Department of Planning and Environment

Preliminary Biodiversity Development Assessment Report

Proposed rezoning for residential use, Lots 70, 73 & 77 DP 1006688, 407 & 457 Crookwell Road, Kingsdale.

Prepared by Ms Rebecca Hogan, BAAS17090

Preliminary Report – February 2023

Hayes Environmental reference: 21009

Document control

Version	Date	Author	Details
1	22/02/2023	R. Hogan	Preliminary report for Planning Proposal

Summary

The subject property is identified as Lots 70, 73 & 77 DP 1006688, 407 & 457 Crookwell Road, Kingsdale. It is 50.7 hectares in size. The purpose of the planning proposal is to rezone the subject property for residential use, to enable subdivision creating up to 275 new residential lots, with sizes ranging from 700m2 to 2.5 hectares.

The development footprint (being all land that would be directly affected by the masterplan) is 48.8 hectares. This includes 3.3ha of land designated for open space and Aboriginal Archaeological conservation. It does not include a 1.9ha area designated as biodiversity conservation reserve.

Virtually all of the subject land has historically been cleared for agricultural use. The land is currently used for sheep grazing. Existing infrastructure includes a dwelling in the southeast with access from Crookwell Road, various sheds, tracks, fences, water tanks and irrigation lines. A patch of remnant woodland in moderate condition occurs on a knoll immediately west of the existing dwelling.

No part of the subject land is included on the Biodiversity Values Map. The BOS area of clearing threshold is 0.5ha. The masterplan would directly impact upon approximately 12.1ha of native vegetation (noting that 11.4ha of this area comprises low quality grassland with a vegetation integrity score below the offset threshold). Development in accordance with the masterplan would exceed the BOS area threshold.

A biodiversity constraints study was carried out across the subject property prior to development of the masterplan (Hayes Env, Feb 2022). The findings of the study were provided to Council and discussed with Council's biodiversity officer during a pre-lodgement meeting for the project in March 2022, and a general agreement made on the avoid and minimise strategy.

The avoid and minimise strategy was subsequently forwarded to the Department of Planning and Environment (DPE) regional Biodiversity and Conservation Division (BCD) for comment. The BCD responded in April 2022 with advice that they were broadly supportive of the strategy. The BCD recommended formal protection of avoided areas through conditions of consent, conservation covenant or other legal instrument.

The masterplan was designed to avoid and minimise impacts on biodiversity in accordance with the strategy and the advice of Council and the BCD. It contains the following:

i Retention of a 1.9ha conservation reserve on the hilltop in the southern part of the property. The reserve would retain the entirety of the existing patch of woodland in moderate condition (1.4ha) and would also include adjacent areas of native grassland (0.3ha), thus achieving regular (straightened) reserve boundaries by adding land to the reserve rather than by 'trimming' edges of the woodland patch.

ii Addition of a 25m wide 'handle' to the eastern side of the reserve to enable tree retention and planting to maintain canopy connectivity of the reserve to remnant woodland occurring on lands further to the east.

iii Creation of three larger lots, each approximately 1,800m^2 in size (proposed lots 50, 51 & 52), to the east of the reserve handle to enable retention of mature hollow-bearing trees, and maintain canopy connectivity of the reserve to remnant woodland occurring on lands further to the east.

iv Security of the reserve through zoning of the area as RE1, and placement of a conservation covenant across it. It is recommended that a Vegetation Management Plan be prepared for the reserve at the development application stage, to address mitigation of impacts, and to develop a plan to avoid long term loss of canopy density from senescence.

v It is recommended that conservation covenants also be placed on each of proposed Lots 50, 51 & 52 at the development application stage. These covenants shall identify trees that must be retained, and specify a method by which presence of mature native trees is retained in the long term.

All native vegetation within the subject land has been assessed as aligning with the BioNet Vegetation Classification PCT 1330 *Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion*.

This community is part of the BC Act listed CEEC *White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions*. All native vegetation within the subject land is considered to be part of this TEC. This TEC is listed to be at risk of Serious And Irreversible Impact (SAII).

PCT 1330 is also associated with the EPBC Act listed CEEC *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.* However, none of the vegetation zones on the subject land meet the specified condition criteria to be included within this listing.

Nineteen threatened 'ecosystem credit' fauna species are predicted to use the subject land.

Two threatened 'species credit' fauna species are assumed at this stage to use the subject land due to insufficient field survey to demonstrate absence under the BAM. It is recommended that further surveys are conducted for these species at the development application stage:

* Koala *Phascolarctos cinereus* - this species is listed as Endangered under both the BC Act and EPBC Act. It is not listed as a species at risk of SAII.
* Key's Matchstick Grasshopper *Keyacris scurra*. This species is listed as Endangered under the BC Act. It is not listed under the EPBC Act. It is not listed as a species at risk of SAII.

The development would directly impact upon 12.1 hectares of native vegetation, comprised of 0.7ha hectares of PCT 1330 woodland in poor condition and 11.4 hectares of PCT 1330 grassland (cleared woodland). All of the area of PCT 1330 woodland in moderate condition (1.4ha) would be retained within the biodiversity conservation reserve.

Residual indirect and prescribed impacts would be managed and mitigated through preparation of a Vegetation Management Plan for the conservation reserve, and preparation of wildlife protocols for clearing and demolition works. These plans should be prepared at the development application stage when detailed designs are available. No additional offsets for indirect or prescribed impacts appear warranted at this stage.

Table E1 Impacts that require an offset – ecosystem credits

Vegetation zone	PCT	TEC/EC	Impact area (ha)	Number of ecosystem credits required
PCT 1330b	Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands 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.	0.7 ha	8

Table E2 Impacts that require an offset – species credits

Common name	Scientific name	Loss of habitat (ha) or individuals	Number of species credits required
Key's Matchstick Grasshopper	*Keyacris scurra*	11.4 ha	59
Koala	*Phascolarctos cinereus*	0.7 ha	7

Contents

List of tables

List of figures

Shortened forms

APZ	asset protection zone
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BC Regulation	Biodiversity Conservation Regulation 2017 (NSW)
BDAR	Biodiversity Development Assessment Report
BOAMS	Biodiversity Offsets and Agreement Management System
BOS	Biodiversity Offsets Scheme
CEEC	critically endangered ecological community
DBH	diameter at breast height over bark
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EEC	endangered ecological community
HTW	high threat weed
IBRA	Interim Biogeographic Regionalisation for Australia

LLS Act	*Local Land Services Act 2013* (NSW)
MNES	matters of national environmental significance
NSW	New South Wales
PCT	plant community type
SAII	serious and irreversible impact
TBDC	Threatened Biodiversity Data Collection
TEC	threatened ecological community

Terms used in this BDAR

Assessment Area	1,237.1ha	The subject land and land within a 1500m buffer measured from the outside edge of the subject land.
Subject Property	50.7 ha	Lots 70, 73 & 77 DP 1006688, 407 & 457 Crookwell Road, Kingsdale
Subject Land	50.7 ha	Land that would be affected directly or indirectly by the proposed masterplan, considered to be the entirety of the subject property for this assessment.
Development footprint	48.8 ha	Land that would be affected directly by the proposed masterplan, for roads, residential lots, bushfire asset protection zones, services and stormwater infrastructure, and including temporary impact areas. The development footprint is the entire subject property, with exlcusion of the area proposed as biodiversity conservation reserve.
Open Space	3.3 ha	Areas of land proposed as public open space within the development footprint. Some of these areas would be directly impacted for installation of services and stormwater management. Some of the land impacted would be temporarily disturbed and then restored to green open space.
Biodiversity conservation reserve	1.9 ha	Land supporting moderate condition native woodland proposed to be retained as a reserve. This area would not be subject to direct impacts (such as those identified above) associated with the masterplan.

Declarations

i. Certification under clause 6.15 *Biodiversity Conservation Act 2016*

This BDAR is a preliminary document prepared for the purpose of a Planning Proposal. The credit assessment has not been finalised or submitted within BOAMS.

I certify that this report has otherwise been prepared based on the requirements of, and information provided under, the Biodiversity Assessment Method and clause 6.15 of the *Biodiversity Conservation Act 2016* (BC Act).

Signature:

Rebecca Hogan

Date: 22nd February 2023

BAM Assessor Accreditation no: BAAS17090

This BDAR has been prepared to meet the requirements of BAM 2020. Appendix A provides an assessment of compliance with the minimum information requirements outlined in BAM Appendix K.

ii. Details and experience of author/s and contributors

Authors and contributors

Name	BAM Assessor Accreditation no. (if relevant)	Position/Role	Tasks performed	Relevant qualifications & experience
Ms Rebecca Hogan	BAAS17090	Accredited Assessor Lead Ecologist Principal, Hayes Environmental	Project management; BDAR preparation & certification; BAM-C data entry and analysis; GIS work & figure preparation; BAM plot surveys (function & habitat attributes); Identification of Plant Community Type/s; Fauna habitat evaluation: Targeted threatened bird surveys.	BSc (environmental biology), UTS Sydney, 1996 MEngMngt, UTS Sydney, 2000 Executive member of the Ecological Consultants Association of NSW. 26 years of ecological consulting experience in the Sydney and greater Sydney region.
Mr Daniel Clark	n/a	Project Botanist	BAM plot surveys; Review and assistance with identification of plant community type/s; Targeted threatened plant surveys.	BSc (Hons) (Botany), University of Sydney, 2010 Cert. IV in General Horticulture, 2005 Cert. II in Bushland Regeneration, 2000 Cert. IV in Workplace Training and Assessment, 2011 Grad. Plant Science Internship, National Herbarium of NSW, Royal Botanic Gardens, 2009 Practicing member of the Ecological Consultants Association of NSW. 22 years of field botanist experience in the Sydney and greater Sydney region, including 10 years as a botanical consultant undertaking surveys for development impact assessment.

