

Biodiversity Assessment Report

168 Euchareena Road, Molong

Wakefield Ashurst Developments Pty Ltd

21 June 2023

Final



Report No. 21204RP2

The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or commendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Cumberland Ecology.

Version	Date Issued	Amended by	Details
01	21/06/2023	MF, KW	Final

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Date:	21 June, 2023

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Glossary

Term	Definition
AOBV	Area of Outstanding Biodiversity Value
Assessment Area	The area of land within a 1,500 m buffer around the outer boundary of the subject land
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BAM Plots	Biodiversity Assessment Method Plots
BAR	Biodiversity Assessment Report
BC Act	NSW <i>Biodiversity Conservation Act 2016</i>
BC Regulation	<i>Biodiversity Conservation Regulation 2019</i>
BC SEPP	<i>State Environmental Planning Policy (Biodiversity Conservation) 2021</i>
BDAR	Biodiversity Assessment Development Report
BMP	Biodiversity Management Plan
BOS	Biodiversity Offsets Scheme
Box Gum Woodland	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion
CEEC	Critically Endangered Ecological Community
CEMP	Construction Environmental Management Plan
Council	Cabonne City Council
DA	Development Application
DBH	Diameter at Breast Height
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
Disturbance footprint	The area subject to future development for the project.
DNG	Derived native grassland
DPE	NSW Department of Planning and Environment
EHG	NSW Environment and Heritage
EP&A Act	NSW <i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
GIS	Geographic Information Systems
IBRA	Interim Biogeographic Regionalisation for Australia
KAR	Koala Assessment Report
LGA	Local Government Area
MNES	Matters of National Environmental Significance
NRAR	Natural Resources Access Regulator
PCT	Plant Community Type

Term	Definition
Project	The future rezoning and development of the subject land
SAIL	Serious and Irreversible Impact
Subject land	The area subject to the Planning Proposal
TEC	Threatened ecological community
VRZ	Vegetated riparian zone
WM Act	NSW <i>Water Management Act 2000</i>

1. Introduction

1.1. Purpose

Cumberland Ecology has been engaged by Wakefield Ashurst Developments Pty Ltd to prepare a Biodiversity Assessment Report (BAR) to support a planning proposal for the rezoning of land located at Lot A DP 961931 (92 Euchareena Road, Molong), and Lot 11 and 12 DP 546140 (168 Euchareena Road, Molong) (hereafter referred to as the 'subject land'). The subject land is proposed to be rezoned to R1 – General Residential and will entail future subdivision and residential development (the 'project').

Cumberland Ecology has previously undertaken an ecological constraints assessment and provided subsequent ecological advice in April and December 2022 for the project. This BAR provides an assessment of the subject land in accordance with the requirements of the Attachment C of Local Environmental Plan Making Guideline (DPIE 2022).

The planning proposal is for the purposes of rezoning the subject land and is not for a Development Application (DA) at this stage. According to Attachment C of Local Environmental Plan Making Guideline (DPIE 2022), a BAR is required in greenfield or urban / rural edge planning proposals, where they may impact biodiversity and biodiversity values. The project has the potential to impact upon a threatened ecological community (TEC) and therefore a BAR is required to accompany the planning proposal.

The purpose of this BAR is to support a planning proposal for rezoning of the subject land and provide appropriate evidence that future DA's within the subject land can satisfy the requirements of the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

1.2. Project Description

1.2.1. Location

The subject land is approximately 118.94 hectares (ha) in area and is located within the Cabonne Council Local Government Area (LGA). The subject land is entirely zoned as R5 – Large Lot Residential under the *Cabonne Local Environment Plan 2012*.

The subject land is bounded by Euchareena Road to the north, Molong Showground and Golf Course to the east, agricultural grazing land and residential development to the south and west. The subject land has been subject to historical clearing and agricultural grazing. However, patches of remnant vegetation and scattered paddock trees persist, predominantly within the western and eastern portions of the subject land.

The subject land is located within the Inland Slopes Interim Biogeographic Regionalisation for Australia (IBRA) subregion and within the NSW South Western Slopes Bioregion.

A site map and location map have been prepared in accordance with the Biodiversity Assessment Method (BAM) and are presented in **Figure 1** and **Figure 2**, respectively.

1.2.2. Project Overview

The project comprises a proposal to rezone the subject land to facilitate residential development. To meet this end, it is proposed to lodge a planning proposal to Cabonne City Council (Council) to permit future subdivision

and development for residential land use. To enable this, it is anticipated that the subject land would be required to be rezoned to R1 - General Residential.

An indicative layout of the proposed development is shown in **Figure 3**.

1.2.3. Identification of the Subject Land and Disturbance Footprint

This assessment generally applies to the subject land unless otherwise stipulated in this assessment. The subject land includes Lot A DP 961931 (92 Euchareena Road, Molong), and Lot 11 and 12 DP 546140 (168 Euchareena Road, Molong). The subject land encompasses all areas subject to the project, including areas proposed to be disturbed and areas to be retained and/or avoided by future development.

Within the subject land, a 'disturbance footprint' has been defined for the purposes of relevant BAM calculations and incorporates areas that are subject to direct physical works, such as vegetation clearing for all proposed structures and infrastructure. For the purposes of this assessment, the disturbance footprint comprises both the construction footprint and the operational footprint of the project.

The subject land and disturbance footprint are largely the same across most of the project. The only parts of the subject land that are excluded from the disturbance footprint, are the areas that will be avoided by the project, which include areas of remnant native vegetation that are proposed to be retained as open space areas.

The subject land covers a total area of approximately 118.94 ha while the disturbance footprint covers a total of approximately 106.95 ha. The subject land and disturbance area are shown in **Figure 3**.

1.2.4. General Description of the Subject Land

The subject land has been subject to historical clearing for agricultural uses. However, patches of remnant native vegetation, as well as remnant native paddock trees, are present within the western and south-eastern portions of the subject land. A number of unsealed tracks and fences are located throughout the subject land, facilitating the current land use. A residential dwelling is present within the north-eastern portion of the subject land while some sheds are present along the western border.

There are no waterways present, however seven farm dams have been mapped within the subject land. The subject land is not mapped on the NSW Biodiversity Values Map.

Several vegetation communities have been identified within the subject land, including one native vegetation community as well as planted native vegetation, exotic woody vegetation and exotic dominated grassland. The native vegetation community is Plant Community Type (PCT) 266 - White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion (Box Gum Woodland), existing in two conditions states, remnant woodland and derived native grassland (DNG). This community is listed as a critically endangered ecological community (CEEC) under the BC Act and is also a Serious and Irreversible Impact (SII) candidate.

The subject land has been mapped as predominantly comprising the Molong Soil Landscape with a small area of the Lachlan Soil Landscape within the south-western portion of the subject land (DPIE 2020). The Molong Soil Landscape comprises the undulating low hills east of Molong from Amaroo in the south. The geology of

the Molong Soil Landscape is comprised of Andesite, tuff, slate and limestone (DPIE 2020). The Lachlan Soil Landscape comprises the alluvial plains and terraces of the Lachlan, Molong, Bell and lower Belabula Rivers as well as the Winburndale Rivulet and other minor streams. The geology of the Lachlan Soil Landscape is comprised of Alluvium, including granite materials along the Lachlan River; volcanics and metasediments of the Hill End Trough along Lewis Ponds Creek and Winburndale Rivulet; Molong Geanticline volcanics along Bell River and Molong Creek (DPIE 2020).

1.3. Information Sources

1.3.1. Databases

A number of databases were utilised during the preparation of this BAR, including:

- Environment and Heritage group (EHG) BioNet Atlas (EHG 2023a);
- EHG Threatened Biodiversity Data Collection (EHG 2023e);
- EHG BioNet Vegetation Classification database (EHG 2023b);
- Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) Species Profile and Threat Database (DCCEEW 2023b); and
- DCCEEW Directory of Important Wetlands in Australia (DCCEEW 2023a).

1.3.2. Literature

This BAR has utilised the results and/or spatial data from the following datasets:

- Central Tablelands State Vegetation Type Map (DPIE 2019); and
- NSW State Vegetation Type Map (DPE 2022).

Information contained in the following documents has also been considered in the preparation of this BAR:

- Cumberland Ecology (2023): Ecological Constraints Assessment 92 and 168 Euchareena Road, Molong; and
- Other sources of information have been referenced throughout this BAR.

1.3.3. Aerial Photography

The aerial imagery utilised in this BAR is sourced from NearMap and is dated 02/10/2022. Additional aerial images available on NearMap and SixMaps were also consulted.

1.4. Personnel

This BAR and associated field surveys, document preparation and Geographic Information Systems (GIS) mapping was prepared with the assistance of additional personnel as outlined in **Table 1**. Preliminary BAM calculations for the purposes of providing indicative credit requirements for future DA's has been undertaken by Matthew Freeman (BAM Accredited Assessor No: BAAS19019).

Table 1 Personnel

Name	Tasks	Relevant Qualifications / Training	BAM Accredited Assessor No.
Matthew Freeman	Document preparation, data analysis, BAM-C calculations, field surveys	Bachelor of Natural Science (Nature Conservation) University of Western Sydney, 2012 BAM Accredited Assessor Training. Muddy Boots, 2022	BAAS19019
Katrina Wolf	Document review	Bachelor of Science (Environmental). The University of Sydney, 2007 BAM Accredited Assessor Training. Muddy Boots, 2022	BAAS18010
Dr Rohan Mellick	Field surveys, vegetation mapping, PCT Identification	Bachelor of Applied Science (Honours) in Natural Resource Management, Southern Cross University, 2000. Doctor of Philosophy, Evolutionary Ecology. The University of Adelaide, 2012 BAM Accredited Assessor Training. Muddy Boots, 2022	BAAS18075
Rebeca Violante	Field surveys	Diploma of Sustainable Operations. ACBI, Sydney, 2022. Diploma of Project Management. Australasia International School, Sydney, 2018. Bachelor of Science (Biology). Universidade Paulista, Brazil, 2015. BAM Accredited Assessor Training. Muddy Boots, 2022	-
Brooke Crismale	Document preparation	Bachelor of Science (Zoology) and Bachelor of Natural Science (Animal Science). Western Sydney University, 2020	-
Michael Davis	GIS mapping	Bachelor of Biodiversity and Conservation. Macquarie University, 2015. Statement of Attainment in ArcGIS & Reporting for Environmental Resource Management. TAFE NSW Ryde, 2017	-

Name	Tasks	Relevant Qualifications / Training	BAM Accredited Assessor No.
		BAM Accredited Assessor Training. Muddy Boots, 2017	

1.5. Relevant Legislation

1.5.1. Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

Under the EPBC Act, any action (which includes a development, project or activity) that is considered likely to have a significant impact on Matters of National Environmental Significance (MNES) (including nationally threatened ecological communities and species and listed migratory species) must be referred to the Commonwealth Minister for the Environment. The purpose of the referral is to allow a decision to be made about whether an action requires approval on a Commonwealth level. If an action is considered likely to have a significant impact on MNES, it is declared a "controlled action" and Commonwealth approval is required.

1.5.2. NSW *Environmental Planning and Assessment Act*

The NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) is the overarching planning legislation in NSW that provides for the creation of planning instruments that guide land use. The EP&A Act also provides for the protection of the environment, including the protection and conservation of native fauna and flora species. This includes threatened species, populations and ecological communities, and their habitats, as listed under the BC Act and NSW *Fisheries Management Act 1994*.

1.5.3. NSW *Biodiversity Conservation Act 2016*

The BC Act is the key piece of legislation in NSW relating to the protection and management of biodiversity and threatened species. The purpose of the BC Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. The BC Act is supported by regulations, including the *Biodiversity Conservation Regulation 2019* (BC Regulation).

The BC Act introduced the Biodiversity Offsets Scheme (BOS) as a means for assessing biodiversity impacts. The BOS is intended to simplify biodiversity assessment and improve biodiversity outcomes by creating consistent assessment requirements to measure the likely biodiversity loss of development proposals and gains in biodiversity value achieved at offset sites through active management.

The BOS applies to local development (assessed under Part 4 of the EP&A Act that is likely to significantly affect threatened species. A significant affect may occur as follows:

- It is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test of significance in Section 7.3 of the BC Act;
- It exceeds the biodiversity offsets scheme threshold according to Clause 7.1 of the BC Regulation, with the thresholds being:

- The clearing of native vegetation of an area above a prescribed threshold based on the minimum lot size; or
- The clearing of native vegetation, or other prescribed action, on land included on the Biodiversity Values Map.
- It is carried out in a declared area of outstanding biodiversity value (AOBV).

If a project triggers one of the above thresholds, assessment according to the BOS is required, which involves the preparation of a Biodiversity Assessment Development Report (BDAR) in accordance with the BAM. A preliminary assessment of the project (future DA) against these thresholds is provided in **Section 10.1.2**.

1.5.4. NSW Water Management Act 2000

Under the NSW *Water Management Act 2000* (WM Act) approval is required for carrying out a 'controlled activity' that takes place on 'waterfront land' to ensure that the activity to ensure negative impacts upon waterfront land and other water users are avoided or minimised. In this instance, the relevant definition of waterfront land per the WM Act is: *"the bed of any river, together with any land lying between the bed of the river and a line drawn parallel to, and the prescribed distance inland of, the highest bank of the river...where the prescribed distance is 40m or (if the regulations prescribe a lesser distance...) that lesser distance"*.

Controlled activity means:

- Erection of a building;
- Carrying out a work;
- Removing material from waterfront land, such as vegetation or extractive material;
- Depositing material on waterfront land, such as extractive material; and
- Carrying out an activity which affects the quantity or flow of water in a water source.

An application for a 'controlled activity approval' will be refused if the Minister is not satisfied that adequate arrangements are in force to ensure that no more than minimal harm will be done to any waterfront land as a consequence of the carrying out of the proposed controlled activity.

The subject land contains one first order stream which requires a riparian buffer of 10m either side of the watercourse. However, due to the poor condition of the watercourse, with no bed or bank structure, it is not considered to conform to the definition of a watercourse under the WM Act. Consultation with the Natural Resources Access Regulator (NRAR) will be required to confirm the status of the watercourse and confirm whether a controlled activity approval is required for future development.

1.5.5. State Environmental Planning Policy (Biodiversity and Conservation) 2021

State Environmental Planning Policy (Biodiversity and Conservation) 2021 (BC SEPP) came into effect as of 1 March 2022. In part, the purpose of the BC SEPP is to help preserve the conservation and management of native vegetation that provides habitat for koalas and attempt to reverse the current trend of koala population

decline. Chapter 4 'Koala Habitat Protection 2021' of the BC SEPP includes provisions for the assessment of impacts to Koalas. The City of Cabonne LGA is listed in Schedule 2 of the BC SEPP, falling under the Central and Southern Tablelands Koala management area and therefore Chapter 4 of the BC SEPP applies to the subject land.

2. Methodology

2.1. Review of Existing Data

Existing information on biodiversity values within the assessment area (defined as the area of land within a 1,500 m buffer around the outer boundary of the subject land) was reviewed, which includes:

- Species data that is held in the BioNet Atlas (EHG 2023a); and
- Vegetation mapping contained within the Central Tablelands State Vegetation Type Map (DPIE 2019) and NSW State Vegetation Type Map (DPE 2022).

This existing information was considered and included, where appropriate, into survey design, vegetation mapping and reporting.

2.2. Landscape Features

2.2.1. Landscape Features

Landscape features requiring consideration were initially determined via desktop assessment. Field surveys undertaken by Cumberland Ecology on the 1 and 2 September 2021 and 24 and 25 November 2022 sought to verify the following landscape features:

- Rivers, streams and estuaries;
- Dams;
- Important and local wetlands;
- Karsts, caves, crevices, cliffs and areas of geological significance; and
- NSW BioNet Landscapes.

No amendments were required to be made to any of these landscape features following field surveys.

2.2.2. Native Vegetation Cover

The native vegetation cover within the assessment area was determined through the use of existing vegetation mapping data, review of recent aerial imagery and field surveys within the subject land. The existing vegetation mapping data utilised the broad scale vegetation mapping prepared by the Department of Planning and Environment (DPE) (DPE 2022).

The polygons of native vegetation within this dataset were revised following review of aerial imagery from NearMap dated 2 October 2022. Amendments were also made within the subject land following field surveys undertaken on the 1 and 2 September 2021 and 24 and 25 November 2022 (see **Section 4.2**).

