth Regional LGA is listed in Schedule 2 of the SEPP and as such, this chapter is relevant to the Project. However, as the Project is a State Significant Development this chapter does not apply.

9.3. Biodiversity Conservation Act 2016

The NSW BC Act requires that the BAM be applied to all proposals that trigger the BOS, and that a BDAR is required to be submitted to the approval authority.

This Project is considered a State Significant Development and therefore the BOS applies in accordance with Section 7.9 of the BC Act. A BDAR is required, prepared in accordance with the BAM (DPIE 2020a).

9.4. Biosecurity Act 2015

The Biosecurity Act provides for the identification, classification and control of priority weeds with the purpose of determining if a biosecurity risk is likely to occur. A biosecurity risk is defined as the risk of a biosecurity impact occurring, which for weeds includes the introduction, presence, spread or increase of a pest into or within NSW or any part of the State. A pest plant has the potential to; harm or reduce biodiversity or out-compete other organisms for resources, including food, water, nutrients, habitat and sunlight.

The General Biosecurity Duty as outlined in the Biosecurity Act states:

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

One priority weed for the North West LLS Region has been recorded in the subject land and is listed in Table 22, along with their associated Duty.

Table 22 Priority weeds within the subject land

Scientific name	Common name	Relevant biosecurity duty
Hypericum perforatum	St John's Wort	**Regional Recommended Measure** An exclusion zone is established for all lands in the region, except the core infestation area comprising the Gunnedah Shire council, Gwydir Shire council, Liverpool Plains Shire council and Tamworth Regional council. *Whole of region: Land managers mitigate the risk of new weeds being introduced to their land. Within exclusion zone: Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found. Within core infestation: Land managers should mitigate spread of the plant from their land. A person should not buy, sell, move, carry or release the plant into the environment. Land managers should reduce the impact of the plant on assets of high economic, environmental and/or social value.*

9.5. Fisheries Management Act 1994

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 an Assessment of Significance process.

No records of threatened aquatic species have been recorded within 10 kilometres of the subject land on the BioNet Atlas of NSW, however, predicted habitat for threatened aquatic species is mapped on the DPI spatial data portal within the subject land and assessment area:

- Southern Purple Spotted Gudgeon *Mogurnda adspersa* – mapped habitat within Calala Creek, from south of the subject land until intersection with the Peel River.
- Eel Tailed Catfish *Tandanus tandanus* – mapped habitat within Peel River, Piallamore Anabranch and Cockburn River to the north of the subject land.

Despite mapped habitat for Southern Purple Spotted Gudgeon within Calala Creek, the likelihood of this species occurring is considered low. As mentioned, Calala Creek is heavily modified and subject to disturbance along its entire length. Primarily, this includes channel modification resulting in the loss of important habitat features such as aquatic vegetation, overhanging vegetation, rocks or snags. Furthermore, Calala Creek, being ephemeral, is prone to significant fluctuations in water level and quality, meaning successful reproduction and recruitment is likely not possible. Given the above, Calala Creek, particularly in within its upper reaches and that within the subject land, is not considered viable habitat for this species.

Predicted habitat for Eel Tailed Catfish is mapped within the waterways of the floodplain of the Peel River to the north of the subject land. Potential habitat is not present within Calala Creek, however, connectivity, albeit diffuse, to potential habitat is present via Calala Creek. There is risk the Project could cause impacts to

downstream environments via erosion (and subsequent sedimentation) and general stormwater runoff. In response, a range of erosion and sediment controls have been devised including:

- Temporary sediment fences and flow diversion mounds.
- Swales – both temporary and permanent.
- Basins – functioning during both construction and operational stages.

These are considered appropriate to mitigate contamination risk of Calala Creek and by extension mapped habitat for Eel Tailed Catfish.

Given there is no mapped KFH within the subject land and the modified condition of Calala Creek, the Project is unlikely to result in impacts to fish passage. However, due to the mapping of Southern Purple Spotted Gudgeon habitat, a precautionary approach would involve applying for a permit under Part 7 of the FM Act to temporarily obstruct fish passage during construction (Section 219), and for dredging or reclamation works (Section 201).

10. Biodiversity credit report

Offsetting through the transfer and retirement of biodiversity credits, or paying into the Biodiversity Conservation Trust Offset Fund, is required for the current assessment for impacts to one vegetation zone at the subject land. A biodiversity credit report is provided on the following pages.

BAM Credit Summary Report

Proposal Details

Assessment Id
00034966/BAAS18155/22/00034967

Proposal Name
Calala Battery Energy Storage System - March 2024

BAM data last updated *
14/03/2024

Assessor Name
Brendon True

Report Created
08/05/2024

BAM Data version *
67

Assessor Number
BAAS18155

BAM Case Status
Finalised

Date Finalised
08/05/2024

Assessment Revision
8

Assessment Type
Major Projects

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion												
2	599_DNG	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	32.1	32.1	1.6	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	32

3	599_Woodland	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	63.8	63.8	0.03	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	1
											Subtotal	**33**
River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion												
1	84_DNG	Not a TEC	36.5	36.5	0.16	PCT Cleared - 40%	High Sensitivity to Gain			1.50		2
											Subtotal	**2**
											Total	**35**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits

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APPENDICES

Appendix 1. Survey methods

Appendix 1.1. Nomenclature

The flora taxonomy (classification) used in this report follows the most recent Flora of NSW. All doubtful species names were verified with the online Australian Plant Name Index (Australian National Botanic Gardens & Australian National Herbarium 2007). Flora species, including threatened species and introduced flora species, are referred to by both their common and then scientific names when first mentioned. Subsequent references to flora species cite the common names only, unless there is no common name, for which scientific name will be used. Common names, where available, have been included in threatened species tables and the complete flora list in Appendix 3.

Names of vertebrates follow the Census of Australian Vertebrates (CAVs) maintained by the DCCEEW (DSEWPaC 2009). In the body of this report vertebrates are referred to by both their common and scientific names when first mentioned. Subsequent references to these species cite the common name only.

Appendix 1.2. Permits and licences

The flora and fauna assessment was conducted under the terms of Biosis' Scientific Licence issued by EHG (SL100758, expiry date 31 March 2024). The BAM Assessment and quality review of the BDAR was carried out by Accredited Assessors Brendon True (BAAS18155) and Mitchell Palmer (BAAS17051).

Appendix 1.3. Limitations

Field surveys were undertaken in accordance with the BAM (DPIE 2020a). Ecological surveys provide a sampling of flora and fauna at a given time and season. Factors influencing detectability of species during survey include species dormancy, seasonal conditions, ephemeral status of waterbodies, and migration and breeding behaviours of some fauna. In many cases, these factors do not present a significant limitation to assessing the overall biodiversity values of a site.

Surveys undertaken, combined with habitat assessments and desktop analysis are considered sufficient to reach the conclusions herein regarding this and all other species' likelihood of occurrence within the subject land.

Database searches, and associated conclusions on the likelihood of species to occur within the assessment area, are reliant upon external data sources and information managed by third parties.