Name	BAM Assessor Accreditation no. (if relevant)	Position/Role	Tasks performed	Relevant qualifications & experience
Mr Graeme Bradburn	n/a	Orchid specialist	Targeted survey for *Caladenia tessellata*	DPE Approved Expert for *Caladenia tessellata* in the South East region. Extensive experience with native orchids in general and long field involvement in the searching, monitoring and conservation of threatened orchid species including *Caladenia tessellata*. Associate of the Centre for Australian National Biodiversity Research, authorised by the ANH Curator and CANBR Director. Mr Bradburn works in conjunction with the Wollongong, Nowra and Queanbeyan Biodiversity units of DPE.
Mr Deryk Engel	n/a	Project Fauna Surveyor Principal, Lesryk Environmental	Targeted surveys for threatened fauna	BEnvSc (Hons), University of Wollongong, 1990. Practicing member of the Ecological Consultants Association of NSW. Over 30 years of fauna field survey experience across a wide variety of landscapes throughout NSW.
Harry Engel	n/a	Fauna surveyor	Targeted surveys for threatened fauna	BMarSc 8 years of experience carrying out fauna field surveys and biodiversity project management, based in Sydney
Joseph Morton	n/a	Fauna surveyor	Targeted surveys for threatened fauna	BEnvBio
Chelsea Tiller	n/a	Fauna surveyor	Targeted surveys for threatened fauna	BSocSc

iii. Conflict of interest

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

This declaration has been made in the interests of full disclosure to the decision-maker. Full disclosure has also been provided to the client.

Signature:

Rebecca Hogan

Date: 22nd February 2023

BAM Assessor Accreditation no: BAAS17090

Stage 1: Biodiversity assessment

1. Introduction

1.1 Proposed development

1.1.1 Development overview

The purpose of the planning proposal is to rezone the subject property for residential use, to enable subdivision creating up to 275 new residential lots, with sizes ranging from 700m2 to 2.5 hectares.

A concept masterplan has been prepared that reflects the site's opportunities and constraints in the areas of biodiversity, bushfire management, traffic planning, Aboriginal heritage, biophysical strategic agricultural lands, and stormwater and wastewater management.

Land identified during ecological studies as being of higher biodiversity value would be retained within a biodiversity conservation reserve. Additional open space areas would be created for management of stormwater. An Aboriginal Archaeological Conservation Area would be established in the south east.

The project is a development that requires consent under Part 4 of the EP&A Act.

1.1.2 Location

The subject property is identified as Lots 70, 73 & 77 DP 1006688, 407 & 457 Crookwell Road, Kingsdale. It is 50.7 hectares in size. It is located on the northwestern fringe of Goulburn, approximately 3km from Goulburn town centre, within the Goulburn Mulwaree Local Government Area.

The subject land (being land that would be affected either directly or indirectly by the masterplan) is considered to be the entirety of the subject property for this assessment.

Refer to Figure 1 (Site map) and Figure 2 (Location map).

1.1.3 Proposed development and the subject land

The subject land is zoned RU6 Transition under the *Goulburn Mulwaree Local Environmental Plan 2009* (GMLEP), with a minimum lot size of 10 hectares. Virtually all of the subject land has historically been cleared for agricultural use. The land is currently used for sheep grazing. Existing infrastructure includes a dwelling in the southeast with access from Crookwell Road, various sheds, tracks, fences, water tanks and irrigation lines.

A patch of remnant woodland in moderate condition occurs on a knoll immediately west of the existing dwelling. Additional native trees and patches of native grassland occur elsewhere within the property.

The proposal would rezone the majority of the land to permit residential lot sizes in the order of 700m^2 to 1,000m^2. The northern and northwestern parts of the land would be zoned for large lots in the order of 3,500m^2 to 2.5 hectares. The patch of moderate condition woodland is proposed to be retained within a biodiversity conservation reserve.

The development footprint (being all land that would be directly affected by the masterplan, including temporary impacts for construction) is 48.8 hectares. For the purpose of this assessment, the development footprint includes the 3.3 hectares of land designated for open space and Aboriginal Archaeological conservation, as impacts on these areas are uncertain at this planning stage.

Provision for bushfire planning, stormwater management and wastewater management has been assessed and considered in separate reports (listed in Ch1.1.4 below). Direct impacts related to these matters would be contained within the development footprint.

The biodiversity conservation reserve (1.9 hectares) would not be subject to direct impacts associated with development in accordance with the masterplan.

Refer to Figure 3 (Development layout).

1.1.4 Other documentation

Documents referred to and relied upon in this assessment include:

* *Development Masterplan*, prepared by Southern Regional Land Engineering (SRLE), December 2022;
* Landscape scheme, prepared by Habit8 Landscape Architecture and Urbanism, 08/02/2023;
* *Strategic Bush Fire Study* and accompanying *Strategic Bush Fire Study Site Plan*, prepared by SOWDES, 19/11/2022;
* *Water Cycle Management Study*, prepared by SEEC, 22/12/2022.

1.2 Biodiversity Offsets Scheme entry

No part of the subject land is included on the Biodiversity Values Map. The project would not exceed the map threshold.

The minimum lot size of the subject land is 10 hectares. The BOS area of clearing threshold for this land is 0.5ha. The extent of impact on native vegetation would be 12.1 hectares. Whilst a large portion of this area is grassland with a low percent cover of native plants, the adjusted extent would still well exceed the threshold. The project would exceed the area threshold.

The streamlined assessment modules set out in Appendices B, C and D of BAM 2020 do not apply.

1.3 Excluded impacts

There are no biodiversity values not assessed under BAM 2020 (listed in s1.5 of BAM 2020) of relevance to the subject land. No areas of LLS Act Category 1 – exempt land have been identified within the subject land.

1.4 Matters of national environmental significance

Native vegetation within the subject land is a plant community type that is associated with a critically endangered box-gum woodland listed under the EPBC Act. However, none of the vegetation zones within the subject land meet the minimum condition critieria to be included within the EPBC Act listing.

Six of the threatened fauna species predicted to occur (ecosystem credit species) are listed as threatened under the Commonwealth EPBC Act. These six species are mobile and wide-ranging and do not reside or breed within the subject land.

One candidate threatened species (species credit species) assumed to utilise the subject land, the Koala *Phascolarctos cinereus*, is listed as endangered under the EPBC Act. This species is not considered likely to occur, but is assumed present for this assessment due to insufficient survey to demonstrate absence under current guidelines.

Impacts on matters of national environmental significance that are likely to result from rezoning of the subject land are not likely to be significant. On this basis, referral of the project to the Commonwealth Department of Climate Change, Energy, Environment and Water (DCCEEW) under the EPBC Act is not required. A review of this assessment should be undertaken at the development application stage.

Refer to Appendix B (Matters of national environmental significance - MNES) for a summary of details provided throughout the BDAR.

1.5 Information sources

Relevant legislation and policies for this report include:

* Commonwealth Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act)
* Amending Agreement No. 1 – Amending the Original Agreement relating to environmental assessment. Commonwealth of Australia and the State of New South Wales. 2020.
* NSW Biodiversity Conservation Act 2016 (BC Act)
* NSW Biodiversity Conservation Regulation 2017 (BC Reg)
* NSW Biodiversity Assessment Method Order 2020 (BAM)
* Goulburn Mulwaree Local Environmental Plan 2009 (GMLEP)

Relevant guidelines for this report include:

* *Biodiversity Assessment Method Operational Manual – Stage 1*. State of NSW and Department of Planning, Industry & Environment (2020).
* *Biodiversity Assessment Method Operational Manual – Stage 2*. State of NSW and Department of Planning, Industry & Environment (2019).
* *NSW Survey Guide for Threatened Frogs.* Department of Planning, Industry & Environment (2020).
* Threatened reptiles, Biodiversity Assessment Method survey guide. Department of Planning and Environment (2022).
* NSW survey guide – 'Species credit' threatened bats and their habitats (2018).
* Surveying threatened plants and their habitats. NSW survey guide for the Biodiversity Assessment Method (2020). Department of Planning, Industry & Environment (2020).
* Flora species with specific survey requirements. NSW Office of Environment & Heritage.
* Guide for mapping threatened species for inclusion in the NSW regulatory framework. Department of Planning, Industry & Environment (2020).
* Threatened biodiversity survey and assessment: Guidelines for developments and activities. NSW Department of Environment and Conservation (2004, in draft).