2.2.3. Vegetation Mapping

Broad scale vegetation mapping prepared by DPIE (2019) and DPE (2022), as well as the vegetation mapping of the subject land prepared by Cumberland Ecology following previous field surveys in the subject land, was reviewed prior to the most recent field surveys conducted on 24 and 25 November 2022.

The vegetation within the subject land was ground-truthed to examine and verify the mapping of the condition and extent of the different plant communities. Mapping of plant communities within the subject land was undertaken by random meander surveys through patches of vegetation, noting key characteristics of areas in similar broad condition states such as similar tree cover, shrub cover, ground cover, weediness or combinations of these. Vegetation within the subject land was assessed as native vegetation for the purpose of this assessment if it contained any native vegetation.

Records of plant community boundaries were made using a hand-held Global Positioning System and mark-up of aerial photographs. The resultant information was synthesised using GIS to create a spatial database that was used to interpret and interpolate the data to produce a vegetation map of the subject land.

2.2.4. Plot-based Vegetation Survey and Vegetation Integrity Assessment

A plot-based vegetation survey and vegetation integrity assessment was undertaken within the subject land in accordance with Section 4.2.1 and Section 4.3.2 of the BAM (hereafter referred to as 'BAM plots').

A total of 17 BAM plots were undertaken within the subject land by a botanist and ecologist from Cumberland Ecology on the 1 and 2 September 2021 and 24 and 25 November 2022. The locations of all the BAM plots surveyed are shown in **Figure 4**.

The BAM plots required the establishment of a 20 x 50 m plot with an internal 20 m x 20 m plot. The following data was collected within each of the plots:

- Composition for each growth form group by counting the number of native plant species recorded for each growth form group within a 20 m x 20 m floristic plot;
- Structure of each growth form group as the sum of all the individual projected foliage cover estimates of all native plant species recorded within each growth form group within a 20 m x 20 m floristic plot;
- Cover of 'High Threat Exotic' weed species within a 20 m x 20 m floristic plot;
- Assessment of function attributes within a 20 x 50 m plot, including:
 - Count of number of large trees;
 - Tree stem size classes, measured as 'diameter at breast height over bark' (DBH);
 - Regeneration based on the presence of living trees with stems <5 cm DBH;
 - The total length in metres of fallen logs over 10 cm in diameter;
- Assessment of litter cover within five 1 m x 1 m plots evenly spread within the 20 x 50 m plot; and
- Number of trees with hollows that are visible from the ground within the 20 x 50 m plot.

Table 2 summarises the plot requirements based on the size and number of vegetation zones in the subject land. As shown in this table, the minimum number of plots has been completed for each vegetation zone.

Table 2 BAM plot survey requirements

Vegetation Zone	PCT	Condition Name	Area (ha) within the Subject Land	Plot #	Minimum Number of Plots Required	Number of Plots Completed
1	266	Remnant	25.06	Plot 1, Plot 2, Plot 3, Plot 4, Plot 8, Plot 9, Plot 11, Plot 13	4	8
2	266	DNG	13.91	Plot 10, Plot 12, Plot 15, Plot 16	3	4
-	Planted Native Vegetation	-	0.07	Plot 5	0	1
-	Exotic Woody Vegetation	-	2.23	-	0	0
-	Exotic Dominated Grassland	-	77.40	Plot 6, Plot 7, Plot 14, Plot 17	0	4

2.3. Threatened Flora Species Survey

Initially, desktop assessments and field surveys within the subject land included assessment of habitat features for threatened flora species that are known to occur or have the potential to occur within the subject land.

Threatened flora surveys were undertaken in conjunction with the vegetation mapping and BAM plots (see **Section 2.2.4**) within the subject land on the 1 and 2 September 2021 and 24 and 25 November 2022. This included random meanders throughout the subject land. The locations of random meanders and BAM plots are shown in **Figure 4**.

2.4. Threatened Fauna Species Survey

Desktop assessments and field surveys within the subject land included assessment of habitat constraints and microhabitats for predicted threatened fauna species. This included desktop assessment of proximity of the subject land to features such as caves and waterways and field inspection of microhabitats including leaf litter, rocky outcrops and hollow-bearing trees. The field assessments were undertaken on the on 1 and 2 September 2021 and 24 and 25 November 2022 throughout the subject land.

2.5. Habitat Assessment and Incidental Observations

A fauna habitat assessment was conducted on the subject land by an ecologist during field surveys. The subject land was assessed for groundcover, shrub/understory cover, canopy cover, tree hollows as well as other habitat features such as bush rock, fallen trees and signs of fauna use such as scats, scratches and scrapings. The nature and extent of fauna habitats in the subject land were assessed and areas where fauna species could reside, or forage were identified. This included consideration of important indicators of habitat condition and complexity including the occurrence of microhabitats such as tree hollows, fallen logs, bush rock and wetland areas such as dams, creeks and soaks.

The habitat assessment also included consideration of habitat condition and complexity of the mapped watercourses and dams, including presence of:

- Flowing or standing water,
- Riparian vegetation / fringing vegetation e.g. grassy areas, rushes (particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.); and
- Shading.

Any incidental fauna species, particularly avifauna species, that were observed, heard calling, or otherwise detected based on tracks or signs, were recorded and listed in the total species list for the subject land. Furthermore, the locations of any specific habitat features, in particular hollow-bearing trees and raptor nests, incidentally, sighted outside of the habitat assessment locations were also recorded.

3. Landscape Features

3.1. Assessment Area

The subject land is approximately 118.94 ha in size and is shown in **Figure 2**. As the project is being assessed as a site-based project, the assessment area comprises the area of land within a 1,500 m buffer around the outer boundary of the subject land. The assessment area is approximately 1,557 ha in size and is shown in **Figure 1**.

3.2. Landscape Features

Landscape features identified within the subject land and assessment area are outlined below. The extent of these features within the subject land is shown in **Figure 2** and the extent within the assessment area is shown in **Figure 1**.

3.2.1. IBRA Bioregions and IBRA Subregions

The subject land and assessment area occur within the NSW South Western Slopes IBRA Bioregion and within the Inland Slopes Subregion.

3.2.2. Rivers, Streams and Estuaries

A small section of an unnamed watercourse is mapped within the eastern portion of the subject land (see **Figure 1**). The watercourse is mapped as a first order stream (as per the Strahler System of ordering watercourses). The watercourse shows no bed or bank structure and consists primarily of a drainage depression with evidence of overland flow from an existing dam.

3.2.3. Important and Local Wetlands

No important or local wetlands occur in the assessment area. Seven farm dams have been mapped within the subject land which provide some habitat for aquatic species and amphibians, however these are highly degraded due to stock access.

3.2.4. Habitat Connectivity

The subject land does not form part of a regional biodiversity corridor or known flyway for migratory species. However, it includes areas of native vegetation that connect to other areas of remnant native vegetation outside the subject land, and therefore it contributes to connectivity within the assessment area. Several patches of native vegetation are proposed to be retained within the subject land that would continue to provide connectivity to adjacent habitat within the assessment area in the long term.

3.2.5. Karsts, Caves, Crevices, Cliffs and Areas of Geological Significance

No karsts, caves, rocky outcropping or cliffs have been identified within the subject land or assessment area, based on searches of available aerial imagery from NearMap, or topographic data available from SixMaps.

3.2.6. Areas of Outstanding Biodiversity Value

No AOBVs have been mapped within the subject land or assessment area.

3.2.7. BioNet NSW (Mitchell) Landscapes

The subject land is located within the 'Mullion Slopes' BioNet NSW (Mitchell) Landscapes. The assessment area mostly comprises the same BioNet NSW Landscape, however, also includes areas of the 'Wellington – Molong Karst' and Molong Ridges to the west, and Canobolas Sheet Basalts to the east (see **Figure 2**).

3.2.8. Soil Hazard Features

No soil hazard features have been identified within the subject land.

3.3. Native Vegetation Cover

The native vegetation cover was determined through the use of GIS. To map native vegetation cover within the subject land and assessment area, this assessment utilised the detailed vegetation mapping prepared by Cumberland Ecology in conjunction with broadscale mapping by DPIE (2019) and DPE (2022). The native vegetation cover within the assessment area is shown in **Figure 2**. The assessment area is approximately 1,557 ha in size, of which approximately 217 ha comprises native vegetation cover, which represents 13.9% of the assessment area. Therefore, the native vegetation cover value is assigned to the cover class of >10–30%.

The remaining land within the assessment area comprises cleared land, and exotic vegetation. No differences between the aerial photographs used in this assessment and the native vegetation cover shown in **Figure 2** have been identified.

4. Native Vegetation

4.1. Native Vegetation Extent

The subject land has been subject to detailed surveys by Cumberland Ecology for the purpose of this BAR. The native vegetation extent within the subject land was determined through field surveys. The native vegetation extent within the subject land is shown in **Figure 5**. Native vegetation extent has been calculated as occupying approximately 39.04 ha, which represents 33% of the subject land.

No differences between the aerial photographs used in this assessment and the native vegetation cover shown in **Figure 5** have been identified.

4.2. Plant Community Types

4.2.1. Overview

Identification of the PCTs occurring within the subject land was guided by the results of the surveys undertaken by Cumberland Ecology. The data collected during surveys of the subject land was analysed in conjunction with a review of the PCTs held within the BioNet Vegetation Classification database. In selecting PCTs, consideration was given to the following:

- Occurrence within the Inland Slopes IBRA subregion;
- Vegetation formation and class;
- Alignment with Threatened ecological community (TEC);
- Landscape position; and
- Upper, mid and ground strata species (including cover and abundance).

Detailed vegetation mapping of the subject land was conducted by Cumberland Ecology on 1 and 2 September 2021 and 24 and 25 November 2022. During those surveys, Cumberland Ecology ground-truthed the vegetation on the subject land to examine the condition and extent of different PCTs.

The analysis determined that the native vegetation within the subject land aligned with the one PCT held within the BioNet Vegetation Classification database. Detailed descriptions of the vegetation of the subject land are provided below whilst extent within the subject land and disturbance footprint are provided in **Table 3**. The distribution of the PCT within the subject land is shown in **Figure 6**. The alignment of each PCT to a TEC is shown in **Figure 7**, and each vegetation zone is shown in **Figure 8**.

A detailed description of the PCT and the justification for PCT selection is provided in the sections below.

Table 3 Plant Community Types within the subject land and disturbance footprint

PCT	Vegetation Community	Associated Vegetation Zone/Condition Name	Area within the Subject Land (ha)	Area within the Disturbance Footprint (ha)
266		1 (Remnant)	25.06	17.67

PCT	Vegetation Community	Associated Vegetation Zone/Condition Name	Area within the Subject Land (ha)	Area within the Disturbance Footprint (ha)
	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion ¹	2 (DNG)	13.91	12.12
-	Planted Native Vegetation	-	0.07	0.07
-	Exotic Woody Vegetation	-	2.23	2.23
-	Exotic Dominated Grassland	-	77.40	74.59
-	Cleared Land	-	0.29	0.29
Total			118.94	106.95

*Note that numbers may not add up due to rounding

4.2.2. PCT 266 White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion

Vegetation Formation: Grassy Woodlands

Vegetation Class: Western Slopes Grassy Woodlands

Percent Cleared Value: 94%

4.2.2.1. General Description

Within the subject land, this PCT occurs as scattered remnant trees over a predominantly exotic understorey. The community has been subject to a high level of disturbance including clearing, weed invasion and grazing. Within the subject land, this PCT occurs in two condition states, including remnant and DNG. A description of each condition state is provided below.

i. Remnant

This condition state comprises remnant canopy trees within previously cleared agricultural paddocks. The remnant trees consist of species characteristic of the community including, *Eucalyptus melliodora* (Yellow Box), *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus bridgesiana* (Apple Box). The understorey is highly modified and a shrub layer is absent, with the exception of some individuals of *Trema tomentosa* var. *aspera* (Native Peach). Within the eastern portion of the subject land the ground cover layer is dominated by exotic species including *Lolium perenne* (Perennial Ryegrass), *Bromus catharticus* (Paire Grass), *Carthamus lanatus* (Saffron Thistle), *Phalaris aquatica* (Phalaris) and *Trifolium repens* (White Clover). Native species are more common within the ground layer within the western portion of the subject land. Commonly recorded species include the forbs *Rumex brownii* (Swamp Dock), *Einadia nutans* subsp. *nutans* (Climbing Saltbush), *Oxalis perennans* and *Vittadinia cuneata* var. *cuneata* f. *minor*, as well as the perennial herbs *Lomandra filiformis* subsp. *filiformis* and *Lomandra multiflora* subsp. *multiflora*. Native grasses are more prevalent within the western portion of the subject land and include *Microlaena stipoides* var. *stipoides* (Weeping Grass), *Austrostipa bigeniculata* (Yanganbil), *Austrostipa scabra* subsp. *falcata* (Rough Speargrass), *Elymus scaber* (Wheatgrass) and

Sporobolus creber (Slender Rat's Tail Grass). These native species occur in low numbers throughout the community.

Examples of this condition state within the subject land are shown in **Photograph 1** and **2**.

Photograph 1 PCT 266 (Remnant) within the eastern portion of the subject land



Photograph 2 PCT 266 (Remnant) within the western portion of the subject land



ii. DNG

This condition state includes areas that are lacking native tree and shrub layers due to historical agricultural clearing but still comprise characteristic understory species of PCT 266. Patches of the DNG condition class occur predominantly within the western portion of the subject land within Lot A DP 961931. Despite the presence of native species, these grasslands are dominated by heavy infestations of exotic species.

Dominant native grasses include *Austrostipa bigeniculata* (Yanganbil), *Elymus scaber* (Wheatgrass) and *Sporobolus creber* (Slender Rat's Tail Grass). A few native forbs also occur, although in very low numbers, including *Calotis lappulacea* (Yellow Burr-daisy), *Rumex brownii* and *Wahlenbergia stricta* (Tall Bluebell). Dominant exotic species within this condition state include *Avena barbata* (Bearded Oats), *Bromus catharticus* (Prairie Grass), *Hypericum perforatum* (St John's Wort), *Trifolium arvense* var. *arvense* (Haresfoot Clover), *Trifolium repens* and *Vulpia muralis* (Wall Fescue).

An example of this condition state within the subject land is shown in **Photograph 3**.

Photograph 3 DNG within the subject land



4.2.2.2. Justification of PCT Selection

PCTs were initially filtered for the NSW South Western Slopes IBRA region and by the vegetation formation Grassy Woodlands and vegetation class, Western Slopes Grassy Woodlands. Subsequently the canopy species recorded within the subject land, including *Eucalyptus melliodora* (Yellow Box), *Eucalyptus blakelyi* (Blakely's Red Gum) *Eucalyptus bridgesiana* (Apple Box) and *Brachychiton populneus* (Kurrajong) provided five candidate PCTs. The final PCT was then assessed for its similarity to the subject land details and the floristic data collected for the PCT during the field survey, including:

- PCT Name;
- Upper/lower stratum species;
- Diagnostic species;
- Landform elements; and
- PCT classification confidence level.

Based on the detailed review of all items in combination with the floristic data collected, PCT 266 was chosen as the best fit PCT. A list of species recorded within this PCT, and their associated cover and abundance is provided in **Appendix A**.

4.2.2.3. Alignment with Threatened Ecological Communities

Within the BioNet Vegetation Information System, PCT 266 is aligned with 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, which is listed as a CEEC under the BC Act and EPBC Act.

PCT 266 within the subject land is considered to conform to the BC Act listing as the characteristic trees and groundcover species are present despite the ground layer being predominantly composed of exotic species. However, a review of the flowchart published within the EPBC Policy Statement for White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grassland (DEH 2006) indicates that neither of the condition states of PCT 266 within the subject land conform to the EPBC Act listing for the community as the patch of the community within the subject land does not have a predominantly native understory where at least 50% of the perennial vegetation cover in the ground layer is made up of native species.

4.3. Threatened Ecological Communities

One PCT, within the subject land, PCT 266, has been assessed as being associated with a TEC. **Table 4** summarises the TEC identified within the subject land and its distribution is shown in **Figure 7**.