Appendix 2. BAM Candidate species assessment

Table A 1: Threatened flora species assessment

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Conclusion and rationale
	EPBC	BC							
Acacia atrox **Myall Creek Wattle**	-	E	Yes	Dense shrub growing in two populations near Delungra and Gurley in north-west NSW. Grows on the upper slope and crests of hills in partly cleared paddocks adjacent to dry sclerophyll forest primarily in North-west Slopes Dry Sclerophyll Woodlands and Western Slopes Dry Sclerophyll Forests. Grows on basalt in deep clay soils.	Nil	No	No	No	Habitat degraded such that species is considered unlikely to occur. The subject land has a long history of modification and grazing, conditions this species is unlikely to survive in.
Asterolasia beckersii **Dungowan Starbush**	CE	CE	Yes	Near Dungowan Dam, the Dungowan Starbush grows in rocky alluvial soil along a creekbank dominated by River Oak (*Casuarina cunninghamiana*) with or without Manna Gum (*Eucalyptus viminalis*). *Asterolasia beckersii* appears to be killed by fire. The germination of Dungowan Starbush does not appear to be favoured by fire. While *A. beckersii* can flower profusely throughout the year, the species appears to have a very low fruit set. The germination of *A. beckersii* can often be enhanced by some physical disturbance to the soil.	Nil	No	No	No	Associated with PCT 84 which is highly modified and has few natural characters. Habitat for this species is absent within the subject land.
Cadellia pentastylis **Ooline**	V	V	No	Medium sized, spreading tree occurring on the western edge of the North West Slopes ranging from the north of Gunnedah to west of Tenterfield. Grows in Western Vine Thickets. Grows in low to medium	Nil	No	No	No	Habitat for this species is absent within the subject land.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Conclusion and rationale
	EPBC	BC							
				nutrient soils ranging from surface layers of sandy loam grading to light-medium clay soils deeper in the soil profile.					
Callistemon pungens	-	V	Yes	Shrub distributed throughout the north-east region of NSW.	Nil	No	No	No	Habitat degraded such that species is considered unlikely to occur. The subject land has a long history of modification and grazing, conditions this species is unlikely to survive in.
Dichanthium setosum **Bluegrass**	V	V	Yes	Upright grass, growing on the New England Tablelands, North West Slopes and Plains, and the Central Western Slopes of NSW. Grows in moderately disturbed areas including cleared woodlands, roadside remnants and agricultural pasturelands in a variety of communities including Inland Riverine Forests, Northern Tableland Dry Sclerophyll Forests, Western Slopes Grassy Woodlands and Coastal Valley Grassy Woodlands. Grows on heavy black basaltic soils and red-brown loams with clay subsoils.	Low	Yes	Yes- targeted survey undertaken February 2023 and February 2024	Yes	The subject land contains potential habitat for this species, however, it was not detected during targeted surveys across part of the subject land. This species has been assumed present in areas not surveyed.
Digitaria porrecta **Finger Panic Grass**	-	E	Yes	Loosely tufted grass growing on the North West Slopes and Plains spanning from Moree to Tambar Springs in the south, and Coonabarabran to Tamworth. Grows in grasslands, woodlands, travelling stock routes and along roadsides in a variety of communities including Western Slopes Grassy Woodlands, Riverine Plain Woodlands, Western Slopes Grasslands and Semi-arid Floodplain Grasslands. Grows on fertile soils.	Low	Yes	Yes- targeted survey undertaken February 2023 and February 2024	Yes	The subject land contains potential habitat for this species, however, it was not detected during targeted surveys across part of the subject land. This species has been assumed present in areas not surveyed.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Conclusion and rationale
	EPBC	BC							
Euphrasia arguta	CE	CE	Yes	Semiparasitic, erect annual herb restricted to the Nundle area of the NSW north-western slopes and tablelands. Historically this species has been collected from an area extending from Sydney to Bathurst and north to Walcha. Grows in grassy areas near rivers in a variety of communities including Upper Riverina Dry Sclerophyll Forests, Western Slopes Dry Sclerophyll Forests, Western Slopes Grassy Woodlands and Temperate Montane Grasslands.	Nil	No	No	No	The subject land falls outside the species known range with the nearest population at Nundle, over 40 km to the south-east. Known records are from grassy forests with comparatively less, sustained disturbance and modification. As such, habitat is degraded such that the species is considered unlikely to occur.
Haloragis exalata **subsp. *Velutina*** **Tall Velvet Sea-berry**	V	V	Yes	Small to medium sized shrub confined to the north coast of NSW and south-east Queensland. Grows in damp, places adjacent to watercourses and on steep, rocky slopes of gorges in New England Dry Sclerophyll Forests, Eastern Riverine Forests, Inland Riverine Forests, New England Grassy Woodlands, Northern Gorge Dry Sclerophyll Forests and Western Vine Thickets.	Nil	No	No	No	Associated with PCT 84 only which is heavily modified and historically disturbed. Given this severe lack of natural characters and watercourses with rocky slopes, habitat for this species is absent within the subject land.
Homopholis belsonii **Belson's Panic**	E	V	Yes	Perennial grass growing on the northwest slopes and plains of NSW between Wee Waa, Goondiwindi and Glen Innes in the Brigalow Belt South Bioregion. Grows in a variety of communities including Yetman Dry Sclerophyll Forests, Semi-arid Floodplain Grasslands, Western Vine Thickets, Riverine Plain Woodlands and Subtropical Semi-arid Woodlands. Usually grows on poor soils, occasionally found on basalt enriched sites in alluvial clay soils.	Low	Yes	Yes- targeted survey undertaken February 2023 and February 2024	Yes	The subject land contains potential habitat for this species, however, it was not detected during targeted surveys across part of the subject land. This species has been assumed present in areas not surveyed.
Picris evae	V	V	Yes	Soft stemmed annual with a population distribution	Low	Yes	Yes-	Yes	The subject land contains potential

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Conclusion and rationale
	EPBC	BC							
Hawkweed				spanning north from the Inverell area including Inverell, Elsmore and Myall Creek, Oxley Park and Dangar Falls in the Oxley Wild Rivers National Park. Found growing in modified and disturbed areas in a variety of communities including New England Dry Sclerophyll Forests, Western Slopes Dry Sclerophyll Forests, Floodplain Transition Woodlands, New England Grassy Woodlands and Temperate Montane Grasslands. Grows in shallow black, dark grey or red-brown stony soils, reddish clay-loam or medium clay soils.			targeted survey undertaken February 2023 and February 2024		habitat for this species, however, it was not detected during targeted surveys across part of the subject land. This species has been assumed present in areas not surveyed.
Prasophyllum sp. Wybong	-	CE	Yes	Terrestrial orchid restricted to five sites within NSW at Boorowa, Captains Flat, Ilford, a Travelling Stock Route at Delegate and 10 kilometres south-east of Muswellbrook. Found growing in open sites and patchy forest in Natural Temperate Grassland, Box-Gum Woodlands, Temperate Montane Grasslands, Southern Tableland Grassy Woodlands, Subalpine Woodlands, Tableland Clay Grassy Woodlands, Western Slopes Grassy Woodlands. This species is cryptic and most visible when flowering between October and December. Grows in fertile soils.	Nil	No	No	No	Habitat degraded such that the species is considered unlikely to occur.
Syzygium paniculatum **Magenta Lilly Pilly**	E	V	No	Small to medium sized rainforest tree restricted to a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest. Found growing on stabilized dunes near the sea in South Coast Sands Dry Sclerophyll Forests, Coastal Swamp Forests, Coastal Headland Heaths, Littoral Rainforests, Northern	Nil	No	No	No	Habitat for this species is absent within the subject land.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Conclusion and rationale
	EPBC	BC							
				Hinterland Wet Sclerophyll Forests and Southern Lowland Wet Sclerophyll Forests. Grows on grey sandy, gravelly, silty or clay soils over sandstone substrates.					
Thesium australe **Austral Toadflax, Toadflax**	V	V	Yes	Small, straggling herb with a distribution comprising of small populations scattered along the coast of eastern NSW including the Northern and Southern Tablelands, Tasmania, Queensland and eastern Asia. A root parasite found growing on damp sites in grassland, grassy woodlands and coastal headlands often in association with Kangaroo Grass *Themeda triandra* in a variety of communities including New England Dry Sclerophyll Forests, Western Slopes Grasslands, Northern Tableland Wet Sclerophyll Forests, Brigalow Clay Plain Woodlands, Subalpine Woodlands and Maritime Grasslands.	Low	Yes	Yes- targeted survey undertaken February 2023 and February 2024	Yes	The subject land contains potential habitat for this species, however, it was not detected during targeted surveys across part of the subject land. This species has been assumed present in areas not surveyed.
Tylophora linearis	E	V	Yes	Slender, hairless twiner distributed throughout the central western region of NSW with records from Goonoo, Pilliga West, Pilliga East, Bibblewindi, Cumbil and Eura State Forests, Coolbaggie Nature Reserve, Goobang National Park and Hiawatha State Forest. Found growing at low elevations on flats in a variety of communities including North-west Slopes Dry Sclerophyll Woodlands, Yetman Dry Sclerophyll Forests, Floodplain Transition Woodlands and Western Slopes Grassy Woodlands. Grows in sedimentary soils.	Nil	No	No	No	The subject land is beyond the eastern limit of this species known distribution and does not contain sedimentary flats where the species is commonly found. Habitat for this specie is considered absent within the subject land.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Conclusion and rationale
	EPBC	BC							
Swainsona sericea **Silky Swainson-pea**	-	V	Yes	Found in Natural Temperate Grassland and Snow Gum *Eucalyptus pauciflora* Woodland on the Monaro. Found in Box-Gum Woodland in the Southern Tablelands and South West Slopes. Sometimes found in association with cypress-pines *Callitris* spp. Regenerates from seed after fire.	Nil	No	No	No	Generally found at higher altitudes rather than valley flats and floodplains. Habitat for this specie is considered absent within the subject land.