Data sources researched include:

* NSW Bionet (www.bionet.nsw.gov.au): Vegetation Classification tool, Threatened Biodiversity Data Collection (TBDC), and Atlas records.
* Threatened biodiversity profiles. NSW Office of Environment & Heritage.
* *A Directory of Important Wetlands in Australia*, Third Edition, Environment Australia (2001). http://www.environment.gov.au/water/wetlands/publications/directory-important-wetlands-australia-third-edition.
* SEED | Sharing and Enabling Environmental Data (www.seed.nsw.gov.au): NSW Interim Biogeographic Regions of Australia (IBRA) regions and subregions, NSW Mitchell Landscapes (version 3.1), State Vegetation Type Map – SVTM_NSW_Extant_PCT.
* Aerial photography of the site: Department of Lands SIX Viewer, Google Maps 2022 and Nearmap (various dates up to 15th February 2022).

2. Methods

2.1 Site context methods

2.1.1 Landscape features

A general inspection of the subject property was undertaken by Ms Rebecca Hogan on the 13th August 2021. Site features were compared in the field to high resolution aerial images of the land (Nearmap, various dates up to 15/02/2022).

2.1.2 Native vegetation cover

The assessment area is characterised by predominantly cleared agricultural land. Calculation of native woodland and forest cover in the assessment area was obtained through interpretation of aerial images (Nearmap, various dates up to 15/02/2022) and Ms Rebecca Hogan's knowledge of the local area.

In relation to grassland areas, it is not possible to ascertain the percent cover of native plants without intensive field survey beyond the feasible scope of this assessment. Grassland in the local area typically occupies land that was once woodland or forest but has historically been cleared and managed for grazing. Different land management practices have resulted in some properties containing paddocks with a high proportion (15-70%) of native grasses, and other properties containing paddocks that are almost entirely (0-15%) composed of exotic grasses.

All Plant Community Types (PCTs) relevant to the subject land are of a woodland or forest formation. Predicted pre-European PCT mapping (SEED – SVTM_NSW_1750_PCT) indicates the whole of the subject land would once have supported a grassy box woodland. There are no natural grassland PCTs that would be impacted by the project and as such, require an estimate of native grassland cover to apply threatened species filters.

2.2 Native vegetation, threatened ecological communities and vegetation integrity methods

2.2.1 Existing information

2.2.1.1 Existing regional vegetation maps

The remnant patch of woodland in the vicinity of the existing dwelling is shown on the most recent regional vegetation maps as PCT 3376 *Southern Tableland Grassy Box Woodland* (SEED: SVTM_NSW_Extant_PCT).

PCT 3376 is also mapped as occurring on adjacent lands to the east, and is indicated as being the original PCT present across the whole of the subject land prior to European settlement (SEED: SVTM_NSW_1750_PCT).

Earlier mapping of the region (SEED: SouthCoast_SCIVI_V14_E_2230) does not show any native vegetation present on the subject land. Woodland on adjacent lands to the east is mapped as *Tableland Grassy Box-Gum Woodland* (p24). This community was the profile source for PCT 1330 *Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion*, which in turn is a parent PCT for both PCTs 3373 and 3376.

A review was undertaken of the scientific descriptions for these communities within the BioNet Vegetation Classification database.

2.2.1.2 Threatened Ecological Communities potentially relevant to the subject land

PCTs 1330, 3373 and 3376 are all associated 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* listed as 'critically endangered' under the BC Act; and
* *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* listed as 'critically endangered' under the EPBC Act.

2.2.2 Mapping native vegetation extent

Mapping of native vegetation extent and of vegetation zones within the subject land was based on:

* site inspections by Ms Rebecca Hogan on the 13th August 2021, 1st November 2021 and 22nd November 2022;
* consideration of high resolution Nearmap aerial images spanning several years and seasons (in regard to extent of the woodland formations);
* random meanders and sixty-six botanical spot surveys by Mr Daniel Clark over the 7th October 2021 and 22nd November 2022 (including calculation of the percent cover of native plants in the groundlayer and consideration of the reliability of the calculation based on species present and the season);
* verification of percent cover of native plants by Mr Daniel Clarke during BAM-VIS plot surveys on the 1st November 2022; and
* verification of percent cover of native plants by Mr Daniel Clarke during targeted threatened plant surveys on the 22nd and 28th November 2022.

Refer to Appendix C (Vegetation survey data) and Figure 4 (Flora field survey locations).

2.2.3 Plot-based vegetation survey

Five BAM-VIS plot surveys were undertaken within the subject property by Ms Rebecca Hogan and Mr Daniel Clark on the 1st November 2021.

The method uses a 20m x 20m plot to assess composition and structure, within a 20m x 50m plot to assess function attributes, with five 1m^2 sub-plots to assess litter cover, as set out in BAM 2020. Plot

data was collected in accordance with BAM 2020 and is provided in Appendix C (Vegetation survey data).

The number of plots surveyed for each zone was based on the requirements in Table 3 of BAM 2020 Ch4.3.4.

Plot locations were selected using a random point generator within the relevant vegetation zone polygons, and then due to site and zone constraints, the direction was selected to ensure the plot remained within the zone and was representative of the zone. Plots were not located across ecotones or across areas more substantially degraded by stock camps, gateways or farm tracks.

Refer to Figure 4 (Flora field survey locations).

2.2.4 Vegetation integrity survey

Vegetation integrity scores were calculated using data obtained from the plot-based survey described in Ch 2.2.3 above and formulae embedded in the BAM-Calculator. The calculation used standard condition benchmarks within the BAM-Calculator (as at 22nd February 2023).

2.3 Threatened flora survey methods

2.3.1 Review of existing information

The BAM-Calculator (Part 4 Developments) was used to generate a list of relevant threatened species on the basis of IBRA subregion (Monaro SEH16), native vegetation cover class in the assessment area (0-10%) and patch size class (25-<100ha).

A review was undertaken of habitat and constraints information held in the TBDC in relation to the list of relevant species, and geographic and habitat constraints set out in the BAM-Calculator.

A search was also undertaken within the BioNet Atlas (sightings) database for records of all threatened species on and in the vicinity of the subject land.

2.3.2 Habitat constraints assessment

Site inspections were conducted by Ms Rebecca Hogan on the 13th August 2021, 1st November 2021 and 22nd November 2022, partly on foot and partly by vehicle.

On all occasions, a primary purpose of the inspection was to identify habitat constraints and microhabitats of potential value for relevant threatened species.

2.3.3 Field surveys

Targeted surveys for candidate threatened plant species were conducted across the subject property over two survey periods:

- Spring 2021 (7th October 2021 & 1st November 2021)
- Spring 2022 (3rd October 2022, 22nd November 2022 & 28th November 2022)

Species were arranged into the following survey groups on the basis of plant size and strata, and survey period:

- Terrestrial orchids (2);
- Ground layer herbs (6);
- Trees (1).

2.3.3.1 Terrestrial orchids

Target species (2): Thick-lip Spider Orchid *Caladenia tessellata* (Oct) & Tarengo Leek Orchid *Prasophyllum petilum* (Oct).

Orchid specialist, Mr Graeme Bradburn, conducted a targeted random meander survey for both *Caladenia tessellata* and *Prasophyllum petilum* across the subject land on the 3rd October 2022.

Mr Bradburn observed a reference population of *Caladenia tessellata* at Nerriga in Morton National Park to be in flower on the 4th October 2022 (this is the only known reference site on public land), and a reference population of *Prasophyllum petilum* at Boorowa to be in flower on the 2nd October 2022. Both reference populations were noted to be flowering well this season.

Mr Bradburn additionally noted that the subject land is substantially altered and grazed, and as such, does not provide any suitable habitat for either of these orchid species. No orchids of any species were observed on the property.

2.3.3.2 Ground layer herbs

Target species (6): Aromatic Peppercress *Lepidium hyssopifolium* (Oct to Dec), Hoary Sunray, *Leucochrysum albicans var tricolour* (Sep to Apr), Button Wrinklewort *Rutidosis leptorhynchoides* (all year), Small Purple-pea *Swainsona recta* (Oct to Nov), Silky Swainson-pea *Swainsona sericea* (Sep to Nov) and Austral Toadflax *Thesium australe* (Nov to Feb).

Surveys included:

- Targeted surveys using the parallel traverse method (*Surveying threatened plants and their habitats. NSW survey guide for the Biodiversity Assessment Method,* DPIE 2020) were conducted to target the six ground layer species on the 22nd and 28th November 2022 by Mr Daniel Clarke (a single set of traverses was used for all six species[1]). Traverses were conducted

[1] *The DPIE guidelines recommend that no more than 5 species are targeted in each set of traverses. It was deemed appropriate for this project that all 6 species were surveyed at the same time, given the experience of the surveyor (Daniel Clarke), the open and simplified nature of the vegetation present across the study area, and noting that two of the species are from the same genus.*

in all areas of native vegetation identified during preliminary surveys in October 2021, and additional areas where native plant cover was found to have increased to greater than 15% in the ground layer. Traverses were spaced 10m apart, and walked at an average speed of 1km/hr, a total effort of approximately 7 person-hours.