Table 4 Threatened ecological communities within the subject land

TEC Name	BC Act Status	Associated PCT	Associated Vegetation Zone	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	Critically Endangered	266	1_Remnant	25.06
			2_DNG	13.91

4.4. Other Vegetation Communities

4.4.1. Planted Native Vegetation

PCT: Not applicable

BC Act Status: Not listed

EPBC Act Status: Not listed

Planted native vegetation occurs as sparsely planted native trees along the existing driveway. The planted tree species include *Eucalyptus pseudoglobulus* (Bastard Eurabbie), and *Eucalyptus leucoxylon* subsp. *megalocarpa*.

These trees occur a grassy understorey dominated by exotic species. Only one native grass was identified, *Eragrostis benthamii*, which had a very low abundance. Dominate exotic species within the ground layer included *Bromus catharticus* (Praire Grass), *Lolium perenne* (Perennial Ryegrass), *Crepis capillaris* (Smooth Hawksbeard), and *Trifolium repens* (White Clover).

This community does not comprise a defined native vegetation unit and does not conform to a listing under the BC Act or EPBC Act.

An example of this vegetation community within the subject land is shown in **Photograph 4**.

Photograph 4 Planted Native Vegetation within the subject land



4.4.2. Exotic Woody Vegetation

PCT: Not applicable

BC Act Status: Not listed

EPBC Act Status: Not listed

Exotic woody vegetation occurs predominantly within the south-western corner of the subject land except for a few planted exotic species nearby residential dwellings and a few scatted exotic shrubs. Exotic Woody

Vegetation within the south-western corner of the subject land consists of a former pine plantation comprising *Pinus radiata* (Radiata Pine) that has been overgrown with *Ligustrum lucidum* (Large-leaved Privet). The understorey is relatively bare and where vegetated it is dominated by exotic species such as *Lolium perenne* and *Stellaria media* (Common Chickweed). One native grass was *Microlaena stipoides* var. *stipoides* (Weeping Grass) that occurred sporadically and in low densities within the understorey.

An example of this vegetation community within the subject land is shown in **Photograph 5**.

Photograph 5 Exotic Woody Vegetation within the subject land



4.4.3. Exotic Dominated Grassland

PCT: Not applicable

BC Act Status: Not listed

EPBC Act Status: Not listed

Exotic dominated grassland is maintained as lawns along the existing driveway between Euchareena Road and the residential dwelling on Lots 11 and 12 DP546140, however areas of exotic dominated grassland are predominantly maintained across the subject land as pasture. Dominant species include *Phalaris aquatica* (Phalaris), *Carthamus lanatus*, *Crepis capillaris*, *Lolium perenne*, *Bromus catharticus* and *Trifolium repens*.

An example of this vegetation community within the subject land is shown in **Photograph 6**.

Photograph 6 Exotic Dominated Grassland within the subject land



4.5. Vegetation Integrity Assessment

The subject land and disturbance footprint are largely the same across the majority of the site. However, large patches of native vegetation have been avoided by the project and are excluded from the disturbance footprint. As no works are proposed to be undertaken for the project within these areas (and therefore no assessment for direct impacts and related offsetting are required), the vegetation areas entered in the BAM Calculator (BAM-C) for the purposes of credit calculations comprise areas identified as the disturbance footprint.

The native vegetation identified within the subject land and disturbance footprint was assigned to a vegetation zone based on PCTs and broad condition states. The vegetation zones have also been assigned to different management zones. Areas within the disturbance footprint have been classified as either 'Cleared', indicating full clearance, or 'Retained', which apply to areas of woodland that will be retained under a positive covenant to ensure the long-term protection of the community. All remaining areas outside of the disturbance footprint that are within the subject land that will be avoided by the project and are classified as 'Avoided'. Patch sizes were subsequently assigned for each vegetation zone. Patch size classes and the extent of vegetation zones/management zones within the subject land are shown in **Figure 8**.

Each vegetation zone was assessed using survey BAM plots (see **Section 2.2.4**) to determine the vegetation integrity score. BAM plot data utilised within the BAM Calculator to determine the vegetation integrity score is provided in **Appendix B**. The vegetation integrity assessment utilised the benchmark data held within the

BAM-C (as derived from the BioNet Vegetation Classification). This assessment therefore did not utilise local benchmarks.

Vegetation zones, patch sizes and vegetation integrity scores for the disturbance footprint are summarised in **Table 5**.

Table 5 Vegetation zones within the disturbance footprint

Vegetation Zone	PCT	Condition Name	Area (ha)	Patch Size Class	Vegetation Integrity Score	Hollow-bearing Trees Present?
1	266	Remnant	17.67	≥100	40.4 (Composition = 35.9, Structure = 46.5, Function = 39.3)	Yes
2	266	DNG	12.12	≥100	3.3 (Composition = 27.5, Structure = 54.8, Function = 0.0)	No

4.6. Planted Native Vegetation

The decision-making key outlined in Section D.1 of Appendix D of the BAM provides a framework to determine whether the streamlined assessment module for planted native vegetation can be applied to a site.

Planted Native Vegetation consists of planted non-local *Eucalyptus* species amongst exotic grasses that have been planted along the existing driveway within the subject land as described in **Section 4.4.1. Table 6** below details the application of the decision-making key to the planted native vegetation in the subject land. It was determined that subsection 5 applies, as the relevant vegetation has been planted for aesthetic purposes as part of a landscaped driveway.

Table 6 Decision-making key to determine the application of the streamlined assessment module for planted native vegetation

Assessment criteria	Response/Action
1. Does the planted native vegetation occur within an area that contains a mosaic of planted and remnant native vegetation and which can be reasonably assigned to a PCT known to occur in the same IBRA subregion as the proposal?	ii. No..... Go to 2.
2. Is the planted native vegetation: a. planted for the purpose of environmental rehabilitation or restoration under an existing conservation obligation listed in BAM Section 11.9(2.), and	ii. No..... Go to 3.

Assessment criteria	Response/Action
b. the primary objective was to replace or regenerate a plant community type or a threatened plant species population or its habitat?	
3. Is the planted/translocated native vegetation individuals of a threatened species or other native species planted/translocated for the purpose of providing threatened species habitat under one of the following: a. a species recovery project b. Saving our Species project c. other types of government funded restoration project d. condition of consent for a development approval that required those species to be planted or translocated for the purpose of providing threatened species habitat e. legal obligation as part of a condition or ruling of court. This includes regulatory directed or ordered remedial plantings (e.g. Remediation Order for clearing without consent issued under the BC Act or the Native Vegetation Act) f. ecological rehabilitation to re-establish a PCT or TEC that was, or is carried out under a mine operations plan, or g. approved vegetation management plan (e.g. as required as part of a Controlled Activity Approval for works on waterfront land under the NSW Water Management Act 2000)?	ii. No..... Go to 4.
4. Was the planted native vegetation (including individuals of a threatened flora species) undertaken voluntarily for revegetation, environmental rehabilitation or restoration without a legal obligation to secure or provide for management of the native vegetation?	ii. No..... Go to 5.
5. Is the native vegetation (including individuals of a threatened flora species) planted for functional, aesthetic, horticultural or plantation forestry purposes? This includes examples such as: windbreaks in agricultural landscapes, roadside plantings (including street trees, median strips, roadside batters), landscaping in parks, gardens and sport	i. Yes The vegetation has been planted for landscaping around the existing driveway. Go to D.2 Assessment of planted native vegetation for threatened species habitat (the use of Chapters 4 and 5 of the BAM are not required to be applied).

Assessment criteria	Response/Action
fields/complexes, macadamia plantations or teatree farms?	
6. Is the planted native vegetation a species listed as a widely cultivated native species on a list approved by the Secretary of the Department (or an officer authorised by the Secretary)?	This list has not been released at the date of report preparation.
D.2 Assessment of planted Native Vegetation for Threatened Species Habitat.	See Chapter 5 for assessment of threatened species habitats.
The assessor must assess the suitability of the planted native vegetation for use by threatened species and record any incidental sightings or evidence (e.g. scats, stick nests) of threatened species credit species (flora and fauna) using, inhabiting or being part of the planted native vegetation.	See Chapter 7 and Section 9 for impact avoidance and minimisation measures.
If there is evidence that threatened species are using the planted native vegetation as habitat, the assessor must apply Section 8.4 of the BAM to mitigate and manage impacts on these species. Species credits are not required to offset the proposed impacts.	
The steps taken to assess threatened species habitat and all reasonable measures proposed to be taken to mitigate or minimise impacts must be set out in the BDAR or BCAR.	

5. Threatened Species

5.1. Identifying Threatened Species for Assessment

The BAM-C generates a list of threatened species requiring assessment utilising a number of variables. The following criteria have been utilised to predict the threatened species requiring further assessment:

- IBRA subregion: Inland Slopes;
- Associated PCTs: 266;
- Percent native vegetation cover in the assessment area: 13.94%;
- Patch size: ≥ 100 ha; and
- Credit type: Ecosystem and/or species.

Based on the above variables, the BAM-C generated a list of 32 ecosystem credit species and 28 species credit species. Ecosystem credit species and species credit species are assessed further in **Section 5.2** and **Section 5.3**, respectively.

5.2. Ecosystem Credit Species

5.2.1. Overview

A total of 32 ecosystem credit species are predicted to occur on the subject land, including 12 dual credit species which are considered as ecosystem credit species for their foraging habitat. **Table 7** lists the predicted ecosystem credit species for the subject land. One ecosystem credit species; the Glossy Black Cockatoo (*Calyptorhynchus lathami*) has been removed from the assessment and justification for its removal is provided in **Section 5.2.2** in accordance with Steps 1-3 of Section 5.2 of the BAM.

5.2.2. Justification for Removal

The Glossy Black-Cockatoo (*Calyptorhynchus lathami*) has been removed from the assessment as the habitat constraints for the species are absent from the subject land. The TBDC lists the following habitat constraint for the species: *Presence of Allocasuarina and casuarina species*. No *Allocasuarina* or *Casuarina* species were identified within the subject land during field surveys.

Table 7 Predicted ecosystem credit species

Scientific Name	Common Name	BC Status	Act	EPBC Status	Act	Relevant PCT	Sensitivity to Gain Class	Retained in Assessment?
<i>Anthochaera phrygia</i>	Regent Honeyeater (Foraging)	E		CE		266	High	Yes
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V		-		266	Moderate	Yes
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo (Foraging)	V		E		266	Moderate	Yes
<i>Calyptorhynchus lathami</i>	Glossy Black Cockatoo (Foraging)	V		-		266	High	No
<i>Chthonicola sagittata</i>	Speckled Warbler	V		-		266	High	Yes
<i>Circus assimilis</i>	Spotted Harrier	V		-		266	Moderate	Yes
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V		-		266	High	Yes
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V		-		266	Moderate	Yes
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V		E		266	High	Yes
<i>Falco subniger</i>	Black Falcon	V		-		266	Moderate	Yes
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet	V		-		266	High	Yes
<i>Glossopsitta pusilla</i>	Little Lorikeet	V		-		266	High	Yes
<i>Grantiella picta</i>	Painted Honeyeater	V		V		266	Moderate	Yes
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle (Foraging)	V		-		266	High	Yes
<i>Hieraaetus morphnoides</i>	Little Eagle (Foraging)	V		-		266	Moderate	Yes
<i>Hirundapus caudacutus</i>	White-throated Needletail	-		V		266	High	Yes
<i>Lathamus discolor</i>	Swift Parrot (Foraging)	E		CE		266	Moderate	Yes
<i>Lophoictinia isura</i>	Square-tailed Kite (Foraging)	V		-		266	Moderate	Yes
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)	V		-		266	Moderate	Yes

Scientific Name	Common Name	BC Act	EPBC Act	Relevant PCT	Sensitivity to Gain Class	Retained in Assessment?
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	V	-	266	Moderate	Yes
<i>Miniopterus orianae oceanensis</i>	Large Bentwing-bat (Foraging)	V	-	266	High	Yes
<i>Neophema pulchella</i>	Turquoise Parrot	V	-	266	High	Yes
<i>Ninox connivens</i>	Barking Owl (Foraging)	V	-	266	High	Yes
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	V	V	266	High	Yes
<i>Petroica boodang</i>	Scarlet Robin	V	-	266	Moderate	Yes
<i>Petroica phoenicea</i>	Flame Robin	V	-	266	Moderate	Yes
<i>Polytelis swainsonii</i>	Superb Parrot (Foraging)	V	V	266	Moderate	Yes
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V	-	266	Moderate	Yes
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox (Foraging)	V	V	266	High	Yes
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V	-	266	High	Yes
<i>Stagonopleura guttata</i>	Diamond Firetail	V	-	266	Moderate	Yes
<i>Tyto novaehollandiae</i>	Masked Owl (Foraging)	V	-	266	High	Yes

BC Act Status/EPBC Act Status: CE = Critically Endangered, E = Endangered, V = Vulnerable

5.3. Species Credit Species

5.3.1. Overview

A total of seven flora species credit species and 21 fauna species credit species have been predicted for the subject land. This includes 11 dual credit species which are considered as species credit species for their breeding or important habitat.

Table 8 lists the predicted species credit species for the subject land, and whether they have been retained within the assessment following consideration of habitat constraints, geographic limitations, vagrancy and quality of microhabitats. Justification is provided in **Section 5.3.2** *Error! Reference source not found.* for species that have been removed from the assessment in accordance with Steps 1-3 of Section 5.2 of the BAM. Additional species credit species can be excluded from further assessment if an assessment of habitat constraints and microhabitats determines that the habitat within the subject land is substantially degraded such that the species credit species is unlikely to occur.

Of the assessed predicted species, six flora species and 13 fauna species are considered to have potential to occur and cannot be removed due to habitat constraints. As such these species will need to be targeted during surveys at the DA stage. Furthermore, one species credit species, the Superb Parrot (*Polytelis swainsonii*), was incidentally recorded within the subject land. The TBDC identifies breeding habitat for the Superb Parrot as the '*presence of habitat features and observed nest OR two or more birds seen on site*'. As six individual birds were recorded, the subject land is considered to contain breeding habitat for the Superb Parrot.

Table 8 Species credit species requiring further assessment

Scientific Name	Common Name	BC Status	Act	EPBC Status	Act	Sensitivity to Gain Class	Retained in Assessment?
Flora							
<i>Acacia ausfeldii</i>	Ausfeld's Wattle	V		-		High	Yes
<i>Ammobium craspedioides</i>	Yass Daisy	V		V		High	No
<i>Euphrasia arguta</i>	Euphrasia arguta	CE		CE		High	Yes
<i>Grevillea wilkinsonii</i>	Tumut Grevillea	CE		E		High	Yes
<i>Prasophyllum sp. Wybong</i>	Prasophyllum sp. Wybong	-		CE		Moderate	Yes
<i>Swainsona recta</i>	Small Purple-pea	E		E		Moderate	Yes
<i>Swainsona sericea</i>	Silky Swainson-pea	V		-		High	Yes
Fauna							
<i>Anthochaera phrygia</i>	Regent Honeyeater (Breeding)	E		CE		High	No
<i>Aprasia parapulchella</i>	Pink-tailed Legless Lizard	V		V		High	Yes
<i>Burhinus grallarius</i>	Bush Stone-curlew	E		-		High	No
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo (Breeding)	V		E		High	Yes
<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo (Breeding)	V		-		High	Yes
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle (Breeding)	V		-		High	Yes
<i>Hieraaetus morphnoides</i>	Little Eagle (Breeding)	V		-		Moderate	Yes
<i>Keyacris scurra</i>	Keys Matchstick Grasshopper	E		-		High	Yes
<i>Lathamus discolor</i>	Swift Parrot (Breeding)	E		CE		Moderate	No
<i>Lophoictinia isura</i>	Square-tailed Kite (Breeding)	V		-		Moderate	Yes

Scientific Name	Common Name	BC Status	Act	EPBC Status	Act	Sensitivity to Gain Class	Retained in Assessment?
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat (Breeding)	V		-		Very High	No
<i>Ninox connivens</i>	Barking Owl (Breeding)	V		-		High	Yes
<i>Petaurus norfolcensis</i>	Squirrel Glider	V		-		High	Yes
<i>Petaurus norfolcensis</i> – endangered population	Squirrel Glider in the Wagga Wagga Local Government Area	EP		-		High	No
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E		V		Very High	No
<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	V		-		High	Yes
<i>Phascolarctos cinereus</i>	Koala	E		E		High	Yes
<i>Polytelis swainsonii</i>	Superb Parrot (Breeding)	V		V		High	Yes
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox (Breeding)	V		V		High	No
<i>Synemon plana</i>	Golden Sun Moth	V		V		Moderate	No
<i>Tyto novaehollandiae</i>	Masked Owl (Breeding)	V		-		High	Yes

BC Act Status/EPBC Act Status: CE = Critically Endangered, E = Endangered, EP = Endangered Population, V = Vulnerable

5.3.2. Justification for Removal

5.3.2.1. Yass Daisy

The BAM-C identifies a geographic limitation for *Ammobium craspedioides* (Yass Daisy) as 'South of Cowra'. As the subject land is not located south of Cowra, the Yass Daisy has been removed from the assessment.