Table A 2: Threatened fauna species assessment

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Conclusion and rationale
	EPBC	BC							
***Adelotus brevis* - endangered population** **Tusked Frog population in the Nandewar and New England Tableland Bioregions**	-	E2	Yes	Coast and adjacent ranges from central Queensland to southern NSW. Tusked Frogs were once found west to the New England Tableland and North West Slopes (Nandewar bioregion) but are now very rare there, and the population in these regions has been listed as an Endangered Population under the Biodiversity Conservation Act. They remain more common in lower elevation coastal areas.	Nil	No	No	No	Habitat for this species is absent within the subject land. The artificial waterbodies present and Calala Creek lack of natural characters are considered unlikely to support this species.
Anthochaera phrygia **Regent Honeyeater**	CE	CE	Yes	Regent Honeyeaters are semi-nomadic, occurring in temperate eucalypt woodlands and open forests. Most records are from box-ironbark eucalypt forest associations and wet lowland coastal forests. Nectar and fruit from mistletoes are also eaten. This species usually nest in tall mature eucalypts and sheoaks.	Low	No	No	No	The subject land is not within the important area mapping for this species. No notable foraging or nesting resources area present.
Aprasia parapulchella **Pink-tailed Worm-lizard, Pink-tailed Legless Lizard**	V	V	Yes	Fossorial species, which lives beneath surface rocks and occupies ant burrows. It feed on ants, particularly their eggs and larvae. Thought to lay eggs within the ant nests under rocks that it uses as a source of food and shelter. Key habitat features are a cover of native grasses, particularly Kangaroo Grass (Themeda australis), sparse or no tree cover, little or no leaf litter, and scattered	Low	No	No	No	Habitat constraint (rocky areas) and habitat generally for this species is absent within the subject land.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Conclusion and rationale
	EPBC	BC							
				small rock with shallow embedment in the soil surface.					
Botaurus poiciloptilus **Australasian Bittern**	E	E	No	The Australasian Bittern is distributed across south-eastern Australia. Often found in terrestrial and estuarine wetlands, generally where there is permanent water with tall, dense vegetation including *Typha sp.* and *Eleoacharis sp*. Typically this bird forages at night on frogs, fish and invertebrates, and remains inconspicuous during the day. The breeding season extends from October to January with nests being built amongst dense vegetation on a flattened platform of reeds.	Nil	No	No	No	Habitat for this species is absent within the subject land.
Calidris ferruginea **Curlew Sandpiper**	CE, Mi	E	No	Inhabits sheltered intertidal mudflats. Also non-tidal swamps, lagoons and lakes near the coast. Infrequently recorded inland.	Nil	No	No	No	Habitat for this species is absent within the subject land.
Callocephalon fimbriatum **Gang-gang Cockatoo**	E	V	No	In summer, occupies tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. Also occur in subalpine Snow Gum woodland and occasionally in temperate or regenerating forest. In winter, occurs at lower altitudes in drier, more open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas. It requires tree hollows in which to breed.	Low	No	No	No	The habitat constraint (Eucalypt tree species with hollows at least 3 m above the ground and with hollow diameter of 7 cm or larger) for this species is not present within the subject land. Meagre foraging resources present.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Conclusion and rationale
	EPBC	BC							
Calyptorhynchus lathami **Glossy Black-Cockatoo**	V	V	Yes	Inhabits forest with low nutrients, characteristically with key *Allocasuarina* species. Tends to prefer drier forest types. Often confined to remnant patches in hills and gullies. Breed in hollows stumps or limbs, either living or dead.	Low	No	No	No	The habitat constraint (Living or dead tree with hollows greater than 15cm diameter and greater than 8m above ground) for this species is not present within the subject land. Foraging resources also absent.
Dasyurus maculatus maculatus **(SE mainland population)**	E	V	No	Occurs along the east coast of Australia and the Great Dividing Range. Uses a range of habitats including sclerophyll forests and woodlands, coastal heathlands, and rainforests. Occasional sightings have been made in open country, grazing lands, rocky outcrops, and other treeless areas. Habitat requirements include suitable den sites, including hollow logs, rock crevices and caves, an abundance of food and an area of intact vegetation in which to forage. Seventy per cent of the diet is medium-sized mammals, and feeds on invertebrates, reptiles and birds. Individuals require large areas of relatively intact vegetation through which to forage. The home range of a female is between 180 and 1000 ha, while males have larger home ranges of between 2000 and 5000 ha. Breeding occurs from May to August.	Nil	No	No	No	Habitat for this species is absent within the subject land.
Falco hypoleucos **Grey Falcon**	V	V	No	Found over open country and wooded lands of tropical and temperate Australia. Mainly found on sandy and stony plains of inland drainage systems with lightly timbered acacia scrub.	Low – transient flyover or foraging only.	No	No	No	Nesting habitat is absent. Very low likelihood of foraging on avian prey within the subject land.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Conclusion and rationale
	EPBC	BC							
Grantiella picta **Painted Honeyeater**	V	V	No	Found mainly in dry open woodlands and forests, where it is strongly associated with mistletoe. Often found on plains with scattered eucalypts and remnant trees on farmlands.	Low – foraging only.	No	No	No	The subject land does not contain specific resources that will draw this species to it. The species may pass through or flyover transiently.
Haliaeetus leucogaster **White-bellied Sea-Eagle**	-	V	Yes	A migratory species that is generally sedentary in Australia, although immature individuals and some adults are dispersive. Found in terrestrial and coastal wetlands; favouring deep freshwater swamps, lakes and reservoirs; shallow coastal lagoons and saltmarshes. It hunts over open terrestrial habitats. Feeds on birds, reptiles, fish, mammals, crustaceans and carrion. Roosts and makes nest in trees.	Low – flyover only.	No	Yes	No	The habitat constraint (living or dead mature trees within suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines) is not satisfied by the subject land. Unlikely to nest in small trees in small patches of vegetation. May flyover transiently if present in the broader area.
Hamirostra melanosternon **Black-breasted Buzzard**	-	V		Occur in woodland and open country of tropical and temperate Australian. They prefer tree-lined watercourses, billabongs, ephemeral lakes and floodplains. Have been recorded in areas where Melaleuca dominate the vegetation. Nest in dead or partly dead trees usually near watercourses.	Low	No	No	No	Habitat constraint not present.
Hirundapus caudacutus **White-throated Needletail**	V, Mi	-	Yes	An aerial species found in feeding concentrations over cities, hilltops and timbered ranges. Breeds in Asia.	Low - flyover only.	No	No	No	An aerial species that could flyover during migration. Does not breed in Australia.
Lathamus discolor	CE	E	Yes	The Swift Parrot occurs in woodlands and forests of NSW from May to August, where it feeds on eucalypt nectar, pollen and associated insects.	Nil	No	No	No	The subject land is not within the important area mapping for this species. No notable foraging or nesting resources