* Random meander and sixty-two spot surveys (approximately 15m radius at each spot) were conducted by Mr Daniel Clarke across all parts of Lot 407 on the 7th October 2021 (over approximately 6 hours), and an additional random meander and four spot surveys conducted on Lot 457 on the 22nd November 2022 (over approximately 1 hour);
* Five comprehensive BAM-VIS plot surveys were conducted within areas of native vegetation on the 1st November 2021, with botanical identification by Mr Daniel Clarke.

Refer to Figure 4 (Flora field survey locations).

2.3.3.3 Trees

Target species (1): Paddy's River Box *Eucalyptus macarthurii* (all year).

The subject land is predominantly open grassland with occasional isolated trees. Every tree within the subject land was inspected and identified by Mr Daniel Clarke during the course of the random meander and parallel traverse survey work.

2.4 Threatened fauna survey methods

2.4.1 Review of existing information

The BAM-Calculator (Part 4 Developments) was used to generate a list of relevant threatened species on the basis of IBRA subregion (Monaro SEH16), native vegetation cover class in the assessment area (0-10%) and patch size class (25-<100ha).

A review was undertaken of habitat and constraints information held in the TBDC in relation to the list of relevant species, and geographic and habitat constraints set out in the BAM-Calculator.

A search was also undertaken within the BioNet Atlas (sightings) database for records of all threatened species on and in the vicinity of the subject land (with a final check on the 22nd February 2022).

2.4.2 Habitat constraints assessment

Site inspections were conducted by Ms Rebecca Hogan on the 13th August 2021, 1st November 2021 and 22nd November 2022, partly on foot and partly by vehicle.

On all occasions, a primary purpose of the inspection was to identify habitat constraints and microhabitats of potential value for relevant threatened species.

The habitat assessment included consideration of vegetation structure and diversity, identification of hollow-bearing trees (particularly noting presence of medium and large hollows), and identification of other specific elements such as caves and rock habitat, watercourses and dams, presence of *Allocasuarina* species, mistletoes, termite mounds, quantity and size of fallen timber and logs, burrows etc.

An additional detailed hollow-bearing tree survey was conducted by Lesryk Environmental on the 12th October 2021. Refer to Figure 5 (Fauna field survey locations).

2.4.3 Field surveys

Targeted fauna surveys were conducted across the subject property over three survey periods:

* August 2021 (13th August 2021)
* October 2021 (12th to 27th October 2021)
* November 2022 (4th to 24th November 2022)

A variety of methods and techniques were employed across the subject property. A summary of survey methods and effort employed to target relevant species is set out in Table 1. Refer to Figure 5 (Fauna field survey locations).

Refer to Appendix D (Fauna survey methods and data) for detailed descriptions of survey methods, specific timings and effort.

In addition to the targeted surveys, a record was maintained of all opportunistic sightings and of indirect evidence found, such as tracks, scats, scratchings and diggings.

Table 1 Summary of threatened fauna survey methods and effort

Survey Method	Cumulative survey effort
Dedicated bird surveys.	120 person-minutes (6 x 20mins)
Dedicated herpetofauna surveys	310 person-minutes (12 x 10mins with 2 to 3 surveyors at each location)
Echolocation detection targeting insectivorous bats (Anabat)	55 recording-nights (15 nights in 2021, 40 nights in 2022).

2.5 Weather conditions

Table 2 Environmental conditions during threatened species surveys

Survey undertaken (e.g. method / targeted species)	**Date**	**Time**	**Temperature** (min. & max.)	**Wind** (light, mod…)	**Rainfall** (mm)	**Other conditions relevant to the species**
Bird surveys (diurnal)	13/08/2021	11:45 to 13:00	11°C	mod	0	-
	01/11/2021	morning	min 4.9°C max 22.1°C	light	0	-
	22/11/2022	7:00 to 8:00	9°C	moderate	0	-
	12/10/2021	10:20 to 12:30	8°C	none	drizzle	-
	27/10/2021	16:45 to 18:30	23°C	light	0	-
	04/11/2022	13:00-15:00	12°C	light	0	-
	24/11/2022	14:00-16:00	22°C	light	0	-
Herpetofauna surveys (threatened lizards)	12/10/2021	10:20 to 12:30	8°C	none	drizzle	
	27/10/2021	16:45 to 18:30	23°C	light	0	
	04/11/2022	13:00-15:00	12°C	light	0	
Anabat recording (microchiropteran bats)	12-27/10/21	nocturnal	max 25.5°C	not recorded	18.4mm over the period.	-
	04-24/11/22	nocturnal	min 3.0°C max 25.3°C	variable	59mm over the period.	-
Parallel traverses (threatened plants)	22/11/2022	morning	min 4.0°C max 13.6°C	moderate	0	
	28/11/2022	morning	min 12.5°C max 21.0°C	light	0	
Random meander (orchids)	03/10/2022	not reported	min 3.4°C max 18.0°C	light	0	
Random meander and spot surveys (flora)	07/10/2021	morning	max 20°C	not recorded	0	
	28/11/2022	morning	min 12.5°C max 21.0°C	light	0	

Survey undertaken (e.g. method / targeted species)	**Date**	**Time**	**Temperature** (min. & max.)	**Wind** (light, mod…)	**Rainfall** (mm)	**Other conditions relevant to the species**
BAM-VIS plot surveys	01/11/2021	8:30-14:00	min 4.9°C max 22.1°C	light	0	-

* some weather data was recorded on site at the time of surveys and some data was later obtained from BOM records - Goulburn TAFE.

2.6 Limitations

2.6.1 Flora

Botanical surveys were conducted over a limited number of days during October 2021, October 2022 and November 2022. Whilst the surveys were thorough, it is noted some species are seasonal in appearance and may not have been visible at the time of the surveys, or able to be identified at the time of the surveys.

In relation to estimating the percent cover of native species (for the purpose of mapping extent of native vegetation), the surveys were conducted during periods of good rainfall and milder conditions in which grass and herbaceous species generally exhibited good growth. Consideration was given in the field to the potential for seasonal variability, and this was tested with verification checks across two years. The survey dates are believed appropriate to enable detection of the majority of native species present and an acceptable accuracy for estimation of percent cover of native species.

Targeted surveys for candidate threatened plant species were conducted in accordance with the TBDC designated timing and conditions. Surveys were conducted over two separate seasons and in accordance with relevant guidelines.

There is a high level of confidence in the accuracy and completeness of flora data used for the assessment.

Surveyor Licences:

Mr Daniel Clark

Scientific Licence, s132c of the NP&W Act 1974 (SL101495)

Mr Graeme Bradburn

Included with Scientific Licence, s132c of the NP&W Act 1974 (SL100750)

Included on ACT Government Scientific Licence (PL2018160)

Included with Forestry Corporation Forest Permit (RES100050)

2.6.2 Fauna

There are inherent limitations to fauna surveying due to the mobility of species and natural population fluctuations and movements. To address these limitations, fauna surveys were conducted over three separate survey periods, in accordance with the TBDC designated timing and conditions, and in accordance with relevant guidelines.

The fauna data is augmented by historical local records within the Bionet (sightings) database, and through searches for indirect evidence of fauna (such as nests, feathers, scats etc), which can persist on a site for some time.

There is a high level of confidence in the accuracy and completeness of fauna data used for the assessment.

Surveyor Licences:

Ms Rebecca Hogan

Scientific Licence, s132c of the NP&W Act 1974 (SL100778)

DPI Animal Care & Ethics Committee Approval (exp. September 2023)

Mr Deryk Engel

Scientific Licence, s132c of the NP&W Act 1974

DPI Animal Care & Ethics Committee Approval

Mr Harry Engel

Scientific Licence, s132c of the NP&W Act 1974

Mr Joseph Morton

Scientific Licence, s132c of the NP&W Act 1974

Ms Chelsea Tiller

Scientific Licence, s132c of the NP&W Act 1974

3. Site context

3.1 Assessment area

The assessment area is the subject land and land within a 1500m buffer measured from the outer boundary of the subject land. Refer to Figure 2 (Location map).

3.2 Landscape features

Landscape features identified within the subject land and assessment area are shown on Figure 1 (Site map) and Figure 2 (Location map), respectively.

3.2.1 IBRA bioregions and IBRA subregions

Subject Land:

- IBRA bioregion: South East Highlands (SEH)
- IBRA subregion: Monaro (SEH16)

Assessment Area:

- IBRA bioregion: South East Highlands (SEH)
- IBRA subregion: Monaro (SEH16)

3.2.2 Rivers, streams, estuaries and wetlands

The subject land and assessment area are entirely within the catchment of the Wollondilly River.

Three un-named tributaries to the Wollondilly River run through the subject land, the easternmost and central tributaries being first order streams and the western tributary being a second order stream (Strahler classification). All three tributaries are ephemeral grassy swales with a series of in-line farm dams. There are four dams within the subject land.

There are additional farm dams of various sizes scattered throughout the assessment area. The large Sooley Dam is located just to the northwest of the assessment area.

No important wetlands (DIWA) are present within or immediately downstream of the subject land.