5.3.2.2. Regent Honeyeater

The Regent Honeyeater (*Anthochaera phrygia*) is listed as a species credit species for breeding habitat only, as defined by mapped important areas. The subject land is not located within a mapped important area and therefore the species does not require further assessment.

5.3.2.3. Bush Stone-curlew

The TBDC profile for the Bush Stone-curlew (*Burhinus grallarius*) states that the species inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber (EHG 2023c). The patches of woodland within the subject land are highly degraded and have been predominantly cleared for grazing. Throughout the subject land understorey vegetation and habitat including fallen timber has been cleared, with logs largely absent. As such, the subject land is not considered to contain the microhabitats required by the species and therefore the species has been removed from further consideration.

5.3.2.4. Swift Parrot

The Swift Parrot (*Lathamus discolor*) is listed as a species credit species for breeding habitat only, as defined by mapped important areas. As the subject land is not located within a mapped important area, the species does not require further assessment.

5.3.2.5. Large Bent-winged Bat

The Large Bent-winged Bat (*Miniopterus orianae oceanensis*) is a species credit species for breeding habitat only, described as caves, tunnels, mines, culverts or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers of individuals >500; or from the scientific literature (EHG 2023d). Existing houses/sheds are present within the subject land, however these are well maintained and are not considered to comprise breeding habitat. Therefore, the subject land is not considered to comprise suitable breeding habitat, and the species does not require further assessment.

5.3.2.6. Squirrel Glider in the Wagga Wagga Local Government Area

The Squirrel Glider in the Wagga Wagga Local Government Area (*Petaurus norfolcensis* – *endangered population*) has a geographic limitation, restricted to the Wagga Wagga LGA. As the subject land is not located within the Wagga Wagga LGA, the Squirrel Glider in the Wagga Wagga LGA has been removed from the assessment.

5.3.2.7. Brush-tailed Rock Wallaby

The TBDC profile for the Brush-tailed Rock-wallaby (*Petrogale penicillata*) identifies habitat constraints for the species as land within 1 km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or cliff

lines. As the subject land is not located within 1 km of these habitat features, the species has been removed from the assessment.

5.3.2.8. Grey-headed Flying-fox

The Grey-headed Flying-fox (*Pteropus poliocephalus*) is listed as a species credit species for breeding habitat only, which is listed in the TBDC as breeding camps. The location of breeding camps for the Grey-headed Flying-fox are well known and are not located within the subject land. As such, the Grey-headed Flying-fox has been removed from the assessment.

5.3.2.9. Golden Sun Moth

The BAM-C identifies a geographic limitation for the Golden Sun Moth (*Synemon plana*) as 'South of Mid-Western Highway'. As the subject land is not located to the south of the Mid-Western highway, the Golden Sun Moth has been removed from the assessment.

6. Prescribed Impacts

Prescribed impacts are identified in Clause 6.1 of the BC Regulation. Prescribed impacts are those that are additional to the clearing of native vegetation and associated habitat. These include:

- Development on the habitat of threatened species or ecological communities associated with:
 - karst, caves, crevices, cliffs, rock outcrops and other geological features of significance;
 - human-made structures;
 - non-native vegetation;
- Development on areas connecting threatened species habitat, such as movement corridors;
- Development on water quality, water bodies and hydrological processes that sustain threatened species and TECs (including from subsidence or upsidence from underground mining);
- Wind turbine strikes on protected animals; and
- Vehicle strikes on threatened species or on animals that are part of a TEC.

An assessment of the relevance of these prescribed impacts to the project is provided in **Table 9**. The location of prescribed impacts is shown in **Figure 9**.

Table 9 Relevance of prescribed impacts

Prescribed Impact	Relevance to Project	Associated Threatened Entities
Karst, caves, crevices, cliffs, rock outcrops and other geological features of significance	Not relevant. Features are not present within the subject land.	-
Human-made structures	Relevant. Existing structures including a residential dwelling and sheds are present within the subject land.	Threatened bat species may utilise the human made structures as rooting habitat.
Non-native vegetation	Relevant. Non-native vegetation occurring within the subject land comprises areas of exotic woody vegetation and exotic dominated grassland. This vegetation may provide some low-value habitat for native fauna on occasion. Impacts to non-native vegetation would occur during the construction phase of the project and result in a long-term impact.	Ecosystem credit fauna species which may utilise the habitat as part of a larger foraging range.

Prescribed Impact	Relevance to Project	Associated Threatened Entities
Habitat connectivity	Relevant. The subject land is connected to areas of vegetation that extend to the east and south of the subject land. Minor long-term, direct impacts to habitat connectivity may occur as a result of the project.	Ecosystem credit fauna species which may utilise the habitat as part of a larger foraging range.
Waterbodies, water quality and hydrological processes	Relevant. The subject land contains one drainage lines and farm dams. The project will impact on the hydrological processes operating in the subject land. Minor long-term, direct impacts to waterbodies may occur as a result of the project.	Ecosystem credit fauna species which may utilise the habitat as part of a larger foraging range.
Wind turbine strikes	Not relevant. The project does not comprise a wind farm development.	-
Vehicle strikes	Relevant. The proposed development will result in the creation of access roads and the increase in residential dwellings will result in an increase in traffic with an associated increase in the risk of vehicle strike. However, given the slow speeds of vehicles travelling within the area and the lack of high-quality habitat in the vicinity, it is unlikely to significantly increase the potential of vehicle strike for fauna.	Ecosystem credit fauna species which may utilise the habitat as part of a larger foraging range.

7. Avoid and Minimise Impacts

This chapter includes demonstration of efforts to avoid and minimise impacts on biodiversity values identified within the subject land, which includes assessment of direct, indirect and prescribed impacts.

Under the BAM, measures taken to avoid and minimise impacts on biodiversity values from the development need to be documented. As described in previous chapters, the subject land comprises of 38.97 ha of remnant native vegetation in the form of PCT 266, which represents 38.97% of the site. The remainder of the subject land comprises land that has previously been modified for agricultural purposes, and now constitutes a mix of planted native vegetation (0.07 ha), exotic woody vegetation (2.23 ha), exotic dominated grassland (77.40 ha), and cleared land (0.29 ha).

Minimisation of impacts can be achieved by careful consideration of the location and design of the project. Details of the recommended measures to avoid and minimise impacts are outlined below.

7.1. Avoid and Minimise Direct and Indirect Impacts on Native Vegetation and Habitat

7.1.1. Project Location

The subject land is situated to allow for the construction and operational requirements of the residential development while minimising impacts to biodiversity values. In determining the location of the development footprint, the project has sought to avoid and minimise direct and indirect impacts on native vegetation and habitat by:

- Locating the project as much as possible within areas containing exotic-dominated vegetation that hold minimal biodiversity value;
- Locating the project to retain larger more distinct patches of native vegetation, subsequently removing/modifying areas comprising sparse scattered paddock trees; and
- Locating the project to allow for retention of areas of native vegetation in open space areas in the subject land as part of the proposed development.

7.1.2. Project Design

Due to the nature of the proposed residential development, avoiding and minimising direct impacts within the development footprint is not feasible. However, in determining the design of the development footprint, the project has sought to avoid and minimise direct impacts on native vegetation and habitat by:

- Reducing the size and configuration of lots to avoid large patches of native vegetation;
- Designing the project to cluster buildings and contain the footprint within the smallest area possible, while remaining functional for the purpose;
- Implementation of a suite of mitigation measures as part of the project (**Chapter 9**), to minimise the impacts on biodiversity, including:
 - Weed management;

- Biodiversity Management;
- Retention of native vegetation and corridors; and
- Application of a positive covenant.

7.2. Avoid and Minimise Prescribed Impacts

7.2.1. Non-native Vegetation

Areas of non-native vegetation within the subject land are predominantly in the form of exotic woody vegetation and exotic dominated grassland. Although the non-native vegetation may provide some habitat value for native fauna in terms of foraging resources, these areas are unlikely to be favoured over adjoining treed habitats outside of the subject land.

Nevertheless, the location of the project and development design have been focused on avoiding and minimising impacts on areas of high biodiversity values, with a specific focus on Box Gum Woodland. Hence, impacts to areas of non-native vegetation are not able to be avoided as part of the project.

7.2.2. Habitat Connectivity

A low degree of habitat connectivity occurs within the subject land, however some of the vegetation in the eastern and southern section connects to vegetation in adjoining properties. The future development of the subject land will disrupt this habitat connectivity. However, in the southern section, a large quantity of the vegetation will be retained in this area within public open spaces. The vegetation in the subject land does not connect to vegetation further to the north as this part has been cleared and to the west as this part contains residential dwellings. Further avoidance on disturbance to habitat connectivity will be achieved through the implementation of a positive covenant to retain remnant vegetation in the western section of the disturbance footprint.

Furthermore, the species most likely to utilise these corridors are highly mobile species such as birds and bats that are capable of accessing habitat across fragmented landscapes.

7.2.3. Waterbodies, Water Quality and Hydrological Processes

The project has the potential to result in alterations to hydrological processes as bulk earthworks will be required to facilitate construction, and drainage lines and existing dams will be altered. Increased impermeable surfaces caused by the creation of buildings and roads are likely to result in reduced levels of infiltration and increased volumes of runoff which may also be contaminated with pollutants from the residential areas.

The implementation of rigorous water quality controls will reduce the impacts on waterbodies in the subject land.

7.2.4. Vehicle Strike

The project will result in the creation of residences and roads within the subject land which will result in an increase in vehicle traffic within the subject land and thereby increasing the potential of vehicle strikes on native

fauna species. The implementation of traffic control measures, primarily speed limits along access roads and driveways will reduce the potential for vehicle strikes on native fauna.

8. Assessment of Potential Impacts

8.1. Direct Impacts

There are no direct impact resulting from the proposed rezoning, however, this BAR has aimed to identify the potential impacts of the proposed future development within the subject land. The primary impact is the loss of vegetation and associated habitat within the subject land. **Table 10** identifies the extent of impacts to vegetation within the subject land. Additional surveys are required to determine the presence of threatened species within the subject land and calculate offsetting requirements which will need to be undertaken at the DA stage for future developments once exact impact footprints are known.

Table 10 Extent of vegetation impacts within the subject land

Vegetation Zone	PCT	Condition	BC Act Status	Area (ha)
1	266	Remnant	Critically Endangered	25.06
2	266	DNG	Critically Endangered	13.91

8.2. Change in Vegetation Integrity Score

Table 11 details the change in vegetation integrity score for each vegetation zone and management zone.

To reflect the intended development within the subject land, which includes areas of complete clearing, areas of retained vegetation and areas of avoided land, three management zone types have been identified. Of these only two are located within the disturbance footprint and have been included in calculations within the BAM-C. These are shown in **Figure 8**, and include:

- Cleared: areas subject to complete clearing; and
- Retained: areas of remnant vegetation to be retained under a positive covenant.

For the clearing management zone, the future vegetation integrity scores have been reduced to 0. For the retained management zone, the future vegetation integrity scores have been retained as existing values. It is noted that has been minor increases in the future VI scores within the retained management zone, however the future VI score for the entirety of the vegetation zone has been calculated as a reduction.

Table 11 Changes in vegetation integrity score

Zone	PCT	BC Act Status	BRW	Management Zone	Area (ha)	Vegetation Integrity Score			
						Current	Future	Change	Total Change
1	266_Remnant	CEEC	2.5	1_Cleared	10.45	40.4	0	-40.4	-22.6
				2_Retained	7.22	40.4	43.5	3.2	
2	266_DNG	CEEC	2.5	1_Cleared	12.12	3.3	0	-3.3	-3.3

BRW = Biodiversity Risk Weighting

8.3. Impact to Riparian Land and Mapped Watercourses

The subject land contains an area of riparian land associated with the unnamed first order watercourse.

Riparian corridors consist of the following components (DPI 2018):

- The channel which comprises the bed and banks of the watercourse (to the highest bank); and
- The vegetated riparian zone (VRZ) adjoining the channel.

The width of the VRZ is required to be measured from the top of the highest bank on both sides of the watercourse (DPI 2018). As the unnamed watercourse is classed as a 1st order watercourse it therefore requires a VRZ buffer of 10 m from the bank. The exact impact to each mapped watercourse and its associated VRZs will need to be assessed at the DA stage for future developments once exact impact footprints are known. The NRAR may also need to be consulted as outlined in **Section 10.1.3**.

8.4. Indirect Impacts

The potential indirect impacts of the future development are anticipated to occur throughout and immediately adjacent to the subject land. No indirect impact zones have been identified for the purpose of this assessment.

8.4.1. Edge Effects

Edge effects are impacts that occur at the interface between natural habitats, especially forests and disturbed or developed land (Yahner 1988). When an edge is created between woodland and a cleared area, changes to ecological processes within the vegetation can extend between 10 m and 100 m from the edge (Yahner 1988). These include microclimatic changes in light, temperature, humidity and wind, which can favour a suite of different species and therefore cause significant changes to the ecology of the patch (Lindenmayer and Fischer 2006). Edge effects can also result from the increase in noise and artificial light from a project.

Some areas of native vegetation occur outside of but directly adjacent to the subject land in the eastern and southern section and these areas will experience increased edge effects due to the residential development directly adjacent. However, due to the relatively high degree of existing disturbance and the already degraded nature of the subject land, edge effects are not considered likely to be significant.

8.4.2. Construction Impacts

A number of indirect impacts relevant to the construction phase of the future development have the potential to impact the remaining ecological values of the subject land, such as those relating to noise, dust, light, sedimentation and erosion. These are considered below.

i. Noise

Noise can affect animal physiology and behaviour, and if it becomes an ongoing stress, it can be injurious to an animal's energy budget, reproductive success and long-term survival. There are other potential impacts that include habitat loss through avoidance, reduced reproductive success and a retreat away from favourable habitats (AMEC 2005).

The subject land is not likely to provide significant habitat for native species and it is likely that most animal species that currently occur will habituate to the periodic noise disturbance (AMEC 2005), and the construction phases of future development are likely to cause only temporary disturbance only to occurring fauna. It is unlikely that noise levels will have a significant, long-term, impact on any wildlife populations.

ii. Dust

Future construction activities have the ability to generate dust, which may result in negative consequences on the ecological values of the subject land and adjacent areas. Dust pollution can lead to a decrease in habitat quality which has the potential to extend the area of impact beyond the direct footprint of future developments. With regard to the habitats within the subject land, dust generated by future developments may impact native woody vegetation, resulting in the loss of health of retained individuals, as well as individuals directly surrounding the subject land.

While future development will have some effect on the surrounding environment, the impacts from dust are likely to be minimal and restricted to the construction phase. Any minimal increase in dust levels is expected to be localised to the subject land and immediate surrounds, and due to its temporary nature, is unlikely to have significant, long-term impact on existing biodiversity.

iii. Light

Future development has the potential to increase the level of artificial light in the natural environment. Increased light levels may adversely impact wildlife by direct glare, chronic or periodic increased illumination and temporary unexpected fluctuations in light levels (Saleh 2007, Longcore and Rich 2010).