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Conclusion and rationale
	EPBC	BC							
Swift Parrot				The Swift Parrot is dependent on flowering resources across a wide range of habitats in its wintering grounds in NSW. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted *Gum Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon,* and White Box *E. albens*. Commonly used lerp infested trees include Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*. This species is migratory, breeding in Tasmania and also nomadic, moving about in response to changing food availability.					are present.
Litoria booroolongensis **Booroolong Frog**	E	E	Yes	The species is restricted to NSW and north-eastern VIC, predominantly along the western-flowing streams of the Great Dividing Range. The most recent records occur on the south-west slopes of NSW. The species is found in upland rivers, montane creeks and lowland rivers and creeks, particularly in permanent rocky western-flowing streams and rivers on the slopes and tablelands of NSW, with some fringing vegetation cover such as ferns, sedges or grasses. The Booroolong Frog is often found in daylight on rocks by the waters edge or sheltering under rocks or amongst vegetation. Breeding occurs in spring and early summer when eggs are laid in submerged rock crevices. Tadpoles develop in slow-flowing connected or isolated pools and	Nil	No	No	No	Habitat for this species is absent within the subject land. The artificial waterbodies present and Calala Creek lack natural characters and are considered unlikely to support this species.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Conclusion and rationale
	EPBC	BC							
				metamorphose in late summer to early autumn.					
Miniopterus orianae oceanensis **Large Bent-winged Bat**	-	V	Yes	Occurs from Victoria to Queensland, on both sides of the Great Dividing Range. Forms large maternity roosts (up to 100,000 individuals) in caves and mines in spring and summer. Individuals may fly several hundred kilometres to their wintering sites, where they roost in caves, culverts, buildings, and bridges. They occur in a broad range of habitats including rainforest, wet and dry sclerophyll forest, paperbark forest and open grasslands. Has a fast, direct flight and forages for flying insects (particularly moths) above the tree canopy and along waterways.	Low – flyover or foraging only.	No	No	No	The breeding habitat constraint (Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding) is not satisfied by the subject land.
Petaurus norfolcensis **Squirrel Glider**	-	V	Yes	Generally occurs in dry sclerophyll forests and woodlands but is absent from dense coastal ranges in the southern part of its range. Requires abundant hollow-bearing trees and a mix of eucalypts, banksias and acacias. Within a suitable vegetation community at least one species should flower heavily in winter and one species of eucalypt should be smooth barked.	Nil	No	No	No	The subject land contains small, isolated patches of vegetation in a highly cleared landscape. Habitat for this species is considered absent within the subject land.
Phascolarctos cinereus **Koala**	E	E	Yes	In NSW the Koala mainly occurs on the central and north coasts with some populations in the western region. Koalas feed almost exclusively on eucalypt foliage, and their preferences vary regionally. Primary feed trees include *Eucalyptus robusta*, *E. tereticornis*, *E. punctata*, E. *haemostoma*	Low – traversal, impromptu foraging only.	No	No	No	Breeding habitat for this species is considered absent within the subject land. Could, on occasion, traverse the subject land, however, low likelihood given the broader cleared landscape and lack of foraging resources generally.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Conclusion and rationale
	EPBC	BC							
				and *E. signata*. They are solitary with varying home ranges.					
Polytelis swainsonii **Superb Parrot**	V	V	No	Found mainly in open, tall riparian River Red Gum forest or woodland. Often found in farmland including grazing land with patches of remnant vegetation. Forages primarily in grassy box woodland, feeding in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants.	Low – foraging only.	No	No	No	Breeding habitat is absent within the subject land. Poor quality foraging only.
Pteropus poliocephalus **Grey-headed Flying-fox**	V	V	Yes	Occurs along the NSW coast, extending further inland in the north. This species is a canopy-feeding frugivore and nectarivore of rainforests, open forests, woodlands, melaleuca swamps and banksia woodlands. Roosts in large colonies, commonly in dense riparian vegetation.	Low – flyover only.	No	No	No	Breeding habitat absent within the subject land. May flyover and occasional forage if present in the broader area.
Rostratula australis **Australian Painted Snipe**	E	E	No	Usually found in shallow inland wetlands including farm dams, lakes, rice crops, swamps and waterlogged grassland. They prefer freshwater wetlands, but have been recorded in brackish waters. Forages on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter.	Nil	No	No	No	Habitat for this species is considered absent within the subject land.
Uvidicolus sphyrurus **Border Thick-tailed Gecko**	V	V	Yes	The Border Thick-tailed Gecko is generally found in undisturbed habitat remnants on rock outcrops and stony hills within eucalypt and cypress-pine open forest or woodland between 500 and 1100 m elevation. Prefers habitat with numerous logs	Nil	No	No	No	This species prefers areas with dense tree canopy, boulders, rock slabs, fallen timber and deep leaf litter. The subject land lacks these microhabitats.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Conclusion and rationale
	EPBC	BC							
				and timber debris, sparse grass/herb ground cover and abundant litter.					

Appendix 3. Flora

Appendix 3.1. BAM plot field data

Table A 3: BAM plot floristics

Family	Scientific name	Common name	37994.P1		37994.P2		37994.P3		37994.P4		37994.P5	
			Cvr%	Abund	Cvr%	Abund	Cvr%	Abund	Cvr%	Abund	Cvr%	Abund
Native species												
Amaranthaceae	*Amaranthus spp.*	Amaranth			0.1	1						
Amaranthaceae	*Alternanthera denticulata*	Lesser Joyweed			0.1	1						
Asteraceae	*Calotis spp.*	A Burr-daisy							0.2	200		
Asteraceae	*Calotis cuneifolia*	Purple Burr-Daisy	0.3									
Asteraceae	*Calotis lappulacea*	Yellow Burr-daisy	0.2				4	800				
Campanulaceae	*Wahlenbergia spp.*	Bluebell			0.1	1	0.4	400				
Chenopodiaceae	*Einadia spp.*	None			3	400	2	800				
Convolvulaceae	*Dichondra repens*	Kidney Weed					0.3	50				
Convolvulaceae	*Convolvulus graminetinus*	None	0.1									
Cyperaceae	*Cyperus spp.*	None					15					
Geraniaceae	*Erodium spp.*	Crowfoot	0.5									
Geraniaceae	*Geranium solanderi*	Native Geranium	0.3		2	300	0.5	50				
Juncaceae	*Juncus spp.*	A Rush	0.1		0.7	50						
Lomandraceae	*Lomandra spp.*	Mat-rush					0.3	50				
Malvaceae	*Sida corrugata*	Corrugated Sida	0.1				0.2	9				
Myrtaceae	*Eucalyptus albens*	White Box					50					
Oxalidaceae	*Oxalis perennans*	None			0.2	50	0.2	50				
Plantaginaceae	*Veronica spp.*	None			0.2	10						
Poaceae	*Digitaria spp.*	A Finger Grass	0.5									

Family	Scientific name	Common name	37994.P1		37994.P2		37994.P3		37994.P4		37994.P5	
			Cvr%	Abund	Cvr%	Abund	Cvr%	Abund	Cvr%	Abund	Cvr%	Abund
Poaceae	*Aristida spp.*	A Wiregrass	15									
Poaceae	*Aristida vagans*	Threeawn Speargrass									15	
Poaceae	*Cynodon dactylon*	Common Couch			65						8	
Poaceae	*Panicum effusum*	Hairy Panic							10			
Poaceae	*Lachnagrostis filiformis*	None			1	200	2	200	5			
Poaceae	*Rytidosperma spp.*	None					10		5		1	
Poaceae	*Eragrostis leptostachya*	Paddock Lovegrass	8									
Poaceae	*Panicum spp.*	Panicum	1								7	
Poaceae	*Austrostipa aristiglumis*	Plains Grass			0.5	50	1	90				
Poaceae	*Aristida ramosa*	Purple Wiregrass			1	200	20		5			
Poaceae	*Dichanthium sericeum*	Queensland Bluegrass							10			
Poaceae	*Bothriochloa macra*	Red Grass	20		1	200	15	200				
Poaceae	*Rytidosperma pallidum*	Red anther Wallaby Grass; Silvertop Wallaby Grass	2									
Poaceae	*Bothriochloa spp.*	Red grass, Bluegrass							15		6	
Poaceae	*Dichelachne micrantha*	Shorthair Plumegrass	5									
Poaceae	*Sporobolus creber*	Slender Rat's Tail Grass	8								20	
Poaceae	*Sporobolus elongatus*	Slender Rat's Tail Grass			2	400	15		25		3	400
Poaceae	*Chloris ventricosa*	Tall Chloris	7									
Poaceae	*Microlaena stipoides*	Weeping Grass	4				15	700	15			
Poaceae	*Chloris truncata*	Windmill Grass			1	200			5			
Polygonaceae	*Persicaria spp.*	Knotweed			0.3	50						
Pteridaceae	*Cheilanthes sieberi*	Rock Fern	0.1				0.2	30				
Verbenaceae	*Verbena spp.*	None	0.3		7		0.5	30	0.2	50		
Introduced species												
Asteraceae	*Aster spp.*	None							0.1	20		

Family	Scientific name	Common name	37994.P1		37994.P2		37994.P3		37994.P4		37994.P5	
			Cvr%	Abund	Cvr%	Abund	Cvr%	Abund	Cvr%	Abund	Cvr%	Abund
Asteraceae	*Aster subulatus*	Wild Aster			0.3	20						
Poaceae	*Avena spp.*	Oats					0.1	2				
Asteraceae	*Bidens spp.*	None			0.5	50	0.1	1				
Brassicaceae	*Brassica spp.*	Brassica			2	200						
Poaceae	*Briza subaristata*	None	0.1									
Poaceae	*Bromus catharticus*	Prairie Grass			2	300						
Asteraceae	*Carthamus lanatus*	Saffron Thistle	0.2		0.2	10	0.3	10	0.2	30	0.5	200
Asteraceae	*Centaurea calcitrapa*	Star Thistle	0.3									
Gentianaceae	*Centaurium erythraea*	Common Centaury	0.4								0.1	1
Asteraceae	*Cirsium vulgare*	Spear Thistle					0.2	1				
Apiaceae	*Conium maculatum*	Hemlock										
Asteraceae	*Conyza spp.*	A Fleabane	0.1		3	300	0.5	20	0.5	200		
Apiaceae	*Cyclospermum leptophyllum*	Slender Celery	2		0.8	100			0.3	300	0.1	20
Cyperaceae	*Cyperus aggregatus*	None					5					
Cyperaceae	*Cyperus eragrostis*	Umbrella Sedge			1	80						
Poaceae	*Eleusine indica*	Crowsfoot Grass			2	300						
Poaceae	*Eragrostis cilianensis*	Stinkgrass					0.5	50				
Aizoaceae	*Galenia pubescens*	Galenia			3	500						
Poaceae	*Hyparrhenia hirta*	Coolatai Grass	0.3									
Clusiaceae	*Hypericum perforatum*	St. John's Wort	6						0.1	5		
Asteraceae	*Lactuca serriola*	Prickly Lettuce			0.2	10	0.1	1			0.3	50
Poaceae	*Lolium spp.*	A Ryegrass	0.2									
Primulaceae	*Lysimachia arvensis*	Scarlet Pimpernel	0.2				0.1	1				
Fabaceae (Faboideae)	*Medicago sativa*	Lucerne			1	100						
Malvaceae	*Modiola caroliniana*	Red-flowered Mallow			0.3	20						