3.2.3 Habitat connectivity

Woodland within the subject land is loosely connected (across Crookwell Road) to a larger patch of similar condition (moderate to poor) woodland on private land to the east. This patch is approximately 43ha in extent. It is substantially isolated from any area of intact native woodland.

Habitats within the subject land would not be part of a wildlife corridor and are not likely to be of particular importance for connectivity through the landscape.

3.2.4 Karst, caves, crevices, cliffs, rocks or other geological features of significance

No karst, caves, crevices, cliffs, or other such geological features occur within the subject land or assessment area. The nearest such habitat appears to be that associated with the Bungonia complex approximately 30km to the east.

The subject land does contain scattered patches of loose surface rocks and embedded boulders. These are characteristic of the region and are associated with derived native grassland patches on the property, so are assessed as habitat aligned with native vegetation.

3.2.5 Areas of outstanding biodiversity value

Not applicable.

3.2.6 NSW (Mitchell) landscape

Subject Land:

- *Rockley Plains* (Rop): Landscape 62% cleared

Assessment Area:

- *Rockley Plains* (Rop): Landscape 62% cleared
- Breadalbane Swamps and Lagoons (Brl): Landscape 91% cleared
- *Gundary Plains* (Ggp): Landscape 72% cleared

3.2.7 Additional landscape features identified in SEARs

Not applicable.

3.2.8 Soil hazard features

Not applicable.

3.3 Native vegetation cover

Approximately 56 hectares of native woodland and forest in variable condition occurs within the assessment area (based on woody vegetation cover evident on aerial images – Google Satellite 2022 and Nearmap, various dates).

Table 3 summarises the extent of native vegetation cover within the assessment area. Figure 2 (Location map) shows native vegetation cover within the assessment area.

Table 3 Native vegetation cover in the assessment area

Assessment area (ha)	1,237.1 ha
Total area of native vegetation cover (ha)	55.6 ha
Percentage of native vegetation cover (%)	4 %
Class (0-10, >10-30, >30-70 or >70%)	0-10%

4. Native vegetation, threatened ecological communities and vegetation integrity

4.1 Native vegetation extent

The subject land contains 13.8ha of native vegetation, comprised of 2.1ha of woodland and 11.7ha of cleared woodland (groundlayer only) containing some cover of native grasses.

Refer to Figure 1 (Site map).

4.1.1 Changes to the mapped native vegetation extent

Not relevant. Site inspection and field survey found that aerial images represent the current extent of native vegetation across the subject land.

4.1.2 Areas that are not native vegetation

Cleared grassland areas that were found through field inspection to be almost entirely exotic (0-15% cover of native plants) are not classed as native vegetation.

Existing built areas and ornamental gardens and exotic trees planted around existing buildings are not classed as native vegetation.

Refer to Figure 1 (Site map).

4.2 Plant community types

4.2.1 Overview

All native vegetation within the subject land has been assessed as aligning with the BioNet Vegetation Classification PCT 1330 *Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion*. A detailed description of the PCT is provided in the following subsection.

Table 4 PCTs identified within the subject land

PCT ID	PCT name	Subject land area (ha)
1330	Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion	13.8 ha
	Total area	13.8 ha

4.2.2 PCT 1330: Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion

4.2.2.1 PCT overview

Table 5 PCT 1330

PCT ID	1330
PCT name	Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
Vegetation formation	Grassy Woodlands
Vegetation class	Southern Tableland Grassy Woodlands
Per cent cleared value (%)	94 %
Extent within subject land (ha)	13.8 ha

Native trees present across the subject land include Brittle Gum *Eucalyptus mannifera,* Blakely's Red Gum *Eucalyptus blakelyi,* Yellow Box *Eucalyptus melliodora,* and Apple Box *Eucalyptus bridgesiana.* Two individuals of Buloke *Allocasuarina leuhmannii* occur at the edge of a patch of woodland to the southwest of the existing dwelling. A single Snowgum *Eucalyptus pauciflora* occurs near a drainage line on the eastern boundary of the land.

There is no native mid-layer.

The ground-layer contains a mix of native and exotic species in varying proportion. Native species recorded include Speargrass *Austrostipa scabra*, Pacific Bent Grass *Lachnagrostis filiformis*, Kneed Spear-grass *Austrostipa bigeniculata*, Dense Spear-grass *Austrostipa densiflora*, Australian Stonecrop *Crassula sieberiana*, Windmill Grass *Chloris truncata*, Slender Rat's-tail Grass *Sporobolus creber* and Blue Storksbill *Erodium crinitum*.

4.2.2.2 Condition states

Three condition states of PCT 1330 were identified within the subject land:

* Woodland in moderate condition to the west of the existing dwelling.

  This area has a discontinuous canopy of scattered mature and senescent Brittle Gum *Eucalyptus mannifera*, with some individuals of Blakely's Red Gum *Eucalyptus blakelyi*. There is no mid-layer. The ground layer is comprised of a mix of native and exotic species with approximately 35% cover of native plants. Native species recorded include *Austrostipa scabra, Austrostipa bigeniculata, Erodium crinitum* and *Crassula sieberiana*. Exotic species recorded include *Hypochaeria glabra, Trifolium subterraneum, Paronychia brasiliana, Nassella trichotoma, Hordeum glaucum* and *Medicago polymorpha*.

* Woodland in poor condition generally to the south of the existing dwelling.

  This area has a discontinuous canopy of scattered mature and senescent Blakely's Red Gum *Eucalyptus blakelyi*, Yellow Box *Eucalyptus melliodora,* and Apple Box *Eucalyptus bridgesiana*. Two individuals of Buloke *Allocasuarina leuhmannii* occur at the southwestern extremity of the

woodland patch. The mid-layer is comprised of occasional individuals of the exotic Box Thorn *Lycium ferocissimum*. The groundlayer is comprised almost entirely of exotic species (>99%) including *Trifolium subterraneum, Hordeum glaucum, Erodium crinitum, Lolium* sp, *Medicago polymorpha, Hypochaeria glabra, Arctotheca calendula*, *Nassella trichotoma, Onopordum acanthium, Dactylis glomerata*. Native species present include *Austrostipa scabra, Austrostipa bigeniculata, Crassula sieberiana, Juncus continuus, Lachnagrostis filiformis* and *Erodium crinitum.*

* Grassland – cleared woodland (where the percent cover of native plants varies from 15% to approximately 50%).

  While predominantly treeless, these areas do contain very occasional isolated eucalypts of the above listed woodland species. Native grasses commonly recorded include *Austrostipa scabra*, *Lachnagrostis filiformis*, *Austrostipa bigeniculata*, *Austrostipa densiflora*, *Crassula sieberiana*, *Chloris truncata*, *Sporobolus creber* and *Erodium crinitum*. The native *Lachnagrostis filiformis* is a widespread opportunistic and colonising grass that tends to thrive in moist areas. It behaves as an annual in some situations. This species may not be part of the native community, but was present in extensive dense patches and was included in the native percent cover.

  Common exotic grasses include Dactylis glomerata, Hordeum glaucum, Lolium spp, Poa compressa, Arctotheca calendula, Trifolium subterraneum, Nassella trichotoma, Hypochaeria glabra, Vulpia myuros, Eleusine tristachya, and Erodium crinitum.

Photo 1 PCT 1330, zone a – woodland in moderate condition

Photo 2 PCT 1330, zone b – woodland in poor condition

Photo 3 PCT 1330, zone c – grassland – cleared woodland

4.2.2.3 Justification of PCT selection

The PCT was identified in the first instance using the BioNet Vegetation Classification filter tool, on the basis of IBRA subregion (Monaro), vegetation formation (grassy woodlands and grasslands) and common tree and grass species present across the subject land.

The profiles of the top ten PCTs (based on number of matching filter criteria) were reviewed and considered. The PCTs are listed below in order of number of matches, with a brief summary of key decision points:

* PCT 3376 *Southern Tableland Grassy Box Woodland.* Strong floristic, structural and landscape match. Grades into PCT 3373 which has a more diverse shrub layer and some subtle differences in canopy species.
* PCT 3375 *Monaro-Queanbeyan Rolling Hills Grassy Forest*. The subject land is not within the described distribution for this PCT.
* PCT 3415 *Southern Tableland Red Grass-Spear Grass Grassland*. Described as occurring on valley floors, and almost always contains *Chrysocephalum apiculatum* which was not recorded on the property. The subject land does not match landscape position and is not a strong match for floristics.
* PCT 3373 *Goulburn Tableland Box-Gum Grassy Forest*. Described as occurring on moderately deep soil profiles, particularly footslopes of low hills. Not as strong a floristic or landscape match as PCT 3376.
* PCT 3414 *Monaro Snowgrass-Kangaroo Grass Grassland*. The subject land is not within the described distribution for this PCT. *Poa sieberiana* is described as almost always present, yet was not recorded on the property.
* PCT 3338 *Goulburn Tableland Frost Hollow Grassy Woodland*. Not a good floristic or landscape match.
* PCT 3370 *Central Tableland Red Stringybark Grassy Forest*. Not a good floristic or structural match.
* PCT 3348 *Southern Tableland Granites Ribbon Gum Grassy Forest*. Not a good floristic or landscape match.
* PCT 3374 *Goulburn Tableland Peppermint Grassy Forest*. The subject land is not within the described distribution for this PCT.
* PCT 3347 *Southern Tableland Creekflat Ribbon Gum Forest*. Not a good floristic or landscape match.