While future development will have some effect on the surrounding environment, the impacts from light pollution are likely to be minimal. Any minimal increase in light levels is expected to be localised to the subject land and immediate surrounds. Light pollution from the future developments is unlikely to have a significant or long-term impact on any fauna species as it is expected that local species will become habituated to the increased light levels from street lighting of the future residential area.

iv. Sedimentation and Erosion

During the construction and earthworks phase of the future development, the retained vegetation and vegetation occurring directly adjacent but outside of the subject land has potential to be impacted by sedimentation and erosion. Eroded sediment can smother retained vegetation if appropriate control measures are not implemented. Smothering can reduce regeneration of groundcover species and enter drainage lines. Sediment and eroded material can also contain weed matter and nutrients, and movement of this material into the retained vegetation can facilitate the spread of weeds which can result in changes to community composition. However, it is considered that with the implementation of appropriate sediment control methods, the risk of sedimentation is considered to be minor and manageable.

8.5. Prescribed Impacts

The project has been assessed as resulting in five prescribed impacts (see **Chapter 6**). An assessment of these prescribed impacts is provided below in accordance with Section 8.3 of the BAM.

8.5.1. Habitat Connectivity

8.5.1.1. Nature

The native vegetation within the subject land connects to areas of woody vegetation to the east and south of the subject land (see **Figure 1**). The woody vegetation proposed to be removed or modified from within the subject land occurs predominantly within areas of scattered trees, which may act as stepping stone habitat for highly mobile species.

8.5.1.2. Extent

Habitat connectivity will be marginally reduced by the removal of 17.74 ha of woody vegetation, including 2.23 ha of exotic woody vegetation, 10.45 ha of remnant woodland and 0.07 ha of planted native vegetation. The majority of this woody vegetation is relative degraded, comprising scattered trees and being subject to grazing. Removal of the woody vegetation within the subject land will increase the fragmentation of the vegetation to the east of the subject site.

8.5.1.3. Duration

Direct impacts to habitat connectivity would occur during the construction and operational phase of the project and is considered to be a long-term impact.

8.5.1.4. Threatened Entities Affected

The habitat provided by woody vegetation may provide foraging habitat for ecosystem species, such as the Grey-headed Flying-fox, microchiropteran bats and birds, and species credit species such as the Squirrel Glider.

8.5.1.5. Consequences

The project will result in the reduction in woody vegetation by 17.74 ha. The reduction of this relatively small area of habitat is not considered to significantly impact the movement of mobile fauna species as extensive areas of similar vegetation and habitat is located in adjacent areas and throughout the assessment area (**Figure 1**). For example, the Grey-headed Flying-fox forages opportunistically, often at distances up to 30 km from camps, and occasionally up to 60-70 km per night, in response to patchy food resources (DEC (NSW) 2005). Although native vegetation is present outside the subject land to the east and south that connects to vegetation in the subject land, it is considered unlikely that highly mobile native fauna would be solely reliant on the habitat within the subject land for movement between different areas of habitat.

8.5.2. Non-native Vegetation

8.5.2.1. Nature

The project will likely require the removal of all non-native vegetation within the subject land. Non-native vegetation includes areas of exotic vegetation as displayed in **Figure 9**.

8.5.2.2. Extent

The proposed development will clear a total of 76.82 ha of non-native vegetation.

8.5.2.3. Duration

Impacts to non-native vegetation would occur during the construction phase of the project and would be a long-term impact.

8.5.2.4. Threatened Entities Affected

The habitat provided by non-native vegetation may provide some foraging habitat for ecosystem species, such as microchiropteran bats and birds, in particular raptors. The non-native vegetation is not considered suitable breeding/nest habitat due to lack of hollows.

8.5.2.5. Consequences

The project will result in a reduction in non-native vegetation by 76.82 ha. The reduction of this small area of habitat is not considered to significantly impact upon the potentially affected threatened entities as the non-native vegetation comprises marginal to sub-optimal habitat and other areas of suitable habitat, in the form of both native and non-native vegetation, will remain immediately adjacent the subject land and within the assessment area.

8.5.3. Human-made Structures

8.5.3.1. Nature

The project will require the removal of existing human-made structures, including a residential dwelling and sheds within the subject land (see **Figure 9**).

8.5.3.2. Extent

The proposed development will clear a total of 0.1 ha of human-made structures.

8.5.3.3. Duration

Impacts to human-made structures would occur during the construction phase of the project and would be a long-term impact.

8.5.3.4. Threatened Entities Affected

The habitat provided by human-made structures may provide some roosting habitat for ecosystem species, such as microchiropteran bats. The human-made structures are not considered likely to comprise suitable breeding habitat for these species.

8.5.3.5. Consequences

The project will result in a reduction in human-made structures by 0.1 ha. The reduction of this small area of habitat is not considered to significantly impact upon the potentially affected threatened entities as the human-made structures are not likely to comprise breeding habitat or be important to their survival.

8.5.4. Waterbodies, Water Quality and Hydrological Processes

8.5.4.1. Nature

The project will result in the alteration of a first order watercourse. The project has potential to cause alterations to the hydrological regime within the subject land, due to changes to drainage patterns due to bulk earthworks

and potential sedimentation and erosion. Increased impermeable surfaces caused by the creation of buildings and roads are likely to result in reduced levels of infiltration and increased volumes of runoff.

8.5.4.2. Extent

Several drainage lines are likely to be removed or modified as part of the project, with a total area of 0.61 ha. Additionally, there is potential for water quality to be reduced due to the alteration to hydrological processes and increased surface runoff which may be contaminated with pollutants from the residential areas.

8.5.4.3. Duration

Impacts to the smaller waterbodies would occur during the construction phase of the project and would be a long-term impact. Ongoing impacts on water quality and hydrological processes could occur during the construction and operational phases of the project and would also be a long-term impact.

8.5.4.4. Threatened Entities Affected

The habitat provided by the waterbodies in the subject land may provide some foraging habitat for ecosystem species, such as microchiropteran bats and birds. Amphibian species are likely to utilise the waterbodies/farm dams when they contain water, although no threatened species were recorded from these areas.

8.5.4.5. Consequences

The project will remove some waterbodies (farm dams) and modify the hydrological regime through bulk earthworks for residential development and may result in impacts to water quality of the first order water course. These habitats are reliant on specific hydrological regimes and changes to these regimes can affect the integrity, structure and composition of habitat and thus, have secondary impacts on the species that rely on them.

However, the habitats to be removed or altered are minor in nature and are already degraded through agricultural use. Potential issues regarding water quality and sedimentation are likely able to be addressed satisfactorily with the implementation of appropriate mitigation measures.

No threatened entities are known to use the waterbodies within the subject land however further targeted surveys to determine the presence of threatened species will be required at the DA stage for future developments.

8.5.5. Vehicle Strike

8.5.5.1. Nature

The construction of roads, houses and driveways will result in an increase in vehicles that will traverse the subject land and will increase the risk of fauna vehicle strike.

8.5.5.2. Extent

The risk of vehicle strike will only occur within the proposed road network.

8.5.5.3. Duration

The risk of vehicle strike is considered to be a long-term potential impact.

8.5.5.4. Threatened Entities Affected

The risk is of relevance to a number of ecosystem credit species including terrestrial mammals, reptiles and birds which have the potential to occur. However, these species are likely to avoid interactions with vehicles due to increased noise from construction activities.

8.5.5.5. Consequences

There is no data or relevant literature available to enable an estimate of vehicle strikes; however, the consequence of increased vehicle strike on native species known to occur within the assessment is not considered likely to be significant as it is expected that the numbers of wildlife struck by cars will be very low. This is because the proposed development predominantly will occur in areas of grassland that are not utilised extensively by native species of fauna. When the development is complete, there will be even less potential habitat for native species and although it is possible, it is considered very unlikely that any species will be impacted to any extent by vehicle strike. Furthermore, it is expected vehicle movement will be slow (<50km/hr speed limits) throughout the subject land and the potential increase in fauna vehicle strike will be minimal.

Accordingly, the consequences of the impacts for the local and bioregional persistence of any species that currently has the potential to utilise the subject land is very low.

9. Mitigation Measures

9.1. Mitigation of Impacts to Native Vegetation and Habitat

As demonstrated in previous chapters, the subject land provides potential foraging, breeding or roosting habitat for threatened species. As a result, there will be a need to implement measures to minimise impacts to these entities. This section outlines proposed mitigation measures for the project. These measures will be described in further detail within the relevant biodiversity assessment at the DA stage. Construction related mitigation measures will be detailed in separate Construction Environmental Management Plan (CEMP).

9.1.1. Inductions

Site inductions should be given by the civil contractor to ensure all site workers and visitors are aware of ecological issues associated with the subject land and the location of any restricted access areas.

9.1.2. Access Restrictions

To avoid unnecessary removal or damage to vegetation to be retained adjacent to the rezoning area, the clearing area should be clearly demarcated and signed to ensure no vegetation beyond these boundaries is removed. Clearing works and equipment should be excluded from areas outside the clearing area.

9.1.3. Traffic Management

In order to reduce the risk to fauna from vehicle strike, traffic management will be implemented during construction to maintain slow vehicle speeds. Traffic management measures will be developed as part of a CEMP.

Post construction, speed signage will be installed on internal roads, and traffic calming measures installed, where required (subject to Council approval).

9.1.4. Erosion, Sedimentation and Pollution Control

To reduce sedimentation on the construction site, erosion control measures should be implemented. This includes minimising the amount of exposed soils on the site at any given time. All soil stockpiles should be adequately covered when not in use to prevent erosion through heavy rainfall.

Sediment fences should be established around the perimeter of the development area to prevent the impacts of sedimentation on adjoining vegetation and the adjacent drainage line. During development, precautions should be taken to ensure that no pollution, such as petrochemical substances or water containing suspended solids, escapes the construction site. Pollution traps and efficient removal of pollution to an off-site location would help to minimise pollution impacts.

9.1.5. Weed Management

In order to minimise the spread of weeds throughout the subject land and adjoining areas, appropriate weed control activities will be undertaken prior to vegetation clearing in accordance with the *Central Tablelands Regional Strategic Weed Management Plan 2023 – 2027* (Central Tablelands LLS 2022) under the NSW *Biosecurity Act 2015*.

The *Biosecurity Act 2015* and regulations provide specific legal requirements for state level priority weeds and high risk activities, as provided in the Appendices of the *Central Tablelands Regional Strategic Weed Management Plan 2023 – 2027* (Central Tablelands LLS 2022). In order to comply with the objectives of the plan, it is recommended the following measures be implemented as part of weed management for the subject land.

i. Prevention

Appropriate construction site hygiene measures will be implemented to prevent entry of new weeds to the area such as the cleaning of equipment prior to entering the subject land.

ii. Eradication

Initial weed management will be carried out within the subject land according to best-practice methods. The targeted species will be those listed under Appendix 1 of the *Central Tablelands Regional Strategic Weed Management Plan 2023 – 2027* (Central Tablelands LLS 2022), which have been recorded from the subject land. Initial weed treatment will include eliminating woody species and targeting large dominant infestations of exotic herbs. This may be achieved via a combination of manual weed removal and herbicide use.

Weed management measures should avoid adverse impacts to retained vegetation within the subject land, including not over clearing (remove only targeted species), employment of minimal disturbance techniques to avoid soil and surrounding vegetation disturbance.

iii. Containment

Follow-up monitoring and maintenance should be undertaken in the subject land following vegetation clearing activities, to contain any re-emergence of weed species.

9.1.6. Biodiversity Management Plan

Due to the potential for future development to impact on areas of potential habitat for native species in the subject land, a Biodiversity Management Plan (BMP) should be prepared. The overall objectives of the BMP will be to minimise impacts to biodiversity as a result of development by prescribing a range of management measures that will be implemented both during construction and in the long term.

Specific management measures that should be detailed in the BMP include the following:

- Pre-clearance surveys and clearance supervision during construction to minimise impacts of construction;
- Delineation of clearing boundaries and the installation of sediment fences and erosion control measures;
- Retention and management for biodiversity of all wooded habitat that is outside of the development footprint, including areas under the positive covenant (see **Section 9.1.9**);
- Implementation of weed control measures, both during construction and in areas of retained estuarine vegetation in the long term;
- Implementation of measures to avoid and minimise sedimentation and erosion;
- Undertake a monitoring programme, including water quality, weeds and native species; and

- Rehabilitation/revegetation of treed habitat in areas outside of the development footprint.

The implementation of the BMP will enable the minimisation of impacts to biodiversity and the appropriate mitigation of potential impacts.

9.1.7. Stormwater Management

As detailed previously, future residential development will reduce infiltration of stormwater due to the increase in impervious surfaces such as roads and roofs which will increase water runoff into waterways. The resulting stormwater has potential to result in increased pollution including sediments, pesticides and fertilisers and petrochemicals. In order to mitigate the potential impacts of stormwater from the developed areas entering waterways, a Stormwater Management Plan should be developed to specifically address measures relating to both stormwater runoff and water quality.

Water quality measures that should be implemented and detailed in the Stormwater Management Plan include a range of measures including the installation of rainwater tanks, bioretention swales and gross pollutant traps to improve water quality runoff discharging from the proposed development. Water Sensitive Urban Design should be utilised where possible in the development to integrate stormwater, groundwater and wastewater management and water supply, to minimise environmental degradation and improve aesthetic and recreational appeal.

With the implementation of such measures to be detailed in the Stormwater Management Plan, it is expected that stormwater impacts on aquatic environments will be able to be appropriately managed.

9.1.8. Landscaping and Understorey Replanting

Landscaping presents an opportunity for revegetation of areas of open space within the subject land with characteristic species that would have occurred prior to historic clearing for agriculture. There are opportunities for planting in areas of open space and around the proposed water detention basins. For any landscaping works to be undertaken, it is recommended that characteristic species of the pre-existing communities listed be utilised where possible.

All plants to be planted should be of local provenance (if possible, from within a 10 km radius of the subject land) and sourced from nurseries that specialise in growing seedlings of native plants with seed sourced from bushland within the local area. This is to avoid planting of cultivars that are human created, and not genetically representative of species as they naturally occur within the subject land and wider assessment area. All plants should be disease and pest-free, hardened off and well-watered at the time of planting. All plants are to be provided in a healthy condition. They must have good root development and a sturdy shoot system.

This type of landscaping will provide habitat values in the longer term for locally native fauna groups including small birds, microchiropteran bats, arboreal mammals and reptiles.

9.1.9. Implementation of a Positive Covenant

A positive covenant will be applied to areas of remnant woodland in the western portion of the disturbance footprint to ensure the long-term survival of the vegetation community within the proposed future lots. Areas of remnant vegetation subject to the positive covenant have been mapped under the 'Retained' management

zone, as shown in **Figure 8**. The future lots are proposed to have sufficient developable areas with only a portion of the lot being subject to the covenant. Maintenance of understorey vegetation would be permissible (such as mowing of grasses) as this is not expected to reduce the condition of the community beyond current conditions, however, trees and shrubs would be retained and managed under the BMP.

10. Discussion

10.1. Future Assessment Requirements

10.1.1. EPBC Act Requirements

Threatened species, populations and communities listed under the EPBC Act that are considered to be directly or indirectly impacted by the proposed development should be assessed in accordance with the *Matters of National Environmental Significance Significant Impact Guidelines 1.1* (DoE, 2013). If a development is considered to significantly impact any MNES, then a referral would be required to be submitted to DCCEE.

One vegetation community recorded from the subject land (PCT 266) conforms to Box Gum Woodland which is listed as a CEEC under the EPBC Act. However, the occurrence of this community in the subject land does not conform to the EPBC listing for this community (see **Section 4.2.2.3**). Future development may impact threatened fauna and flora which are listed under the EPBC Act, in which case a referral to the Commonwealth would also be required. As such, any future DAs will need to consider impacts to threatened species and populations listed under the EPBC Act if recorded as present within the subject land.

10.1.2. BC Act Requirements

To determine the type of assessment required for a future development under Part 4 (Local Development) of the EP&A Act, it is necessary to determine whether the proposed development triggers the BOS. As outlined previously, for the proposed development to trigger the BOS, it would need to be considered as likely to significantly affect threatened species, which could occur as follows:

- It is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test of significance in Section 7.3 of the BC Act;
- It exceeds the biodiversity offsets scheme threshold according to Clause 7.1 of the BC Regulation, with the thresholds being:
 - The clearing of native vegetation of an area above a prescribed threshold based on the minimum lot size; or
 - The clearing of native vegetation, or other prescribed action, on land included on the Biodiversity Values Map.
- It is carried out in a declared AOBV.