Family	Scientific name	Common name	37994.P1		37994.P2		37994.P3		37994.P4		37994.P5	
			Cvr%	Abund	Cvr%	Abund	Cvr%	Abund	Cvr%	Abund	Cvr%	Abund
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues	1		0.2	10	10		3	400	2	500
Polygonaceae	*Rumex crispus*	Curled Dock	0.5									
Polygonaceae	*Rumex obtusifolius*	Broadleaf Dock			0.4	10						
Malvaceae	*Sida rhombifolia*	Paddy's Lucerne	0.1				6		0.1	10		
Solanaceae	*Solanum nigrum*	Black-berry Nightshade			0.1	1	0.1	1				
Poaceae	*Sorghum halepense*	Johnson Grass					0.5	10				
Lamiaceae	*Stachys arvensis*	Stagger Weed	2									
Fabaceae (Faboideae)	*Trifolium spp.*	A Clover	10		0.4	200						
Verbenaceae	*Verbena bonariensis*	Purpletop									30	

Table A 4: BAM plot summary

Plot ID	PCT	Condition	Zone	Easting	Northing	Bearing	Comp. Tree	Comp. Shrub	Comp. Grass	Comp. Forbs	Comp. Ferns	Comp. Other	Struc. Tree	Struc. Shrub	Struc. Grass	Struc. Forbs	Stuc. Ferns	Stuc. Other
37994.P1	599	DNG	56	305239	6552207	202	0	0	11	6	1	1	0.0	0.0	70.6	1.7	0.1	0.1
37994.P2	84	DNG	56	306259	6553196	120	0	0	8	9	0	0	0.0	0.0	72.2	13.0	0.0	0.0
37994.P3	599	Woodland	56	304986	6552164	187	1	0	9	8	1	0	50.0	0.0	93.3	8.1	0.2	0.0
37994.P4	599	DNG	56	305542	6552340	157	0	0	9	2	0	0	0.0	0.0	95.0	0.4	0.0	0.0
37994.P5	599	DNG	56	305641	6552422	120	0	0	7	1	0	0	0	0	60	0.2	0	0
Plot ID	**PCT**	**Condition**	**Zone**	**Easting**	**Northing**	**Bearing**	**Funn. Large Trees**	**Fun. Hollow Trees**	**Fun. Litter Cover**	**Fun Len. Fallen Logs**	**Fun. Tree Stem 5to9**	**Fun. Tree Stem 10to19**	**Fun. Tree Stem 20to29**	**Fun. Tree Stem 30to49**	**Fun. Tree50to79**	**Fun. Tree Regen**	**Fun. High Threat Exotic**	
37994.P1	599	DNG	56	305239.2	6552207	202	0	0	24	0	0	0	0	0	0	0	6.6	

37994.P2	84	DNG	56	306259.4	6553196	120	0	0	35	0	0	0	0	0	0	0	4.7	
37994.P3	599	Woodland	56	304985.8	6552164	187	1	0	46	0	1	1	1	1	0	1	0.9	
37994.P4	599	DNG	56	305542.1	6552340	157	0	0	27	0	0	0	0	0	0	0	0.3	
37994.P5	599	DNG	56	305641	6552422	120	0	0	40	0	0	0	0	0	0	0	0.5	

Appendix 4. Fauna

Table A 5: Fauna species recorded at the subject land

Common name	Scientific name
Mammals	
Horse	*Equus caballus*
Eastern Grey Kangaroo	*Macropus giganteus*
Birds	
Australian Raven	*Corvus coronoides*
Willie Wagtail	*Microeca fascinans*
Galah	*Eolophus roseicapilla*
Australian Magpie	*Cracticus tibicen*
White-backed Swallow	*Cheramoeca leucosterna*
Weebill	*Smicrornis brevirostris*
Magpie-lark	*Grallina cyanoleuca*
Crimson Rosella	*Platycercus elegans*
Masked Lapwing	*Vanellus miles*
Noisy Miner	*Manorina melanocephala*

Appendix 5. SAII

SAII assessment for White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Box Gum Woodland)

Box Gum Woodland is listed as critically endangered under the BC Act and EPBC Act. The vegetation community has an open woodland or open forest structure and often contains a high diversity of groundcover species. Its distribution is strongly associated with more fertile soils on lower elevations across the known range in Queensland, New South Wales and Victoria. The geographic range of Box Gum Woodland is quite broad, ranging from the Queensland border in the north, to the Victorian border in the south. In NSW, it occurs in the following bioregions NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina.

Over much of its range, the CEEC has been subject to extensive clearing and modification for agriculture and grazing, so it often occurs as derived native grasslands with no overstorey. It now mostly occurs as fragmented, isolated and modified fragments. Key historical and current threats to this CEEC include clearing for agriculture and urban development.

One PCT within the development footprint aligns with the floristic description of this TEC:

- PCT 599: Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion

The CEEC is listed in the BioNet Threatened Biodiversity Data Collection (TBDC) as an entity at risk of SAII based on the following principles (DPIE 2019):

- Principle 1: an ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline.
- Principle 2: an ecological community that is observed, inferred or reasonably suspected to be severely degraded or disturbed.

Given the absence of definitive impact thresholds stated for the community, the potential for a SAII will be determined by the consent authority, guided by the additional assessment provided below.

Impacts to Box Gum Woodland in the context of this SAII assessment are mapped on Figure 11.

1. Impacts to the CEEC and the action and measures taken to avoid the direct and indirect impact on the CEEC at risk of an SAII.

All condition states of PCT 599 support the required floristic diversity to represent the CEEC. Within the development footprint, there is a total of 1.63 hectares of Box Gum Woodland.

The CEEC was found to occur along the transmission line corridor to the south-west of the BESS, both wooded and non-wooded forms are present.

Actions and measures to avoid direct impacts

Throughout the development of the Project layout, design decisions have been implemented to avoid impacts to Box Gum Woodland. This has included early biodiversity surveys, prior to development of the preferred corridor.

During the design development phase, a wider landscape was reviewed for potential transmission line corridor, several potential transmission line routes were identified and discussed in relation to their potential impact to biodiversity, chiefly Box Gum Woodland. Due to practical constraints, such as existing overhead infrastructure, the transmission line connect must be underground and follow the boundaries of the Lots affected. As a result, the route intersects areas of PCT 599_Woodland, arguably of highest conservation value within the subject land. Given this potential direct impact, sections of the transmission line corridor, totalling approximately 207 metres, will be constructed using trenchless methods to avoid direct impacts to all but one small White Box along the transmission line. Due to access requirements, a single Yellow Box and disturbed groundcover adjacent Calala Lane would also be removed.

Actions and measures to avoid indirect impacts

Opportunities to complete revegetation works along the transmission line corridor using groundcover species characteristic of Box Gum Woodland have been committed to in Section 7 of this BDAR with all revegetation seed / plantings sourced to ensure appropriate local provenance.

Additional indirect impacts associated with construction will be managed through preparation and implementation of a Biodiversity Management Plan that will highlight ecologically sensitive areas, including areas Box Gum Woodland CEEC, and ensure these areas are maintained as no-go zones, ensure the current condition of retained areas are maintained and improved, and no indirect impacts associated with water, materials storage, access etc occur and ongoing weed control will occur.

2a. Evidence of reduction in geographic distribution, as the current total geographic extent of the TEC in NSW and the estimated reduction in geographic extent of the TEC since 1970 (not including impacts of the proposal). (SAII Principle 1)

Species and ecological communities that have undergone large reductions or are likely to undergo large reductions in the future are considered to be at greater risk of extinction than those that have undergone or are likely to undergo smaller reductions (NSW TSSC 2018).

To be considered under this principle, the ecological community should have been observed, estimated, inferred, or reasonably suspected to have undergone, or be Projected to undergo, a very large reduction in distribution (DPIE 2019).

The Final Determination for the listing of Box Gum Woodland as a CEEC under the BC Act states the community has undergone "a very large reduction in geographic distribution" evidenced by the community having been extensively cleared throughout its range, and remnants typically are small, isolated, highly fragmented, that occur in predominantly cleared landscapes and exhibit a highly modified understorey (TSSC 2006). Based on a compilation of available maps depicting the current extent of the community at the national scale, TSSC (2006) estimated that less than 5% of the original distribution remained (NSW TSSC 2020a).