Upon review of the scientific descriptions contained in the BioNet Vegetation Classification database for each of the above PCTs, the best match is PCT 3376. This is consistent with regional PCT mapping for the property.

Native grassland areas are deemed to be derived from the woodland community rather than being a separate community, on the basis of similarity of floristic composition, predicted pre-European vegetation mapping (SEED: SVTM_NSW_1750_PCT), and lack of evidence to justify an alternate PCT.

PCT 3376 is a newly-released PCT not yet available for use in the BAM-Calculator. Tracing the lineage of the PCT and taking into consideration earlier regional vegetation mapping (see discussion in Ch 2.2.1 above), it has been determined that PCT 1330 (*Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion*) is the best match PCT for current use in the BAM-Calculator.

4.2.2.4 Alignment with TECs

PCT 1330 is associated with the critically endangered ecological community: *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*.

Comparison of site data with the Final Determination of the NSW Scientific Committee to list the community under the BC Act confirms that all vegetation zones within the subject land are likely to be part of this TEC.

4.2.2.5 Alignment with EPBC Act listed ECs

PCT 1330 is associated with the critically endangered community: *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland*.

Comparison of site data with Listing Advice provided by the Commonwealth Threatened Species Scientific Committee (TSSC) found that none of the vegetation zones within the subject land meet the listing criteria for this community.

The TSSC states "*In order for an area to be included in the listed ecological community, a patch[2] must have a predominantly native understorey[3]*." Patches are included in the listing if they meet the following criteria:

- areas without native canopy, 0.1ha or greater in size, with the perennial ground layer dominated by native species, and containing at least 12 native non-grass species. At least one of the understorey species should be an important species (eg grazing-sensitive, regionally significant or uncommon, such as Kangaroo Grass or orchids).
- areas with native canopy that meet any of the ground layer criteria above.
- areas with native canopy, 2ha or greater in size, with a predominantly native understorey, and either natural regeneration of the canopy species, or 20 or more trees per hectare.

---

[2] *A patch is defined in the relevant EPBC Act Policy Statement as a contiguous area of the community where the understorey is predominantly native, or trees are no greater than 75m apart.*

[3] *Predominantly native is defined in the relevant EPBC Act Policy Statement as where at least 50% of the perennial vegetation cover in the ground layer is made of up native species.*

Vegetation zone 1330a (woodland in moderate condition). Patch size (based on extent of native trees within 75m of each other and ignoring Crookwell Road) is approximately 43ha. The groundlayer of this zone contains 35% cover of native plants and 3 non-grass native species (based on BAM-VIS plot 4 data). It does not contain any important species. Tree density is approximately 10 per hectare. There is no evidence of natural regeneration. This zone does not meet the condition criteria.

Vegetation zone 1330b (woodland in poor condition). Patch size (based on extent of native trees within 75m of each other and ignoring Crookwell Road) is approximately 43ha. The groundlayer of this zone contains 0.2% cover of native plants and 2 non-grass native species (based on BAM-VIS plot 3 data). It does not contain any important species. Tree density is approximately 10 per hectare. There is no evidence of natural regeneration. This zone does not meet the condition criteria.

Vegetation zone 1330c (grassland – cleared woodland). Variable patch sizes from 0.1ha to 5.5ha. The groundlayer of the patches varies from 15% to around 50% cover of native plants and contains 2 to 6 non-grass native species (based on BAM-VIS plot 1, 2 & 5 data, and botanical survey point data). It does not contain any important species. None of the patches within this zone meet the condition criteria.

4.3 Threatened ecological communities

Table 6 TECs within the subject land

TEC name	Profile ID (from TBDC)	BC Act status	EPBC Act status	Associated vegetation zones within the subject land	Area within 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	10837	CE	-	1330a – woodland (moderate) 1330b – woodland (poor) 1330c – grassland (cleared woodland)	13.8

4.4 Vegetation zones

Vegetation across the subject land has been substantially disturbed through historic clearing, grazing and weed invasion (including introduction of pasture grasses).

The vegetation has been graded into three condition zones:

i. PCT 1330a – woodland in moderate condition (1.4 ha). To be entirely retained within the biodiversity conservation reserve – no direct impact[4].

ii. PCT 1330b – woodland in poor condition (0.7 ha). Location within the development footprint, assumed to be entirely cleared.

iii. PCT 1330c – derived native grassland (11.7 ha). A small portion of this area (~0.3ha) would be retained in the biodiversity conservation reserve with no direct impact. The remaining area (11.4ha) would be within the development footprint and is assumed to be entirely cleared.

Patch size was identified using aerial images (Google 2022, and Nearmap, various dates up to 15th February 2022).

Refer to Table 7 (Vegetation zones and patch sizes). Refer to Figure 1 (Site map) and Figure 2 (Location map).

[4] Data for Vegetation Zone PCT 1330a has been set out in vegetation description tables in this report, for completeness of survey results and to enable discussion of avoidance and minimisation of impacts. This data does not form part of the assessment and has not been included in the BAM-Calculator as there is no direct impact proposed for this Vegetation Zone.

Table 7 Vegetation zones and patch sizes

Vegetation zone ID	PCT ID number and name	Condition / other defining feature	Area (ha)	Patch size class (select multiple if areas of native vegetation are discontinuous)	No. vegetation integrity plots required	No. vegetation integrity plots completed	No. vegetation integrity plots used in assessment	Plot IDs of vegetation integrity plots used in assessment
1330a	1330: Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion	Woodland (moderate)	1.4	☐ <5 ha ☐ 5–24 ha ☒ 25–100 ha ☐ >100 ha	1	1	1	BAM-VIS Plot 4
1330b	1330: Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion	Woodland (poor)	0.7	☐ <5 ha ☐ 5–24 ha ☒ 25–100 ha ☐ >100 ha	1	1	1	BAM-VIS Plot 3
1330c	1330: Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion	Grassland (cleared woodland)	11.7	☒ <5 ha ☒ 5–24 ha ☐ 25–100 ha ☐ >100 ha	3	3	3	BAM-VIS Plot 1 BAM-VIS Plot 2 BAM-VIS Plot 5

4.5 Vegetation integrity (vegetation condition)

4.5.1 Vegetation integrity survey plots

Five plots have been sampled across three vegetation zones, in accordance with BAM Table 3. Vegetation floristics and structure within each zone is relatively consistent, such that no additional plots are warranted.

4.5.2 Scores

Table 8 Vegetation integrity scores

Vegetation zone ID	Composition condition score	Structure condition score	Function condition score (where relevant)	Vegetation integrity score	Hollow bearing trees present?
1330a – moderate	15.7	49.6	53.8	34.7	Yes
1330b – poor	7.2	24.9	39.7	19.2	Yes
1330c – cleared	26.9	23.2	1.8	10.4	No

4.5.3 Use of benchmark data

Standard condition benchmarks within the BAM-Calculator (as at 22/02/2023) were used to assess the vegetation integrity attributes of each vegetation zone.

5. Habitat suitability for threatened species

5.1 Identification of threatened species for assessment

5.1.1 Ecosystem credit species

Table 9 Predicted ecosystem credit species

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Regent Honeyeater (foraging)	*Anthochaera phrygia*	CE	CE	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c	High
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	V	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☒ Current survey	Yes	n/a	1330a, 1330b, 1330c	Moderate
Glossy Black Cockatoo (foraging)	*Calyptorhynchus lathami*	V	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	Partial exclusion due to reason 2 – habitat constraints (further detail provided below this table).	1330b	High

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Speckled Warbler	*Chthonicola sagittata*	V	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c	High
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	V	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c	High
Spotted-tailed Quoll	*Dasyurus maculatus*	V	E	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c	High
Black Falcon	*Falco subniger*	V	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c	Moderate
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☒ Current survey	Yes	n/a	1330a, 1330b, 1330c	High
Little Lorikeet	*Glossopsitta pusilla*	V	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c	High

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
White-bellied Sea-Eagle (foraging)	*Hieraaetus morphnoides*	V	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c	High
White-throated Needletail	*Hirundapus caudacutus*	-	V	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c	High
Swift Parrot (foraging)	*Lathamus discolor*	E	CE	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c	Moderate
Hooded Robin (south-eastern form)	*Melanodryas cucullata cucullata*	V	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c	Moderate
Large Bent-wing Bat (foraging)	*Miniopterus orianae oceanensis*	V	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☒ Current survey	Yes	n/a	1330a, 1330b, 1330c	High
Scarlet Robin	*Petroica boodang*	V	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c	Moderate

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Flame Robin	*Petroica phoenicea*	V	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c	Moderate
Superb Parrot (foraging)	*Polytelis swainsonii*	V	V	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c	Moderate
Grey-headed Flying-fox (foraging)	*Pteropus poliocephalus*	V	V	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c	High
Diamond Firetail	*Stagonopleura guttata*	V	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☒ Current survey	Yes	n/a	1330a, 1330b, 1330c	Moderate

5.1.1.1 Predicted ecosystem credit species excluded from assessment:

The following species was excluded from some zones within the subject land on the basis of habitat constraints:

* The Glossy Black Cockatoo (foraging) – zones 1330a and 1330c do not contain *Allocasuarina* or *Casuarina* species.