At this stage, no Tests of Significance, for TECs or potentially occurring threatened species, in accordance with Section 7.3 of the BC Act have been undertaken for this assessment. As such, any future DA lodged for the future development of the subject land would need to prepare a test of significance in accordance with Section 7.3 of the BC Act in the event that the BOS was not triggered by another mechanism.

The minimum lot size of the subject land is currently 4000 m² and zoned R5 Large Lot Residential. Based on the areas of clearing thresholds outlined within the BC Regulation, and reproduced in **Table 12**, the BOS would be triggered if future development cleared 0.25 ha of native vegetation. The rezoning will seek to apply a R1 General Residential zoning to the subject land, with a minimum lot size of less than 1 ha. Therefore, it is likely

that future DAs could potentially trigger entry into the BOS by this mechanism, under either the existing or proposed zoning.

Table 12 Area of clearing thresholds

Minimum Lot Size of Land	Area of Clearing
Less than 1 hectare	0.25 hectares or more
Less than 40 hectares but not less than 1 hectare	0.5 hectares or more
Less than 1,000 hectares but not less than 40 hectares	1 hectare or more
1,000 hectares or more	2 hectares or more

The subject land is not currently mapped on the NSW Biodiversity Values Map and Threshold Tool (BV Map). Therefore, entry into the BOS will not be triggered via this mechanism. However, the Biodiversity Values Map is updated every 90 days, and as such it would need to be consulted during the DA process.

The subject land is not currently mapped as an AOBV. Therefore, the BOS is not currently triggered by this mechanism. Although unlikely to be included in the near future, the list of AOBVs would need to be consulted during the DA process.

10.1.2.1. Offsetting Requirements

The BOS provides a framework to avoid, minimise and offset impacts on biodiversity from development and clearing, and to ensure land that is used to offset impacts is secured in-perpetuity. Developers and landholders who undertake development or clearing, generating a credit obligation that must be retired to offset their activity following approval by the consent authority. Under the BAM, there are two types of credits on development sites:

- Ecosystem credits, which measure the offset requirement for impacts on threatened ecological communities, threatened species habitat for species that can be reliably predicted to occur with a plant community type, and other plant community types generally; and
- Species credits, which measure the offset requirement for impacts on threatened species individuals or area of habitat.

Once the consent authority has issued the approval or consent that includes the final credit obligation of ecosystem and/or species credits, the obligation can be satisfied as follows:

- The retirement of the required number and class of like-for-like biodiversity credits;
- The retirement of the required biodiversity credits in accordance with the variation rules;
- The funding of a biodiversity conservation action that would benefit the relevant threatened species or ecological community and that is equivalent to the cost of acquiring the required like-for-like biodiversity credits as determined by the offsets payment calculator referred to in Section 6.32 of the BC Act; and

- The payment under section 6.30 of the BC Act of an amount into the Biodiversity Conservation Fund determined in accordance with the offsets payment calculator to satisfy the requirement to retire biodiversity credits.

Should the BOS be triggered by future development, this process will be followed to ensure appropriate offsetting is undertaken.

This BAR has been prepared on the assumption that the BOS will be triggered by a future DA for the development of the subject land, and indicative BAM credit calculations and thresholds of assessment have been provided, as outlined in **Section 10.2**.

10.1.3. WM Act Requirements

Under the WM Act, a 'controlled activity approval' is required to carry out activities in, on or under waterfront land, which includes the bed and a distance of 40 metres from any river, lake or estuary. An application for a 'controlled activity approval' will be refused if adequate arrangements are not in force to ensure that no more than minimal harm will be done to any waterfront land as a consequence of the carrying out of the proposed controlled activity.

As land proposed to be modified/developed in the subject land is located directly adjacent to the unnamed watercourse (i.e. within 40 m), the WM Act is relevant to the proposal due to the proposed activities taking place within waterfront land and a controlled activity approval will need to be obtained prior to the commencement of works. Furthermore, as the unnamed watercourse is classified as a 1st order watercourse under the WM Act, the watercourse requires a VRZ buffer of 10 m from the bank on each side of the watercourse. However, due to the poor condition of the watercourse, with no bed or bank structure, it is not considered to conform to the definition of a watercourse under the WM Act. Consultation with the NRAR will be required to confirm the status of the watercourse and confirm whether a controlled activity approval is required for future development.

10.1.4. State Environmental Planning Policy (Biodiversity Conservation) 2021

The City of Cabonne LGA is listed in Schedule 2 of the BC SEPP, falling under the Central and Southern Tablelands Koala management area and therefore Chapter 4 of the BC SEPP applies to the subject land. A brief assessment of the requirements of the BC SEPP is provided below as it provides a useful framework for considering the suitability of land to support the Koala.

The subject land contains Koala Use Tree species listed under Schedule 3 of BC SEPP 2021, including *Eucalyptus melliodora* (Yellow Box), *Eucalyptus bridgesiana* (Apple-topped Box) and *Eucalyptus blakelyi* (Blakely's Red Gum). Therefore, according to the BC SEPP the subject land is determined to be 'highly suitable koala habitat' and therefore the subject land would be considered to include 'Potential Koala habitat', as defined under the BC SEPP. For land under which BC SEPP 2021 applies, DAs impacting Koalas or Koala Habitat must be accompanied by Koala surveys, and if requested a Koala Assessment Report (KAR). Therefore, as the City of Cabonne LGA is included in Schedule 2 of the BC SEPP, it does apply to the subject land and a KAR may be required for future DAs.

10.2. Preliminary BAM Credit Calculations

This BAR has aimed to provide a preliminary assessment in accordance with the BAM, including credit calculations for ecosystem credits. Credit calculations for species credit species have not been calculated and these will need to be determined at the DA stage as part of the preparation of the BDAR accompanying the DA and will be informed by targeted fauna surveys conducted in accordance with the BAM. Although the At this stage, Superb Parrot, which was incidentally recorded within the subject land will require offsetting however further surveys will be required to identify nesting trees and determine species polygons. However, it must be acknowledged that the project is a rezoning proposal, and is therefore conceptual in nature, and does not necessarily represent the final footprint for the project. A detailed assessment consistent with the BAM will be required for any future DA.

The following sections provide an indication of the assessment thresholds in accordance with the BAM, based on the indicative footprint.

The assessment thresholds that must be considered under the BAM include the following:

- Impacts on an entity that is at risk of a serious and irreversible impact;
- Impacts for which the assessor is required to determine an offset requirement;
- Impacts for which the assessor is not required to determine an offset requirement; and
- Impacts that do not require further assessment by the assessor.

The following sections outline these assessment thresholds and their relevance to the project.

10.2.1. Impacts on Serious and Irreversible Impact Entities

One candidate SAIL entity has been considered as relevant to the project, being the Box Gum Woodland TEC. Further consideration of this entity is provided below.

10.2.1.1. Box Gum Woodland

Box Gum Woodland is confirmed as occurring within the disturbance footprint and will be impacted by the project. Approximately 29.79 ha of the community will be removed within the disturbance footprint, including 17.67 ha of remnant woodland and 12.12 ha of DNG. Within the disturbance footprint and wider subject land, Box Gum Woodland is degraded due to historical land clearing and is currently unmanaged and subject to grazing. The location of the Box Gum Woodland within the subject land is shown in **Figure 7**.

Section 9.1.1 of the BAM requires the provision of additional information regarding SAIL entities that are TECs. The additional information is required to assist the consent authority to evaluate the nature of an impact on a potential entity at risk of a serious and irreversible impact. The additional information requirements are provided in **Table 13**.

Table 13 Additional impact assessment provisions for Box Gum Woodland

Criteria	Additional Impact Assessment Provisions	Response
1	The assessor is required to provide further information in the BDAR or BCAR regarding the impacts on each TEC at risk of an SAI. This must include the action and measures taken to avoid the direct and indirect impact on the TEC at risk of an SAI. Where these have been addressed elsewhere the assessor can refer to the relevant sections of the BDAR and BCAR.	Avoidance of impacts to Box Gum Woodland is addressed in Chapter 7 .
2	The assessor must consult the TBDC and/or other sources to report on the current status of the TEC including:	-
(a)	Evidence of reduction in geographic distribution (Principle 1, clause 6.7(2)(a) BC Regulation) 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)	The current total geographic extent of Box Gum Woodland varies depending on the source interrogated. The Final Determination for Box Gum Woodland (NSW Scientific Committee 2011) identifies that the TEC has undergone a very large reduction in geographic distribution and has been extensively cleared throughout its range and remnants typically are small, isolated, and highly fragmented. It estimates that less than 5% of the original distribution remains, though notes there is variability amongst other sources (Benson 2008, Tozer et al. 2010, Armstrong et al. 2013). Despite these uncertainties, the final determination concludes the plausible range estimated for the amount remaining includes values less than 10% for almost all of the components of the community described by Benson (2008). The Advice to the Minister for the Environment and Heritage from the Threatened Species Scientific Committee (TSSC) on Amendments to the List of Ecological

Criteria	Additional Impact Assessment Provisions	Response
		Communities under the EPBC Act for Box Gum Woodland (Threatened Species Scientific Committee 2006) places the NSW pre-1750 extent at 3,717,366km² and estimates it is 93% cleared – with a current area of approximately 250,729 ha. Following a review of the above information for the extent of Box Gum Woodland, both current and prior to European settlement, it is clear there is some variation in area calculations. It is noted however, that it is unanimously accepted by all sources that the community has suffered extensive clearing to a level that the community requires significant external intervention to maintain and recover the community. No published data was found in the literature on the 1970 extent of Box Gum Woodland and an accurate estimate of the reduction in distribution between the current extent and the 1970 geographic extent cannot be provided.
(b)	The extent of reduction in ecological function for the TEC using evidence that describes the degree of environmental degradation or disruption to biotic processes (Principle 2, clause 6.7(2)(b) BC Regulation) indicated by: Change in community structure Change in species composition Disruption of ecological processes Invasion and establishment of exotic species Degradation of habitat; and Fragmentation of habitat	According to the final determination for Box Gum Woodland (NSW Scientific Committee 2011) there are a number of threatening processes that have caused severe declines in biotic processes and interactions throughout its range and are likely to cause continuing decline in the future, such as: • Tree removal; • Removal for crops and pastures; • Fragmentation of habitat; • Grazing by livestock and rabbits; • Modification of understory; • Dryland salinity; • Soil chemical and structural modification associated with agricultural uses; • Changes in frequency of fire regimes; and

Criteria	Additional Impact Assessment Provisions	Response
		Prevention of recruitment of species, through continued under-scrubbing and mowing.
(c)	Evidence of restricted geographic distribution (Principle 3, clause 6.7(2)(c) BC Regulation), based on the TEC's geographic range in NSW according to the: extent of occurrence area of occupancy, and number of threat defined locations	The current geographic distribution best estimate of the extent of occurrence is 702,800 km², while the best estimate of the area of occupancy is 151,100 km² according to the final determination. No threat defined location are specifically identified in the TBDC.
(d)	Evidence that the TEC is unlikely to respond to management (Principle 4, clause 6.7(2)(d) BC Regulation)	This principle is not identified as applicable to BARs.
3	Where the TBDC indicates that data is 'unknown' or 'data deficient' for a TEC for a criterion listed in Section 9.1.1(2), the assessor must record this in the BDAR.	Not applicable.
4 (a)	The impact on the geographic extent of the TEC (Principles 1 and 3) by estimating the total area of the TEC to be impacted by the proposal: in hectares; and as a percentage of the current geographic extent of the TEC in NSW	The proposal will remove or modify approximately 29.79 ha of Box Gum Woodland in the disturbance footprint. This includes the direct removal of 22.72 ha while potential modification of 7.06 ha that is proposed to be retained within the disturbance footprint. Of the Box Gum Woodland to be removed, 10.59 ha occurs as remnant woodland, while the remaining 12.12 ha occurs as DNG. The extent of the TEC in NSW differs depending on the information source. The estimated geographic extent in NSW is ~250,729 ha according to resources reviewed for Criteria 2(a).

Criteria	Additional Impact Assessment Provisions	Response
		Based on the numbers outlined above, the extent of Box Gum Woodland to be impacted by the project is less than 0.01% of the current geographic extent of the TEC in NSW.
(b)	The extent that the proposed impacts are likely to contribute to further environmental degradation or the disruption of biotic processes (Principle 2) of the TEC by:	-
	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	The project is likely to result in the isolation of an area of 17.67 ha of Box Gum Woodland from other areas of the community, within the eastern and western portions of the subject land. However, landscaping is proposed to be undertaken within the proposed OSD basins and along drainage features which will provide connectivity across the subject land between all avoided and retained patches of the community. Based on the NSW State Vegetation Type Map there is approximately 103.90 ha of Box Gum Woodland within 500 m of the subject land, comprising PCTs 266, 277, and 278. Therefore, the removal of 22.72 ha (including both remnant and DNG) represents approximately 22% of the occurrence of the TEC within 500m of the subject land. Furthermore, the potential modification to 7.06 ha within retained patches represents approximately 6.8% of the occurrence of the TEC within 500 m of the subject land.
	Describing the impacts on connectivity and fragmentation of the remaining areas of the TEC measures 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	The removal of Box Gum Woodland within the subject land will result in some fragmentation of the community however will not result in the isolation of patches of the community. Connectivity will be maintained between retained patches and adjoining patches of the community to the west of the subject land.

Criteria	Additional Impact Assessment Provisions	Response
	Estimated maximum dispersal distance for native flora species characteristic of the TEC, and	The main dispersal mechanisms for flora species associated with Box Gum Woodland include one or a combination of the following: • animals, • wind, • water runoff, and • gravity. Fauna species are inextricably linked to a functioning woodland/grassland ecosystem. The ecosystem is a source of food and habitat for fauna, while ecosystem services provided by fauna include; plant pollination, seed dispersal, nutrient recycling, maintenance of soil structure, control of herbivorous insects and provision of disturbance which assists in maintaining floristic diversity (ACT Government 2004). The maximum dispersal distance for native flora species characteristic of the community was not stated, however the National Recovery Plan notes that paddock trees should not be more than 80 – 100 metres apart (DECCW 2011).
	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	The subject land comprises remnant patches of Box Gum Woodland as well as scattered paddock trees. As previously described, the project is not considered to significantly affect the connectivity of the TEC, as the largest, highest quality patches of the community have been avoided/retained by the project and will be subject to long-term management.
	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.	The Box Gum Woodland in the subject land corresponds to PCT 266 and has been assessed as two condition states, remnant woodland and DNG. The vegetation integrity score for the each condition state is as follows: • PCT 266_Remnant

Criteria	Additional Impact Assessment Provisions	Response
		○ Vegetation Integrity Score: 40.4 ○ Composition: 35.9 ○ Structure: 46.5 ○ Function: 39.3 ● PCT 266_DNG ○ Vegetation Integrity Score: 3.3 ○ Composition: 27.5 ○ Structure: 54.8 ○ Function: 0.0
5	The assessor may also provide new information that demonstrates that the principle identifying that the TEC is at risk of an SAI is not accurate.	Not applicable.

10.2.2. Impacts that Require an Offset

10.2.2.1. Native Vegetation

Under the BAM, an impact to biodiversity requires offsets for the clearing of native vegetation when the following criteria is met:

- A vegetation zone that has a vegetation integrity score ≥ 15 where the PCT is representative of an Endangered Ecological Community (EEC) or CEEC.

The PCTs and vegetation zones requiring offsets, and the number of ecosystem credits required, are documented in **Table 14**, whilst the areas requiring offsets are mapped in **Figure 10**.

In accordance with Appendix D of the BAM, no offsetting is required for the planted native vegetation.

Table 14 Summary of impacts to native vegetation requiring an offset

Zone	PCT	Condition Name	Area (ha)	Total Vegetation Integrity Loss	Biodiversity Risk Weighting
1	266 - White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	266_Remnant	17.67	-22.6	2.5

10.2.2.2. Threatened Species

In accordance with the BAM, the project is likely to require offsets for the clearing of species credit species habitat. The species requiring an offset will need to be determined at the DA stage as part of the preparation of the BDAR accompanying the DA and will be informed by targeted fauna surveys conducted in accordance with the BAM. At this stage, Superb Parrot, which was incidentally recorded within the subject land will require offsetting however further surveys will be required to identify nesting trees and determine species polygons.

10.2.3. Impacts that do not Require an Offset

In accordance with Appendix D of the BAM, impacts on planted native vegetation do not require an offset. The areas of planted native vegetation in the subject land comprise approximately 0.07 ha, as shown in **Figure 10**.