The NSW Threatened Species Scientific Committee (TSSC) Conservation Assessment of Box Gum Woodland (NSW TSSC 2020b) presents indicative estimates of the historical decline in geographic distribution compiled by the Commonwealth TSSC (2006) for state jurisdictions from sub-jurisdictional vegetation maps. The total

reduction in NSW is stated as being approximately 93% of the pre-1750 distribution of the community (with 250,729 hectares remaining from a historical area of 3,717,366 hectares). It is noted that there are uncertainties around the pre-1750 distribution of the community, however the plausible ranges for variants of the community estimated to have been most extensively distributed in NSW suggest that these have almost certainly been reduced to less than 10% of their pre-1750 distribution (NSW TSSC 2020b).

Data is not available on the community's reduction in geographic extent since 1970 (i.e. over the last 50 years), however NSW TSC (2020b) states there is evidence that clearing of Box Gum Woodland CEEC is ongoing and has increased in recent years. During the period 2009 – 2016 it is noted that:

- An average of 395 ha of Grassy Woodland (sensu Keith 2004, of which Box Gm Woodland CEEC is a major component) was lost annually across NSW to agriculture-related activities (cropping, conversion to pasture and thinning).
- A further 155 ha per annum of Grassy Woodland is lost due to infrastructure developments (NSW DPIE 2019).
- Losses due to agriculture rose during the period 2016-2017 to 654 ha (166% of the average over the preceding seven years) and to 1,344 ha (340%) for the period 2017-2018.
- Losses attributable to infrastructure rose to 216 ha (138% of the 2009-2016 average) and 589 ha (378% of the 2009-2016 average), respectively (NSW DPIE 2019).

It should be noted that these figures include other forms of grassy woodland communities, and impacts to Box Gum Woodland CEEC only form a sub-component of these impacted figures, however the data illustrates ongoing pressures and an expected ongoing reduction in geographic extent of the TEC since 1970.

2b. Extent of reduction in ecological function for the TEC using evidence that describes the degree of environmental degradation or disruption to biotic processes, as indicated by i. change in community structure, ii. change in species composition, iii. disruption of ecological processes, iv. invasion and establishment of exotic species, v. degradation of habitat, and vi. fragmentation of habitat. (SAII Principle 2)

Reduction in ecological function relates to the IUCN principle of "very small population size" which for ecological communities means communities have very high levels of either environmental degradation or disruption of biotic processes, and interactions have an increased risk of failure to sustain their characteristic native species assemblages (Bland et al. 2016).

Ecological communities that are considered to have a very large degree of environmental degradation or disruption of biotic processes or interactions are those with:

- ≥90% extent and severity where the disruption or impacts are measured since 1970.
- ≥80% extent and severity where the disruption or impacts are over a 50-year period, either in the past, future, or any part of the past, present and future (as per (Bland et al. 2016). (DPIE 2019).

Box Gum Woodland CEEC is listed as being Data Deficient for an assessment of environmental degradation of ecological community by NSW TSSC (2020a), however it is listed in the same document as being subject to very large disruption of biotic processes or interactions.

NSW TSSC (2020a) states that Box Gum Woodland CEEC is subject to a number of threatening processes that have negatively impacted upon biotic processes and interactions throughout its range and are likely to cause continuing decline in the future. An almost complete conversion of the community to agricultural production

has occurred which invariably includes the removal and/or thinned of the tree canopy resulting in top-down pressures on the ecosystem, with follow-on grazing of domestic stock being the most widespread activity. The impacts of grazing vary depending on the historical grazing regime (timing, intensity, continuity), methods employed to improve pasture (fertilizer application, augmentation with exotic or native species) and the extent of associated impacts on soil structure and biota (soil erosion, compaction).

Grazing has also been shown to lead to a reduction in understorey species diversity and richness due to the loss of native species that are both highly palatable and intolerant of grazing by domestic stock, with many previously widespread species now confined to the least disturbed remnants NSW TSSC (2020a). Shifts in the dominance of pasture species have also been observed as grazing intensity increases and is attributed to differential palatability and resilience to grazing among species, and the reduction of native plant cover by grazing presents opportunities for the invasion of the community by exotic plant species NSW TSSC (2020a).

NSW TSSC (2020b) also states that Box Gum Woodland CEEC is subject to a number of other threatening processes associated with fragmentation, increased soil salinity, inappropriate fire regimes, and reduced recruitment of tree species.

2c. Evidence of restricted geographic distribution, based on the TEC's geographic range in NSW based on i. extent of occurrence, ii. area of occurrence and iii. number of threat-define locations. (SAII Principle 3)

The geographic distribution of ecological communities is defined by the area of occupancy, sensu (Bland et al. 2016). Ecological communities with a very limited geographic distribution have an area of occupancy of less than or equal to two 10 x 10 km grid cells (200 km2) or an extent of occurrence of ≤1,000 km2, sensu (Bland et al. 2016), and one of the following:

- An observed or inferred continuing decline in:
  - A measure of spatial extent appropriate to the ecological community.
  - A measure of environmental quality appropriate to characteristic biota of the ecological community.
  - A measure of disruption to biotic interactions appropriate to the characteristic biota of the ecological community.
- Observed or inferred threatening processes that are likely to cause continuing declines in geographic distribution, environmental quality or biotic interactions within the next 20 years.
- An ecological community that exists at one location (DPIE 2019).

NSW TSSC (2020a) states that the geographic distribution of Box Gum Woodland CEEC is not restricted.

The best estimate of the extent of occurrence (EOO) is 702,800 km2, based on a minimum convex polygon enclosing likely occurrences of the community, the method of assessment recommended by (Bland et al. 2016). The best estimate of the area of occupancy (AOO) is 151,100 km2 based on 10 x 10 km grid cells (with a minimum of 1% occupied by the community), the scale recommended for assessing AOO by (Bland et al. 2016). The best estimates of EEO and AOO derive from a compilation of maps from multiple sources. Not all of the areas occupied by the community are covered by maps of appropriate scale and accuracy. Therefore, the values for EOO and AOO quoted above may underestimate the true values.

2d. Evidence that the TEC is unlikely to respond to management.(SAII Principle 4)

This principle encompasses two components, firstly whether there are any particular traits of the community which limits its' response to management, and secondly whether there are any key threatening processes affecting the community which cannot be effectively managed (DPIE 2019).

The Commonwealth TSSC (2006) states that Box Gum Woodland CEEC has suffered a severe decline in extent and condition, and remaining areas are generally small and highly fragmented, and that the key threats to the survival of the ecological community include clearing, grazing and weed invasion. Other threats include salinity, nutrient enrichment, altered fire regimes and the effects of fragmentation.

The priority recovery and threat abatement actions required for the listed ecological community include:

- protection of remnants of the listed ecological community through the development of conservation agreements and covenants;
- protection of remnants from weeds, particularly Coolatai Grass, by preventing soil disturbance in and around remnants, and the speedy eradication of any new invasion;
- avoid the use of fertilisers in or near remnants;
- avoid soil disturbance in or near remnants, such as ripping planting lines and road grading;
- in very small derived grassland sites, avoid planting trees as they may reduce the floral diversity through competition for light, nutrients and water;
- planting and other rehabilitation-focused disturbance should focus on the edges of patches, expanding them, rather than within the patches;
- expansion and connection of existing remnants;
- exclusion of continuous grazing from remnants is important, coupled with weed management and control;
- use strategic grazing (incorporating rest at appropriate times) in areas still containing a diverse native understorey;
- burning or slashing if native tussock grasses have built up to a high level, to open inter-tussock spaces for tree seedlings, forbs and shrubs to establish; and,

Further information on recovery actions and conservation measures are detailed in the *National Recovery Plan for White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (DECC 2009). Furthermore the TBDC lists 10 management actions to aid the threat abatement and recovery of the CEEC.

Based on the existence of a national recovery plan providing a guidance as to the management of the CEEC, the community is not considered to be unlikely to respond to management.

3. Where the TBDC indicates data is 'unknown' or 'data deficient' for a TEC, the assessor must record this in the BDAR or BCAR.

Not applicable.

4a. The impact on the geographic extent of the TEC, by estimating the total area of the TEC to be impacted by the proposal.

The impacted area of Box Gum Woodland within the development footprint have been calculated based on a worst case clearing footprint requirement for the transmission line corridor. In total, 1.60 hectares of PCT 599_DNG and a small portion (0.03 hectares) of PCT 599_Woodland will be impacted.

Box Gum Woodland present along the transmission line and in the surrounding landscape largely occurs as fragmented and isolated patches in an over-cleared landscape. The construction and operation of the transmission line will not result in negative ongoing impacts to the CEEC in the landscape, nor will it increase existing pressures associated with fragmentation, isolation and edge effects.