5.1.1.2 Ecosystem credit species added to assessment:

The following species was added to the assessment on the basis of field survey results:

* Eastern False Pipistrelle – detected through echolocation recording on 10/11/2022, with the earliest call recorded at 22:24hrs suggesting the individual/s were recorded during their foraging period rather than when leaving the roost at dark.

5.1.2 Species credit species

Table 10 Predicted flora species credit species

Common name	Scientific name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
Thick Lip Spider Orchid	*Caladenia tessellata*	E	V	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c
Paddy's River Box	*Eucalyptus macarthurii*	E	E	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c
Aromatic Peppercress	*Lepidium hyssopifolium*	E	E	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c
Hoary Sunray	*Leucochrysum albicans var triolor*	-	E	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c
Tarengo Leek Orchid	*Prasophyllum petilum*	E	E	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c

Common name	Scientific name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
Button Wrinklewort	*Rutidosis leptorrhynchoides*	E	E	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c
Small Purple-pea	*Swainsona recta*	E	E	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c
Silky Swainson-pea	*Swainsona sericea*	V	-	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c
Austral Toadflax	*Thesium australe*	V	V	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c

No flora species credit species were removed from, or added to, the assessment.

Table 11 Predicted fauna species credit species

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
Regent Honeyeater (breeding)	*Anthochaera phrygia*	CE	CE	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	2 – Habitat constraints (further detail provided below this table).	n/a
Pink-tailed Legless Lizard	*Aprasia parapulchella*	V	V	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c
Glossy Black Cockatoo (breeding)	*Calyptorhynchus lathami*	V	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	n/a	1330a, 1330b
Striped Legless Lizard	*Delma impar*	V	V	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330b, 1330c
White-bellied Sea-eagle (breeding)	*Haliaeetus leucogaster*	V	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not	n/a	1330a, 1330b

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
						another)		
Little Eagle (breeding)	*Hieraaetus morphnoides*	V	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	n/a	1330a, 1330b
Key's Matchstick Grasshopper	*Keyacris scurra*	E	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	n/a	1330a, 1330c
Swift Parrot (breeding)	*Lathamus discolor*	E	CE	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	2 – Habitat constraints (further detail provided below this table).	n/a
Large Bent-winged Bat (breeding)	*Miniopterus orianae oceanensis*	V	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☒ Current survey	No	2 - Habitat constraints (further detail provided below this table)	n/a

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
Southern Myotis	*Myotis adversus*	V	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	n/a	1330a, 1330b
Squirrel Glider	*Petaurus norfolcensis*	V	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	4 – Habitat degraded such that micro-habitats not available (further detail provided below this table)	n/a
Koala	*Phascolarctos cinereus*	E	E	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	n/a	1330a, 1330b
Superb Parrot (breeding)	*Polytelis swainsonii*	V	V	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	n/a	1330a, 1330b

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
Grey-headed Flying-fox (breeding)	*Pteropus poliocephalus*	V	V	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	2 - Habitat constraints (further detail provided below this table)	n/a
Golden Sun Moth	*Synemon plana*	E	CE	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	1 – Geographic limitations (further detail provided below this table)	n/a

5.1.2.1 Predicted fauna species credit species excluded from assessment:

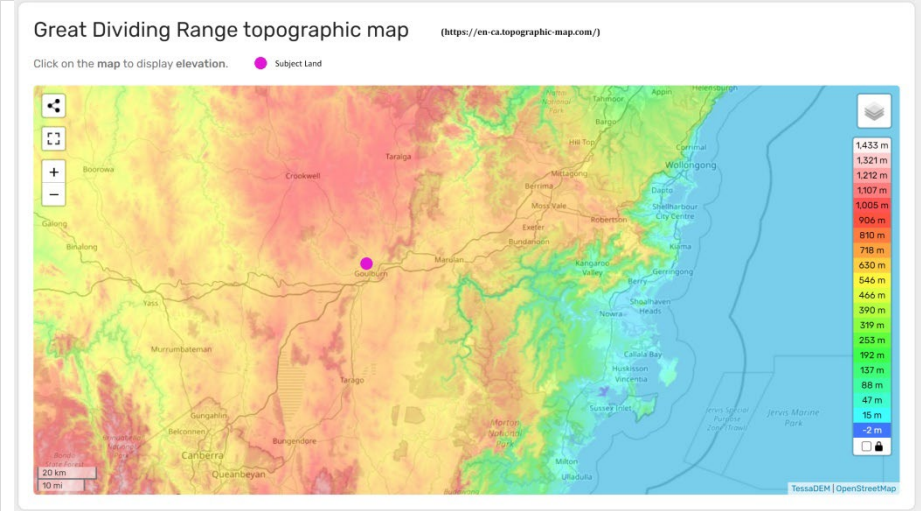
The following four species have been removed from the list for further assessment on the basis of habitat constraints:

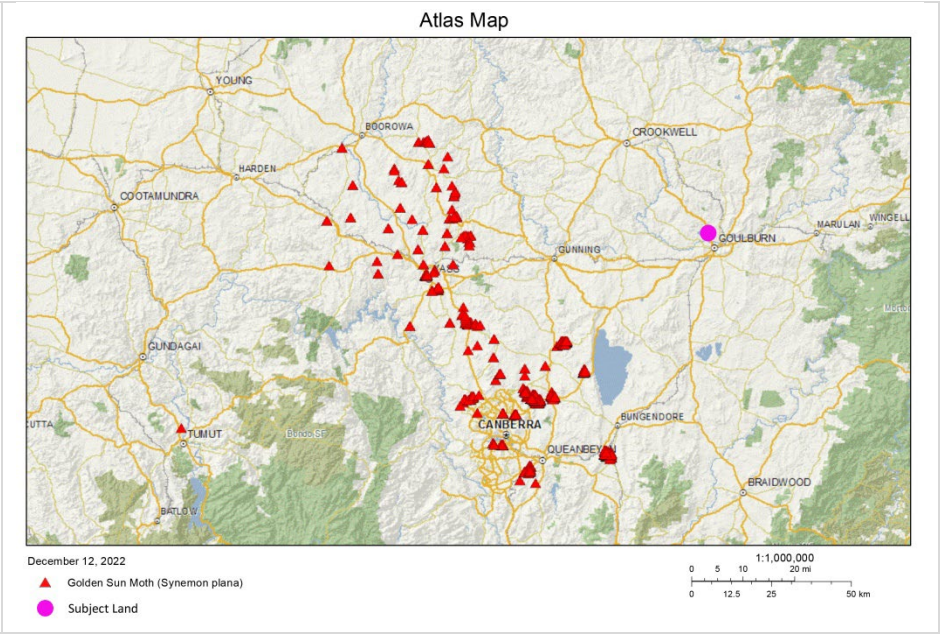
* Regent Honeyeater (breeding) – the subject land is not part of an important mapped area.
* Swift Parrot (breeding) – the subject land is not part of an important mapped area.
* Large Bent-winged Bat (breeding) – the subject land does not contain caves, tunnels, mines or other structures known or suspected to be used for breeding. This species was recorded by Anabat detector from within the subject land on several occasions. The timing of records do not indicate the species was roosting within or close to the subject land.
* Grey-headed Flying-fox (breeding) – the subject land does not contain any camps.

The following species has been removed from the list for further assessment on the basis of geographic limitations:

* Golden Sun Moth – the subject land is approximately 30km east of the Lake George escarpment and on the eastern fringe of the Great Dividing Range (based on the elevation map available at *https://en-ca.topographic-map.com/*). Further investigation to confirm this reason to remove the Golden Sun Moth from

further assessment found that the known records of this species (Bionet sightings) occur in a cluster west of a line between Gunning and Bungendore, with the nearest records to the subject land being approximately 50km to the southwest (near Gundaroo) and more than 60km to the west (near Yass).





The following species have been removed from the PCT 1330c grassland (cleared woodland) zone for further assessment on the basis of lack of trees for nesting or breeding, or, with respect to the Koala, on the basis of advice provided in the Ch3.2 Suitable Habitat of the *Koala BAM Survey Guide* (2022):

* Glossy Black Cockatoo (breeding);
* White-bellied Sea-eagle (breeding);
* Little Eagle (breeding);
* Southern Myotis;
* Koala;
* Superb Parrot (breeding).

The following species has been removed from the PCT 1330b woodland (poor) zone for further assessment on the basis of lack of native grass understorey and tussock grasses:

* Key's Matchstick Grasshopper

The following species has been removed from the list for further assessment on the basis of habitat being degraded such that microhabitats are not available:

* Squirrel Glider – the subject land does not contain sufficient resources to support a population of this species and is separated from larger areas of habitat by Crookwell Road and/or extensive areas of cleared land, with greater than 50m between trees. The subject land does not contain midstorey vegetation. No indirect evidence for this species was noted during fauna habitat evaluation. There are no records (Bionet sightings) of this species within 20 kilometres of the subject land.