10.2.4. Impacts that do not Require Further Assessment

All areas identified as 'Exotic Woody Vegetation', 'Exotic Dominated Grassland', or 'Cleared Land' that occur within the subject land do not require further assessment. These areas comprise approximately 79.92 ha, as shown on **Figure 10**.

10.2.5. Application of the No Net Loss Standard

The BAM sets a standard that will result in no net loss of biodiversity values where the impacts on biodiversity values are avoided, minimised and mitigated, and all residual impacts are offset by retirement of the required number of biodiversity credits.

The ecosystem credit requirement for the project is summarised in **Table 15** whilst the 'like for like' offsetting options for the ecosystem credits are provided in the credit report provided in **Appendix C**.

Table 15 Summary of ecosystem credit liability

PCT	TEC	Area	Hollows present?	Credits
266 - White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	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	29.8	Yes	249

11. Conclusion

The project comprises the rezoning and subdivision of the subject land in order to facilitate future residential development. This BAR has been prepared to assess the impacts of the proposed rezoning on biodiversity values and has provided a preliminary assessment of the impacts of future residential development in accordance with the BAM. The biodiversity values of the subject land and potential ecological impacts of future development the project may facilitate have been appropriately assessed to allow decision makers to appropriately assess the project. More detailed ecological assessments will be conducted after the detailed design stage for submission with future DAs, when the development layout has been finalised and the impacts are better understood.

Past and current use of the subject land has entailed clearing and modification of the majority of pre-existing native vegetation. Despite the impacts of previous disturbance and location within a fragmented landscape, the project will require the clearing of some areas of native vegetation that are likely to provide habitat for several threatened fauna species. The proposed subdivision layout has sought to retain vegetation and habitat of the subject land considered to have the highest biodiversity value with consideration of their listing status under the BC Act and EPBC Act as well as presence of potential habitat for threatened species.

Native vegetation occurring within the subject land includes; PCT 266 White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion. This PCT conforms to Box Gum Woodland listed as a CEEC under the BC Act and EPBC Act. To facilitate the project, approximately 22.72 ha of Box Gum Woodland will be removed, and 16.25 ha will be retained (including 7.06 ha under a positive covenant) within the subject land.

Measures to avoid and minimise impacts to the biodiversity values of the subject land have been incorporated, where possible, and include consideration of the project location and design. Areas of woodland within the subject land extend beyond the subject land to the east and south; however, existing cleared areas prevents any connectivity to the north, and residential dwellings prevent connectivity to the west.

The project may also entail potential indirect impacts, including inadvertent impacts on adjacent habitat and reduced viability of adjacent habitat due to noise, dust or light spill, and prescribed impacts such as alteration to hydrology that have been considered in this BAR.

The BAM sets a standard that will result in no net loss of biodiversity values where the impacts on biodiversity values are avoided, minimised and mitigated, and all residual impacts are offset by retirement of the required number of biodiversity credits. The project has sought to avoid impacts to biodiversity values, and it is recommended that a suite of mitigation measures will be implemented for the project including weed management, delineation of clearing limits, pre-clearance surveys, staging of clearing, sedimentation control measures and landscaping utilising native species.

In order to manage the potential impacts of the project on the environment a range of avoidance, mitigation and compensation measures have been recommended. These include the preparation of a series of detailed management plans including a Sediment and Erosion Plan, a Biodiversity Management Plan, and a Stormwater Management Plan. Furthermore, a positive covenant is proposed to be placed over the patch of remnant woodland within the western portion of the subject land.

The proposed clearing of native vegetation will be subject to further assessment at the DA stage, but it is expected to result in the requirement of offsets in the form of ecosystem credits and species credits. This assessment indicates that the removal of the native vegetation within the subject land required a total of 249 ecosystem credits for PCT 266.

Although targeted threatened fauna species surveys have not been conducted at this stage, the results of the database analysis and habitat assessments indicate that several species credit species are likely to occur on the subject land, in addition to the Superb Parrot which is known to occur. Credit calculations will need be conducted for these species credits species to determine the offset liability at the DA stage of the project.

With the implementation of the proposed mitigation and compensation measures, it is considered likely that the impacts of the planning proposal on flora and fauna species or threatened ecological communities can be appropriately managed.

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APPENDIX A :

Floristic Data



Table 16 Flora species recorded within the subject land

Family	Scientific Name	Common Name	Exotic
Apocynaceae	<i>Gomphocarpus fruticosus</i>	Narrow-leaved Cotton Bush	Yes
Asparagaceae	<i>Asparagus officinalis</i>	Asparagus	Yes
Asparagaceae	<i>Dichopogon strictus</i>	Chocolate Lily	
Asteraceae	<i>Arctotheca calendula</i>	Capeweed	Yes
Asteraceae	<i>Calotis lappulacea</i>	Yellow Burr-daisy	
Asteraceae	<i>Carthamus lanatus</i>	Saffron Thistle	Yes
Asteraceae	<i>Centaurea calcitrapa</i>	Star Thistle	Yes
Asteraceae	<i>Centaurea solstitialis</i>	St Barnabys Thistle	Yes
Asteraceae	<i>Cirsium vulgare</i>	Spear Thistle	Yes
Asteraceae	<i>Conyza bonariensis</i>	Flaxleaf Fleabane	Yes
Asteraceae	<i>Conyza sumatrensis</i>	Tall fleabane	Yes
Asteraceae	<i>Crepis capillaris</i>	Smooth Hawksbeard	Yes
Asteraceae	<i>Cymbonotus lawsonianus</i>	Bear's Ear	
Asteraceae	<i>Gamochaeta americana</i>	Purple Cudweed	Yes
Asteraceae	<i>Hypochaeris albiflora</i>	White Flatweed	Yes
Asteraceae	<i>Hypochaeris radicata</i>	Catsear	Yes
Asteraceae	<i>Lactuca saligna</i>	Willow-leaved Lettuce	Yes
Asteraceae	<i>Lactuca serriola</i>	Prickly Lettuce	Yes
Asteraceae	<i>Schkuhria pinnata</i>	Dwarf Marigold	Yes
Asteraceae	<i>Senecio madagascariensis</i>	Fireweed	Yes
Asteraceae	<i>Senecio quadridentatus</i>	Cotton Fireweed	
Asteraceae	<i>Silybum marianum</i>	Variegated Thistle	Yes
Asteraceae	<i>Sonchus asper</i>	Prickly Sowthistle	Yes
Asteraceae	<i>Sonchus oleraceus</i>	Common Sowthistle	Yes
Asteraceae	<i>Taraxacum officinale</i>	Dandelion	Yes
Asteraceae	<i>Vittadinia cuneata</i> var. <i>cuneata</i> f. <i>minor</i>		
Boraginaceae	<i>Echium plantagineum</i>	Patterson's Curse	Yes
Brassicaceae	<i>Capsella bursa-pastoris</i>	Shepherd's Purse	Yes
Brassicaceae	<i>Lepidium africanum</i>	Common Peppergrass	Yes
Brassicaceae	<i>Rapistrum rugosum</i>	Turnip Weed	Yes
Campanulaceae	<i>Wahlenbergia gracilis</i>	Sprawling Bluebell	
Campanulaceae	<i>Wahlenbergia stricta</i>	Tall Bluebell	
Caryophyllaceae	<i>Cerastium glomeratum</i>	Mouse-ear Chickweed	Yes

Family	Scientific Name	Common Name	Exotic
Caryophyllaceae	<i>Paronychia brasiliiana</i>	Chilean Whitlow Wort, Brazilian Whitlow	Yes
Caryophyllaceae	<i>Petrorhagia dubia</i>		Yes
Caryophyllaceae	<i>Silene gallica</i>	French Catchfly	Yes
Caryophyllaceae	<i>Stellaria media</i>	Common Chickweed	Yes
Chenopodiaceae	<i>Chenopodium album</i>	Fat Hen	Yes
Chenopodiaceae	<i>Einadia nutans</i> subsp. <i>nutans</i>	Climbing Saltbush	
Chenopodiaceae	<i>Einadia polygonoides</i>	Knotweed Goosefoot	
Clusiaceae	<i>Hypericum perforatum</i>	St. Johns Wort	Yes
Cyperaceae	<i>Carex inversa</i>	Knob Sedge	
Cyperaceae	<i>Cyperus eragrostis</i>	Umbrella Sedge	Yes
Cyperaceae	<i>Isolepis hookeriana</i>		
Cyperaceae	<i>Schoenus apogon</i>	Fluke Bogrush	
Fabaceae (Faboideae)	<i>Medicago arabica</i>	Spotted Burr Medic	Yes
Fabaceae (Faboideae)	<i>Medicago polymorpha</i>	Burr Medic	Yes
Fabaceae (Faboideae)	<i>Medicago praecox</i>	Small-leaved Burr Medic	Yes
Fabaceae (Faboideae)	<i>Trifolium angustifolium</i>	Narrow-leaved Clover	Yes
Fabaceae (Faboideae)	<i>Trifolium arvense</i> var. <i>arvense</i>	Haresfoot Clover	Yes
Fabaceae (Faboideae)	<i>Trifolium campestre</i>	Hop Clover	Yes
Fabaceae (Faboideae)	<i>Trifolium repens</i>	White Clover	Yes
Fabaceae (Faboideae)	<i>Vicia sativa</i>	Common vetch	Yes
Fumariaceae	<i>Fumaria muralis</i>	Wall Fumitory	Yes
Gentianaceae	<i>Centaurium tenuiflorum</i>	Branched Centaury, Slender centaury	Yes
Geraniaceae	<i>Erodium cicutarium</i>	Common Crowfoot	Yes
Geraniaceae	<i>Geranium retrorsum</i>	Cranesbill Geranium	
Geraniaceae	<i>Geranium solanderi</i>	Native Geranium	
Haloragaceae	<i>Haloragis heterophylla</i>	Variable Raspwort	
Iridaceae	<i>Romulea minutiflora</i>	Small-flowered Onion Grass	Yes
Juncaceae	<i>Juncus bufonius</i>	Toad Rush	Yes
Juncaceae	<i>Juncus sarophorus</i>		
Juncaceae	<i>Juncus usitatus</i>		
Lamiaceae	<i>Ajuga australis</i>	Austral Bugle	
Lamiaceae	<i>Marrubium vulgare</i>	White Horehound	Yes
Lamiaceae	<i>Salvia verbenaca</i>	Vervain	Yes

Family	Scientific Name	Common Name	Exotic
Lomandraceae	<i>Lomandra filiformis subsp. filiformis</i>		
Lomandraceae	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush	
Lomandraceae	<i>Lomandra multiflora</i>	Many-flowered Mat-rush	
Loranthaceae	<i>Amyema pendula subsp. pendula</i>		
Malvaceae	<i>Brachychiton populneus</i>	Kurrajong	
Malvaceae	<i>Malva parviflora</i>	Small-flowered Mallow	Yes

APPENDIX B :

BAM Plot Data



plot	pct	area	patchsize	conditionclass	compTree	compShrub	compGrass	compForbs	compFerns	compOther	strucTree	strucShrub	strucGrass	strucForbs	strucFerns	strucOther	funLargeTrees	funHollowtrees	funLitterCover	funLenFallenLogs	funTreeStem5to9	funTreeStem10to19	funTreeStem20to29	funTreeStem30to49	funTreeStem50to79	funTreeRegen	funHighThreatExotic
1	266	25.1	100	Remnant	1	0	0	1	0	0	40.0	0.0	0.0	0.1	0.0	0.0	4	1	21.6	1.5	0	0	0	0	2	0	30.0
2	266	25.1	100	Remnant	1	0	1	1	0	0	20.0	0.0	0.2	0.2	0.0	0.0	3	1	29.6	19.5	0	1	0	1	2	0	30.0
3	266	25.1	100	Remnant	3	0	1	5	0	0	38.0	0.0	0.1	1.9	0.0	0.0	4	1	22.6	17.0	0	0	0	0	3	1	5.0
4	266	25.1	100	Remnant	1	0	2	1	0	0	30.0	0.0	0.2	0.1	0.0	0.0	2	1	24.0	1.5	0	0	0	0	1	0	5.0
8	266	25.1	100	Remnant	2	1	6	9	0	0	25.2	0.4	32.1	1.7	0.0	0.0	3	1	3.0	8.0	0	0	0	1	1	1	0.0
9	266	25.1	100	Remnant	1	0	9	7	0	0	30.0	0.0	15.2	3.3	0.0	0.0	1	1	7.0	0.0	1	1	1	0	1	1	0.7
10	266	13.9	100	DNG	0	0	6	3	0	0	0.0	0.0	45.3	0.5	0.0	0.0	0	0	2.0	0.0	0	0	0	0	0	0	3.0
11	266	25.1	100	Remnant	2	0	6	4	0	0	25.0	0.0	17.3	1.6	0.0	0.0	1	1	3.0	8.5	0	0	1	1	1	0	1.0
12	266	13.9	100	DNG	0	0	4	3	0	0	0.0	0.0	35.0	0.5	0.0	0.0	0	0	2.0	0.0	0	0	0	0	0	0	0.1
13	266	25.1	100	Remnant	1	0	4	2	0	1	20.0	0.0	14.0	0.4	0.0	1.0	2	1	1.0	11.5	0	0	0	0	0	0	0.3
14	266	13.9	100	DNG	0	0	4	2	0	0	0.0	0.0	1.7	0.3	0.0	0.0	0	0	1.0	0.0	0	0	0	0	0	0	4.0
15	266	13.9	100	DNG	0	0	6	1	0	0	0.0	0.0	35.6	0.2	0.0	0.0	0	0	5.0	0.0	0	0	0	0	0	0	5.2
16	266	13.9	100	DNG	0	0	4	2	0	0	0.0	0.0	32.0	0.5	0.0	0.0	0	0	1.0	0.0	0	0	0	0	0	0	1.0

APPENDIX C :

BAM Calculator Credit Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00037520/BAAS19019/23/00037521	21204 - Molong	14/04/2023
Assessor Name	Report Created	BAM Data version *
Matthew Freeman	21/06/2023	58
Assessor Number	BAM Case Status	Date Finalised
BAAS19019	Open	To be finalised
Assessment Revision	Assessment Type	BOS entry trigger
0	Part 4 Developments (General)	Test of significance

* 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 SAI	Ecosystem credits

White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion

1	266_Remnant	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 Ri	40.4	22.6	17.7	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	249
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BAM Credit Summary Report

2	266_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 Ri	3.3	3.3	12.1	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	0
											Subtotal	249
											Total	249

Species credits for threatened species

BAM Credit Summary Report

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 SAI	Species credits
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FIGURES