Based on the above, additional indirect impacts to Box Gum Woodland are not expected to be substantial or significant as a result of the Project and therefore only the direct impacts are considered in the calculation of the Project's impacts on the geographic extent of the TEC.

As outlined above, the NSW (2020b) states the current geographic extent of Box Gum Woodland as being estimated as 250,729 hectares. The Project will remove a total of 1.63 hectares of Box Gum Woodland, or approximately 0.0006% of the extant area of the community.

4b. The extent that the proposed impacts are likely to contribute to further environmental degradation or the disruption of biotic processes of the TEC by i. estimating the size of any remaining, but now isolated, areas of the TEC; including areas of the TEC within 500m of the development footprint or equivalent area for other types of proposals.

Patches of potential Box Gum Woodland CEEC present in the wider landscape surrounding the subject land is in an already highly fragmented state. GIS was used to determine the range and average size of mapped (DPE 2023c) occurrences of PCTs representative of Box Gum Woodland CEEC within a 500 metre buffer of the development footprint. The results of which are provided below both for those patches intersected by the development footprint (i.e. subject to vegetation removal) and those patches not intersected by the development footprint (i.e. not directly impact by the Project).

Mapped areas of known and potential Box Gum Woodland within 500m not directly impacted:

- Size range: 0.25ha to 4.09 ha
- Average size: 1.17 ha
- Median: 0.48 ha
- Total no. mapped patches (dissolved Box Gum Woodland PCT polygons): 5

Mapped areas of known and potential Box Gum Woodland within 500m directly impacted:

- Size range: 0.26 ha to 12.79 ha
- Average size: 4.36 ha
- Median: 0.24 ha
- Total no. mapped patches: 3

It can be seen that there are a large number of mapped known and potential Box Gum Woodland patches within 500 metres of the development footprint, ranging from 0.25 hectares to 4.09 hectares in area. Patches directly impacted by the Project are generally larger with a larger minimum size, average size and median size, than those patches not impacted by the Project. The Project is not expected to result in impacts that will substantially increase fragmentation, and/or increase perimeter to area ratios of retained patches of known and potential Box Gum Woodland vegetation based on both the generally large patch sizes of impacted patches and high level of variation in patch sizes within 500 metres of the development footprint.

ii. describing the impacts on connectivity and fragmentation of the remaining areas of TEC measured by:

- ***distance between isolated areas of the TEC, presented as the average***
- ***distance if the remnant is retained AND the average distance if the remnant is removed as proposed, and***
- ***estimated maximum dispersal distance for native flora species characteristic of the TEC, and***
- ***other information relevant to describing the impact on connectivity and fragmentation, such as the area to perimeter ratio for remaining areas of the TEC as a result of the development***

GIS was used to undertake a nearest neighbour analysis of mapped (DPIE 2019, DPIE 2015) occurrences of potential Box Gum Woodland CEEC prior to and post vegetation removal to determine the distance between impacted areas of the CEEC before and after the proposed development. The average and median distance between mapped occurrences of potential Box Gum Woodland CEEC within a 500 m buffer of the impact area, include:

- An average before development separation distance of 135 m.
- An average after development separation distance of 135 m.

As can be seen from the above calculations the proposed vegetation removal will not result in an increase of the average separation distance between patches of known and potential Box Gum Woodland CEEC. This is due to the fact that no patches will be completely removed or split into two or more patches. Native flora species characteristic of the CEEC include a range trees, shrubs, grasses, forbs and other groundcover species, the majority of which are dispersed via wind or animal vectors, with some species primary method of dispersal likely to be via non-flying insects such as ants. As there will be no expected changes to average separation distance between patches of retained known and potential Box gum Woodland CEEC within 500 m of the impact area are not expected, an impediment to the dispersal of native species between these patches, in an already highly fragmented landscape, will not be created.

iii. describing the condition of the TEC according to the vegetation integrity score for the relevant vegetation zone(s) (Section 4.3). The assessor must also include the relevant composition, structure and function condition scores for each vegetation zone.

Box Gum Woodland occurs as one PCT across two vegetation zones. The relevant composition, structure and function condition scores are provided below.

PCT and condition class	Comp. score	Struc. score	Func. score	VI score	Comments
599_DNG	38.9	67.4	14	33.2	An area of derived native grassland resulting from clearing for agriculture/farming purposes. Currently subject to low intensity grazing. A moderate cover of native grasses and groundcovers is present.
599_Woodland	59.8	96.3	45	63.8	Areas containing native canopy, either naturally occurring or planted. Midstory absent, moderate cover of native grasses and groundcovers is present.

Appendix 6. Significant Impact Criteria assessments

White box - yellow box - Blakely's red gum grassy woodlands and derived native grasslands (Critically Endangered).

White box - yellow box - Blakely's red gum grassy woodlands and derived native grasslands (Box Gum Woodland) is strongly associated with more fertile soils on lower elevations across the known range in Queensland, New South Wales and Victoria. Over much of its range, this Threatened Ecological Community (TEC) has been subject to extensive clearing and modification for agriculture and grazing, so it often occurs as derived native grasslands (DNG) with no overstorey. For the purposes of this assessment, all PCT 599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion is considered Box Gum Woodland.

Based on this conservative assumption, the Project will impact on 1.31 hectares of Box Gum Woodland, of which over 97% occurs as a DNG, with impacts to higher condition patches (PCT 599_Woodland) largely avoided via use of trenchless construction methods for portions of the transmission line.

An assessment of the potential significant of this impact is presented below, with a significant impact to Box Gum Woodland determined to be unlikely.

Table A 6: EPBC Act significant impacted assessment for Box Gum Woodland

Criteria	Assessment response
Is there a real chance or possibility that the action will reduce the extent of an ecological community	As outlined in the EPBC Act Listing Advice, the national extent of Box Gum Woodland occurs in an arc along the western slopes and tablelands of the Great Dividing Range from Southern Queensland through NSW to central Victoria (Beadle 1981). It occurs in the Brigalow Belt South, Nandewar, New England Tableland, South Eastern Queensland, Sydney Basin, NSW North Coast, South Eastern Highlands, South East Corner, NSW South Western Slopes, Victorian Midlands and Riverina Bioregions (Environment Australia 2000). The current extent of Box Gum Woodland in NSW is estimated as approximately 250,000 hectares, comprising just 7% of its pre-1750 extent of an estimated 3,700,000 hectares. Of this current estimated extant of 250,000 hectares, approximately 9,000 hectares is estimated to occur within the Nandewar IBRA bioregion, and approximately 39,000 hectares within the NSW North Coast IBRA bioregion (Commonwealth of Australia 2006). The Project will impact upon a total of 1.31 hectares of Box Gum Woodland, within the Nandewar IBRA bioregion. This impact represents a tiny fraction of the extant of Box Gum Woodland at the National scale, and at the bioregional scale.
Is there a real chance or possibility that the action will fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	Box Gum Woodland occurs within the development footprint in association with the transmission line corridor. Along the transmission line, Box Gum Woodland occurs in an already highly fragmented landscape where there is little connectivity of the community other than what could be considered a 'stepping stone' in nature. Given the woodland patches of the community will largely be avoided and that trenching of DNG will not detract from the present level of connectivity, the Project is considered to have a real chance of increasing fragmentation of the community.
Is there a real chance or	Habitat critical to the survival of Box Gum Woodland is on the moderate to highly

Criteria	Assessment response
possibility that the action will adversely affect habitat critical to the survival of an ecological community	fertile soils of the western slopes of NSW, which includes the sections of the transmission line corridor, albeit in generally poor condition. Critical habitat for the survival of the community also includes areas that contain the floristic structure and patch size requirements listed in the recovery plan for Box Gum Woodland. The Project will impact on 1.31 hectares of this habitat. Based on the scale of the impact, and the tiny proportions of existing Box Gum Woodland and its habitat this equates to in the locality, the Projects is not considered likely to adversely affect habitat critical to the survival of the ecological community.
Is there a real chance or possibility that the action will modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	The construction and operation of the transmission line built to the required Australian Standards is unlikely to result in changes to any abiotic factors that are critical to the long term survival of Box Gum Woodland in areas adjacent to the development footprint. The construction of the transmission line will not require substantial earthworks and measures will be in place during construction and operation to mitigate potential impacts to surface water or groundwater flow patterns.
Is there a real chance or possibility that the action will cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	The impacts to Box Gum Woodland associated with the Project are, which the exception of one White Box, confined to areas in DNG condition. Impacts will not result in clearing of vegetation unique to the locality, or to species locally common when compared to elsewhere in the development footprint or broader locality. As such the Project is not considered likely to cause a substantial change in the species composition of an occurrence of Box Gum Woodland such that it would continue to decline.
Is there a real chance or possibility that the action will cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: • **assisting invasive species, that are harmful to the listed ecological community, to become established, or** • **causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the**	As outlined above, impacts to Box Gum Woodland associated with the Project are almost wholly confined to areas of DNG associated with the transmission line. Box Gum Woodland present along the transmission line and in the surrounding landscape largely occurs as fragmented and isolated patches in an over-cleared landscape. The construction and operation of the transmission line will not result in negative ongoing impacts to the community in the landscape, nor will it increase existing pressures associated with fragmentation, isolation and edge effects. Generally, the Project is not expected to exacerbate sources of negative impacts such as weed encroachment above the levels that already existing in the landscape. It cannot be said that the Project is likely to cause a substantial reduction in the quality or integrity of an occurrence of an ecological community through vectors such as invasion of weeds, or the increase of chemicals or other pollutants.

Criteria	Assessment response
growth of species in the ecological community	
Is there a real chance or possibility that the action will interfere with the recovery of an ecological community	Given Box Gum Woodland within the subject land occurs as DNG and small wooded patches on private land, there is limited opportunity for recovery of Box Gum Woodland in this setting. It is envisioned that areas of trenching and disturbance along the transmission line, through active rehabilitation and natural regeneration, are likely to return to a condition commensurate to pre-construction. In light of the above, the Project will not result in direct or future ongoing impacts that are likely to interfere with the recovery of Box Gum Woodland.

Conclusion

The potential for the Project to cause a significant impact to Box Gum Woodland is considered unlikely as:

- Impacts to Box Gum woodland are minor (1.31 ha), somewhat temporary in nature and no critical habitat will be impacted.
- The Project will not substantially reduce the extent or increase fragmentation of Box Gum Woodland.
- The Project cannot be said to substantially interfere with the recovery of Box Gum Woodland.

Bluegrass *Dichanthium setosusm* (Vulnerable)

Bluegrass *Dichanthium setosum* is an upright perennial grass less than 1 metre tall. Bluegrass is associated with heavy basaltic black soils and stony red-brown hardsetting loam with clay subsoil and is found in moderately disturbed areas such as cleared woodland, grassy roadside remnants, grazed land and highly disturbed pasture. The extent to which this species tolerates disturbance is unknown, however habitat for this species is considered present within PCT 599_DNG and PCT 599_Woodland. Targeted searches of suitable habitat within the development footprint were undertaken and Bluegrass was not detected. As such, direct impacts are not envisioned, however, areas that were not surveyed may still contain the species and be subject to indirect impacts.

An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

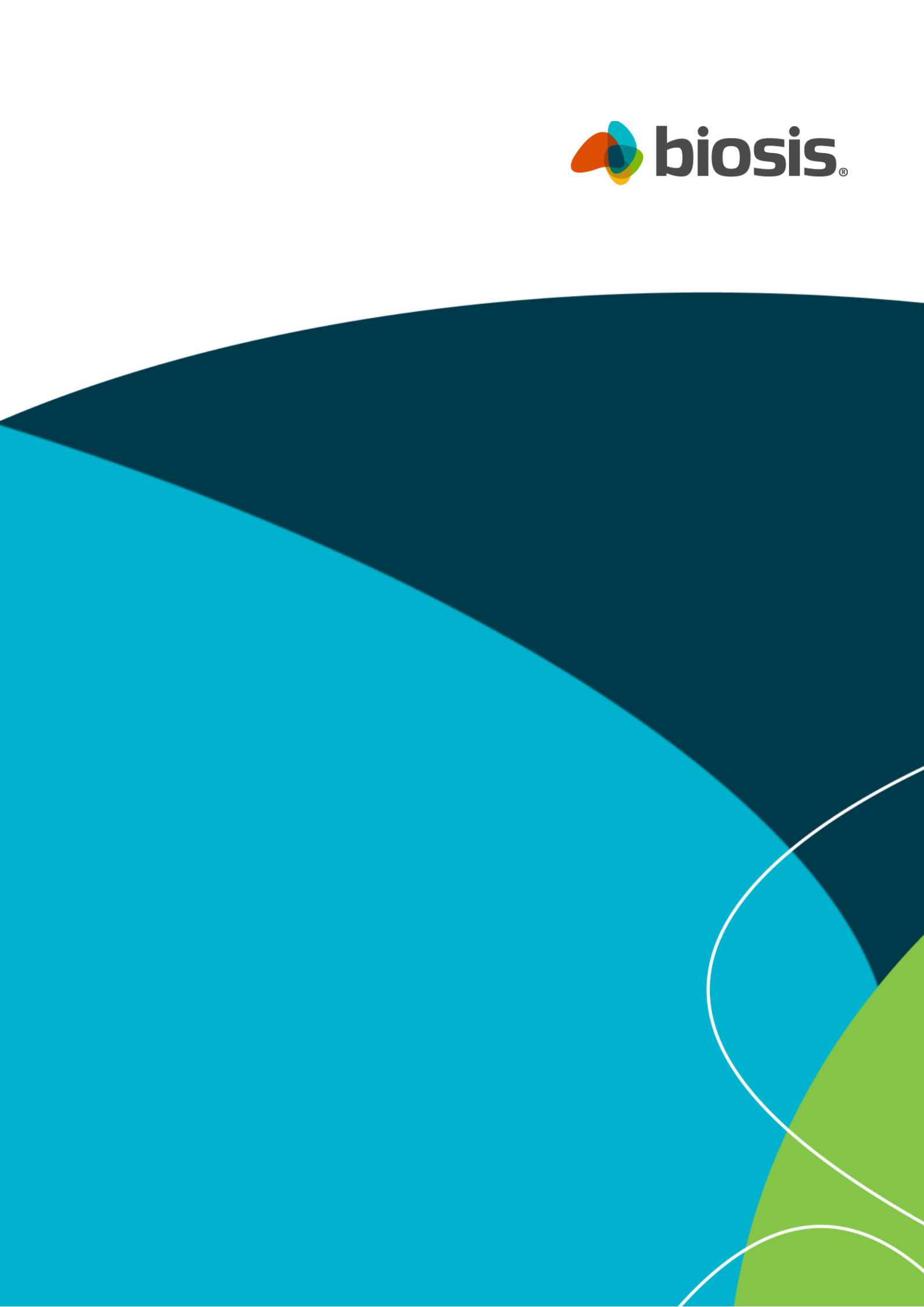
- key source populations either for breeding or dispersal.
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

For the purposes of this assessment, an important population of Bluegrass is not considered present.

Table A 7: EPBC Act significant impacted assessment for Bluegrass Dichanthium setosum.

Bluegrass
Lead to the long-term decrease in the size of an important population of a species.
An important population of Bluegrass is not considered present, therefore this criterion does not apply.
Reduce the area of occupancy of an important population.
An important population of Bluegrass is not considered present, therefore this criterion does not apply.
Fragment an existing important population into two or more populations.
An important population of Bluegrass is not considered present, therefore this criterion does not apply.
Adversely affect habitat critical to the survival of a species.
Habitat critical to the survival has not been determined. The species is considered to not occur within the development footprint and given an important population would not be present, it cannot be said habitat critical to the survival of Bluegrass would be adversely affected.
Disrupt the breeding cycle of an important population.
An important population of Bluegrass is not considered present, therefore this criterion does not apply.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Bluegrass
The Project will impact, somewhat temporarily, 1.63 ha of potential Bluegrass habitat. Similar habitat value is widespread within the locality including contiguous lands that would not be impacted, therefore, it is considered unlikely that the Project would cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.
Bluegrass habitat within the subject land is already prone to pressure from invasive flora, such as common roadside weeds including Coolatai Grass. The Project would introduce disturbance via trenching and construction movements, which has the potential to facilitate further establishment of invasive flora within Bluegrass habitat. Counter measures to this include rehabilitation of disturbed areas, and hygiene protocols for plant and equipment entering and exiting the development footprint.
Introduce disease that may cause the species to decline.
Bluegrass is not known to be susceptible to any particular diseases. Although trenching and associated machinery movements will be required, the potential for this to introduce soil borne pathogens is considered unlikely as hygiene protocols for plant and equipment entering and exiting the development footprint will be in place.
Interfere substantially with the recovery of the species.
Bluegrass has a broad distribution within the Border Rivers–Gwydir, Central West, Namoi, Northern Rivers (NSW), South East and Fitzroy (Queensland) Natural Resources Management Regions. In this context, the negligible habitat removal; proposed by the Project is unlikely to interfere substantially with the recovery of Bluegrass.
Conclusion.
The potential for the Project to cause a significant impact to Bluegrass is considered unlikely as: • An important population of Bluegrass isn't present. • The Project is unlikely to cause the species as a whole to decline. • The Project cannot be said to interfere with the recovery of the species.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