Figure 1. Site map

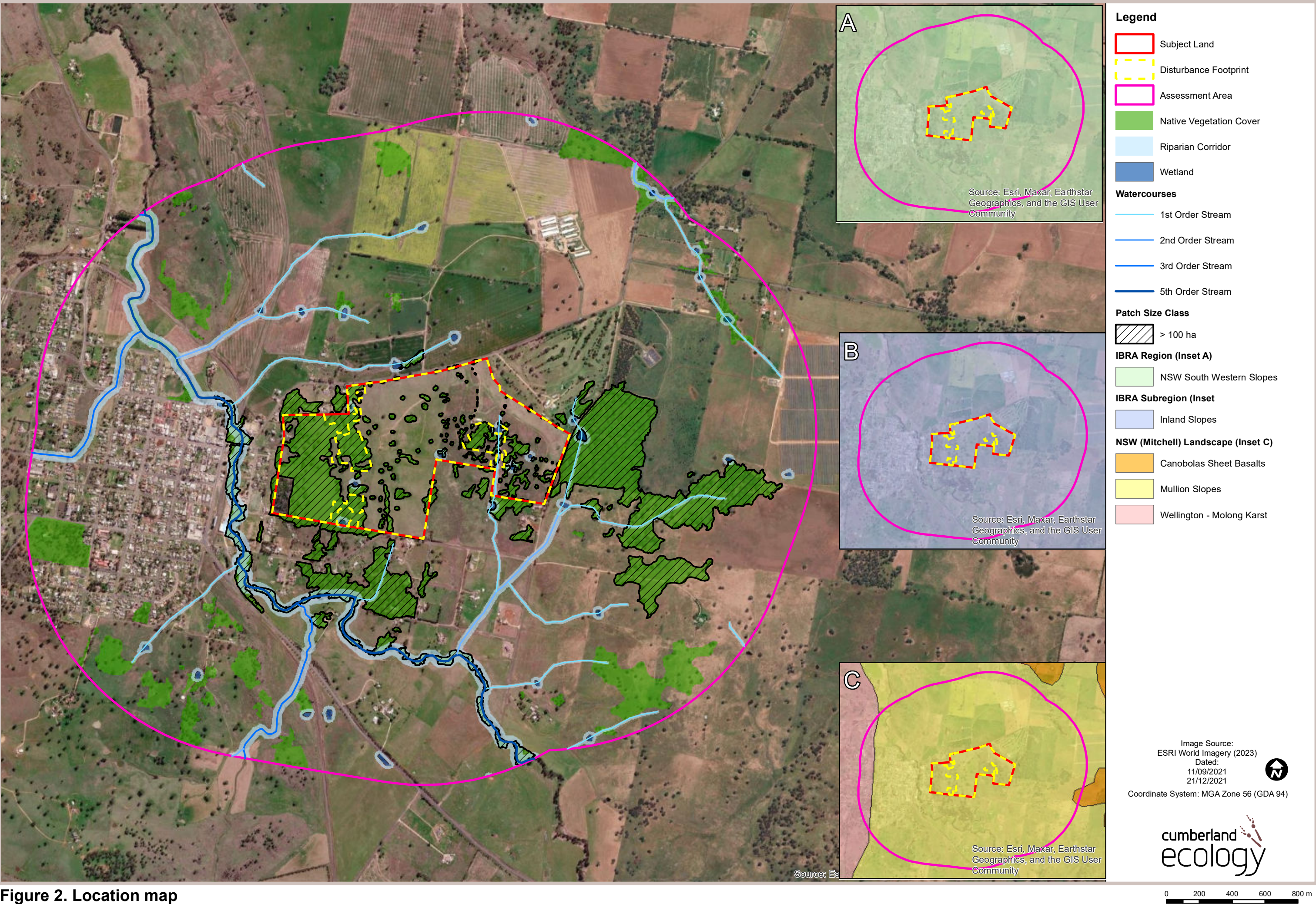


Figure 2. Location map



Legend

Subject Land

Disturbance Footprint

Project Layout

Management Zone

Avoided

Cleared

Retained

Image Source:
Image © Nearmap
Dated: 02/10/2022

Data Source:
Sixmaps Clip & Ship
NSW Spatial Services

Heath Consulting
Engineers (2022)

Coordinate System: MGA Zone 56 (GDA 94)

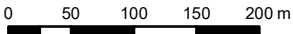
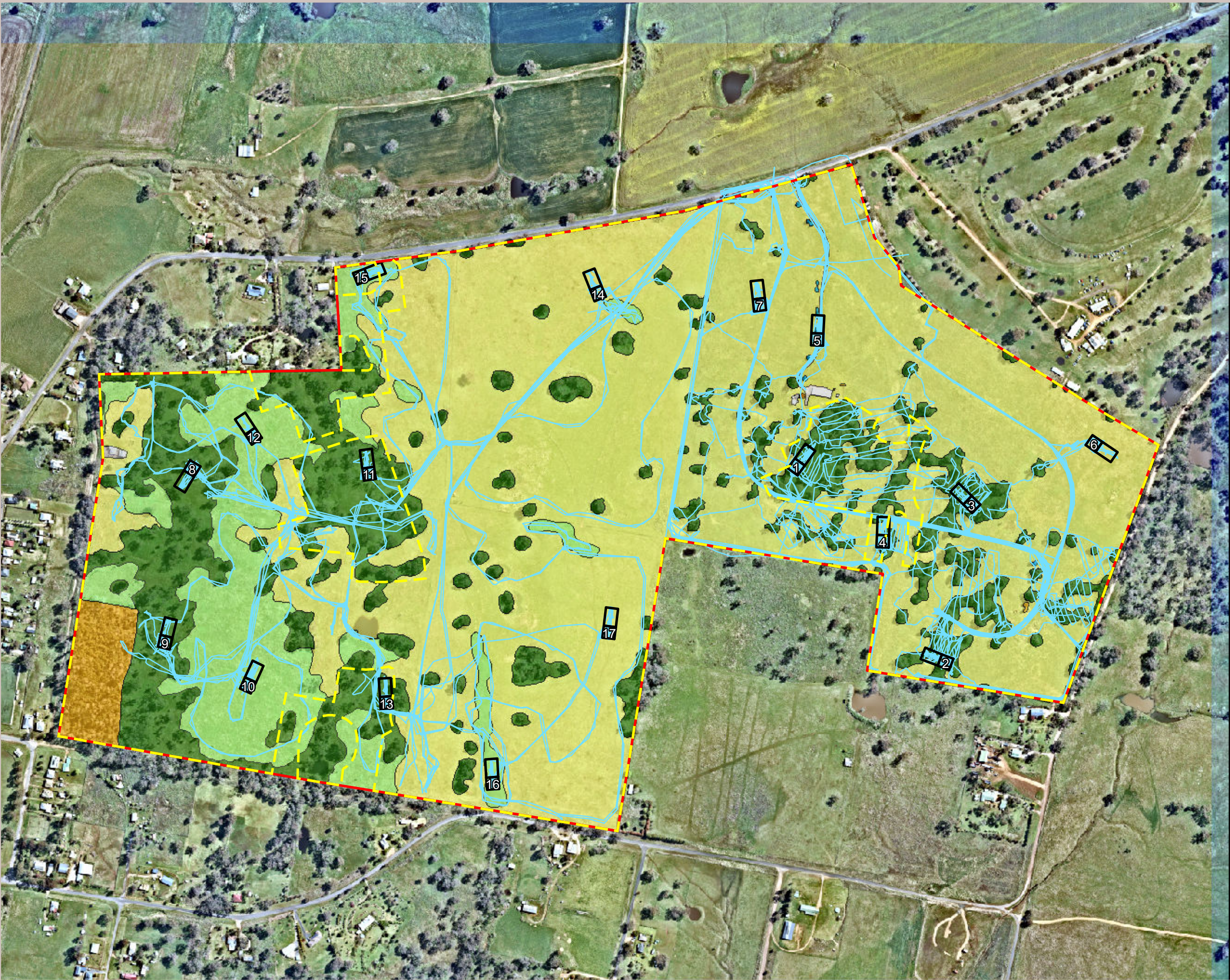


Figure 3. Layout of the project



Legend

- Subject Land
- Disturbance Footprint
- BAM Plot
- Random Meander Transects

Plant Community Type

PCT 266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion - Remnant

PCT 266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion - DNG

Other Vegetation Type

- Planted Native Vegetation
- Exotic Woody Vegetation
- Exotic Dominated Grassland
- Cleared Land

Image Source:
Image © Nearmap
Dated: 02/10/2022

Data Source:
Sixmaps Clip & Ship
NSW Spatial Services

Heath Consulting
Engineers (2022)



Coordinate System: MGA Zone 56 (GDA 94)

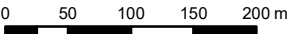
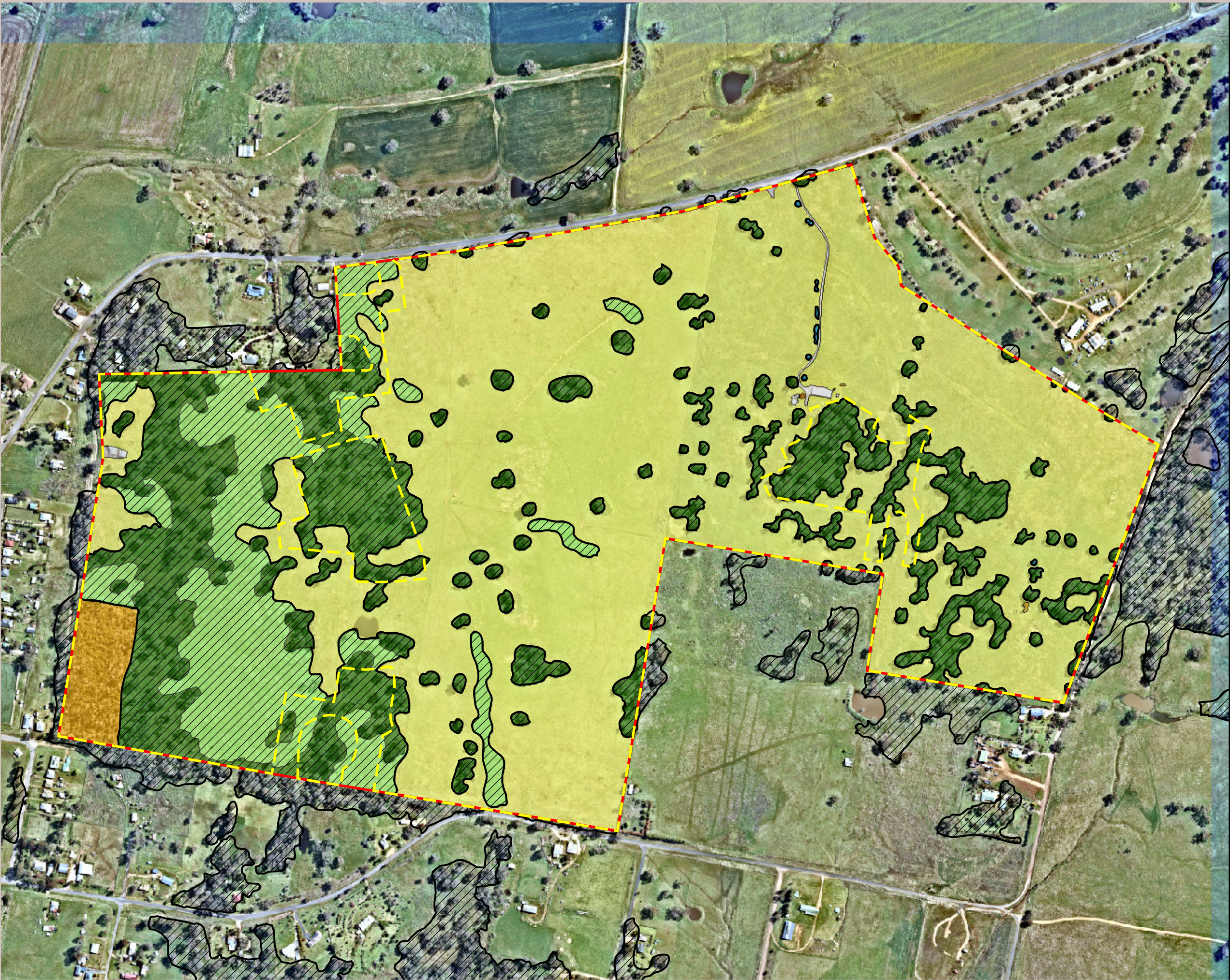


Figure 4. Field survey locations



Figure 5. Native vegetation extent within the subject land



Legend

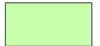
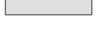
-  Subject Land
-  Disturbance Footprint
- Patch Size Class**
 -  > 100 ha
- Plant Community Type**
 -  PCT 266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion - Remnant
 -  PCT 266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion - DNG
- Other Vegetation Type**
 -  Planted Native Vegetation
 -  Exotic Woody Vegetation
 -  Exotic Dominated Grassland
 -  Cleared Land

Image Source:
Image © Nearmap
Dated: 02/10/2022

Data Source:
Sixmaps Clip & Ship
NSW Spatial Services

Heath Consulting
Engineers (2022)



Coordinate System: MGA Zone 56 (GDA 94)

cumberland
ecology

0 50 100 150 200 m

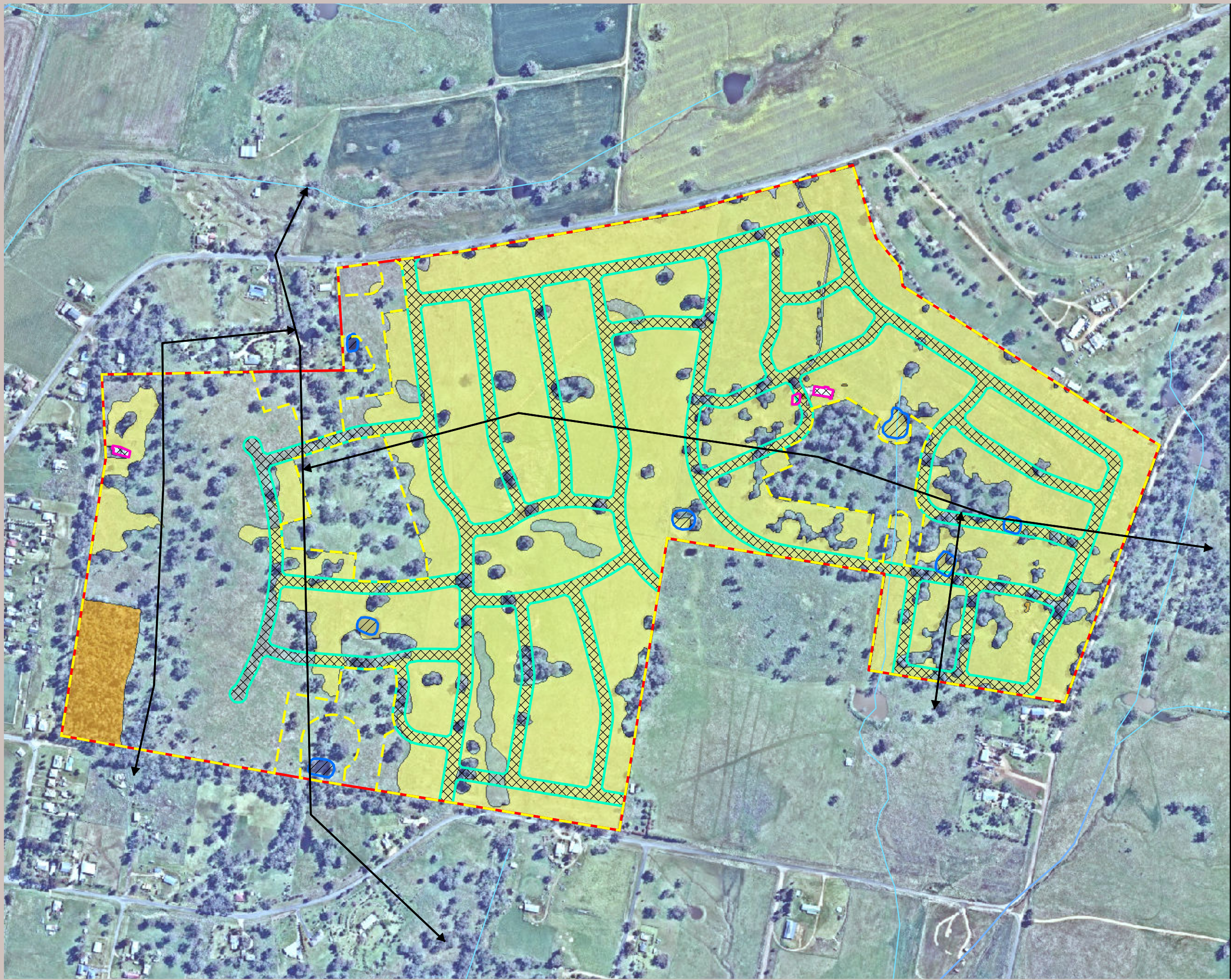
Figure 6. Plant community types within the subject land



Figure 7. Threatened ecological communities within the subject land



Figure 8. Vegetation Zones



Legend

- Subject Land
- Disturbance Footprint
- Vehicle Strike
- Human-made Structures
- Habitat Connectivity
- Waterbodies, Water Quality and Hydrological Processes**
- 1st Order Stream
- 2nd Order Stream
- Dams
- Exotic Vegetation**
- Exotic Woody Vegetation
- Exotic Dominated Grassland

Image Source:
Image © Nearmap
Dated: 02/10/2022

Data Source:
Sixmaps Clip & Ship
NSW Spatial Services

Heath Consulting
Engineers (2022)



Coordinate System: MGA Zone 56 (GDA 94)

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ecology

0 50 100 150 200 m

Figure 9. Prescribed impacts



Figure 10. Thresholds for assessment