5.1.2.2 Fauna species credit species added to the assessment:

The following species has been added to the list for further assessment:

* Little Eagle (breeding) – there are records of this species close to the subject land (within 1-2km).

5.2 Presence of candidate species credit species

Candidate flora species requiring further assessment are listed in Table 12.

Table 12 Determining the presence of candidate flora species credit species on the subject land

Common name	Scientific name	Listing status		Method used to determine presence	Present?	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		BC Act	EPBC Act			
Thick Lip Spider Orchid	*Caladenia tessellata*	E	V	Targeted threatened species survey	No	No
Paddy's River Box	*Eucalyptus macarthurii*	E	E	Targeted threatened species survey	No	No
Aromatic Peppercress	*Lepidium hyssopifolium*	E	E	Targeted threatened species survey	No	No
Hoary Sunray	*Leucochrysum albicans var tricolor*	-	E	Targeted threatened species survey	No	No
Tarengo Leek Orchid	*Prasophyllum petilum*	E	E	Targeted threatened species survey	No	No
Button Wrinklewort	*Rutidosis leptorrhynchoides*	E	E	Targeted threatened species survey	No	No
Small Purple-pea	*Swainsona recta*	E	E	Targeted threatened species survey	No	No
Silky Swainson-pea	*Swainsona sericea*	V	-	Targeted threatened species survey	No	No
Austral Toadflax	*Thesium australe*	V	V	Targeted threatened species survey	No	No

Candidate fauna species requiring further assessment are listed in Table 13.

Table 13 Determining the presence of candidate fauna species credit species on the subject land

Common name	Scientific name	Listing status		Method used to determine presence	Present?	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		BC Act	EPBC Act			
Pink-tailed Legless Lizard	*Aprasia parapulchella*	V	V	Targeted threatened species survey	No	No
Glossy Black Cockatoo	*Calyptorhynchus lathami*	V	-	Targeted threatened species survey	No	No
Striped Legless Lizard	*Delmar impar*	V	V	Targeted threatened species survey	No	No
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	V	-	Targeted threatened species survey	No	No
Key's Matchstick Grasshopper	*Keyacris scurra*	E	-	Assumed present	Yes	Yes
Southern Myotis	*Myotis macropus*	V	-	Targeted threatened species survey	No	No
Koala	*Phascoarctos cinereus*	E	E	Assumed present	Yes	Yes
Superb Parrot	*Polytelis swainsonii*	V	V	Targeted threatened species survey	No	No

5.3 Threatened species surveys

Table 1 Threatened species surveys for candidate flora species credit species on the subject land

Common name	Scientific name	Threatened flora species surveys				Present	Further assessment required (BAM 5.2.5 and 5.2.6)	Compliance with TBDC requirements & DPIE (2020) guidelines
		Survey method (transects or grids)	**Timing of survey – within recommended period?** (BAM-C / TBDC)		**Effort** (hours & no. people)			
Thick Lip Spider Orchid	*Caladenia tessellata*	Random meander by orchid specialist to locate and search areas of potential habitat	☒ Yes	☐ No	1 person	No	No	TBDC survey: Sep to Oct. Survey conducted 3rd October 2022 at a time when a known reference population was flowering well.
Paddy's River Box	*Eucalyptus macarthurii*	Inspection of every tree on the subject land over the course of the surveys.	☒ Yes	☐ No	1 person, opportunistically throughout all surveys	No	No	TBDC survey: all year. Tree inspections were conducted in November 2022, and October & November 2021. The subject land contains very few trees, such that every tree could be inspected and identified without need for systematic survey.

Common name	Scientific name	Threatened flora species surveys				Present	Further assessment required (BAM 5.2.5 and 5.2.6)	Compliance with TBDC requirements & DPIE (2020) guidelines
		Survey method (transects or grids)	**Timing of survey – within recommended period?** (BAM-C / TBDC)		**Effort** (hours & no. people)			
Aromatic Peppercress	*Lepidium hyssopifolium*	parallel traverses (10m spacing); + random meanders & sixty-six spot surveys; + five 20x20m plots	☒ Yes	☐ No	~20 hours hours x 1 person	No	No	TBDC survey: Oct to Dec. Advice that it can occur under paddocks trees. Parallel traverse surveys were conducted in accordance with the DPIE (2020) guidelines in November 2022. Additional meander, spot & plot surveys were conducted in October & November 2021.
Hoary Sunray	*Leucochrysum albicans* var *tricolor*	parallel traverses (10m spacing); + random meanders & sixty-six spot surveys; + five 20x20m plots	☒ Yes	☐ No	~20 hours hours x 1 person	No	No	TBDC survey: Sep to Apr. Parallel traverse surveys were conducted in accordance with the DPIE (2020) guidelines in November 2022. Additional meander, spot & plot surveys were conducted in October & November 2021.
Tarengo Leek Orchid	*Prasophyllum petilum*	Random meander by orchid specialist to locate and search areas of potential habitat	☒ Yes	☐ No	1 person	No	No	TBDC survey: Sep to Dec. Survey conducted 3rd October 2022 at a time when a known reference population was flowering well.

Common name	Scientific name	Threatened flora species surveys				Present	Further assessment required (BAM 5.2.5 and 5.2.6)	Compliance with TBDC requirements & DPIE (2020) guidelines
		Survey method (transects or grids)	**Timing of survey – within recommended period?** (BAM-C / TBDC)		**Effort** (hours & no. people)			
Button Wrinklewort	*Rutidosis leptorrhynchoides*	parallel traverses (10m spacing); + random meanders & sixty-six spot surveys; + five 20x20m plots	☒ Yes	☐ No	~20 hours hours x 1 person	No	No	TBDC survey: all year. Parallel traverse surveys were conducted in accordance with the DPIE (2020) guidelines in November 2022. Additional meander, spot & plot surveys were conducted in October & November 2021.
Small Purple-pea	*Swainsona recta*	parallel traverses (10m spacing); + random meanders & sixty-six spot surveys; + five 20x20m plots	☒ Yes	☐ No	~20 hours hours x 1 person	No	No	TBDC survey: Sep to Nov. Advice that survey months differ based on location. Survey Oct - Nov on Monaro. Survey Sep - Oct in the Riverina. The subject land is associated with the Monaro and is in the Monaro IBRA subregion. Parallel traverse surveys were conducted in accordance with the DPIE (2020) guidelines in November 2022. Additional meander, spot & plot surveys were conducted in October & November 2021.

Common name	Scientific name	Threatened flora species surveys				Present	Further assessment required (BAM 5.2.5 and 5.2.6)	Compliance with TBDC requirements & DPIE (2020) guidelines
		Survey method (transects or grids)	**Timing of survey – within recommended period?** (BAM-C / TBDC)		**Effort** (hours & no. people)			
Silky Swainson-pea	Swainsona sericea	parallel traverses (10m spacing); + random meanders & sixty-six spot surveys; + five 20x20m plots	☒ Yes	☐ No	~20 hours hours x 1 person	No	No	TBDC survey: Sep to Nov. Parallel traverse surveys were conducted in accordance with the DPIE (2020) guidelines in November 2022. Additional meander, spot & plot surveys were conducted in October & November 2021.
Austral Toadflax	Thesium australe	parallel traverses (10m spacing); + random meanders & sixty-six spot surveys; + five 20x20m plots	☒ Yes	☐ No	~20 hours hours x 1 person	No	No	TBDC survey: Nov to Feb. Advice that species can occur within un-treed native grassland or heterogeneous native/exotic grassland if host flora for parasitisation are present [esp T australis]. Species can be easily overlooked when understorey height exceeds 30cm. When this is the case close inspection surveys (searching between grass tussocks) may be necessary to conclusively determine absence. Parallel traverse surveys conducted in accord with the DPIE (2020) guidelines in Nov 2022. Additional meander, spot & plot surveys were conducted in October & November 2021.

Table 15 Threatened species surveys for candidate fauna species credit species on the subject land

Common name	Scientific name	Threatened fauna species surveys				Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)	Compliance with TBDC requirements & specific survey guidelines, where applicable
		Survey method (traps, bioacoustics etc)	**Timing of survey – within recommended period?** (BAM-C / TBDC)		**Effort** (hours & no. people)			
Pink-tailed Legless Lizard	*Aprasia parapulchella*	Diurnal rock searches	☒ Yes	☐ No	12 x 10min searches with 2 to 3 surveyors at each location = total 310 person-minutes	No	No	TBDC survey: Sep to May. DPE Survey Guide (Nov 2022): Sep to Nov. Diurnal rock searches in areas of suitable habitat. >2,000 suitable rocks per 50ha or less of habitat, 4 survey replicates. Turn over a minimum of 200 suitably sized rocks for every 5ha of suitable habitat. Undertake surveys in the 2 hours after sunrise and 2 hours before sunset on sunny days (<50% cloud cover). Cease surveys once temperatures exceed 25°C. This species is described in the TBDC as inhabiting areas with predominantly native grassy groundlayers. It is noted that percent cover of native species in the groundlayer varies across the subject land from 0 to approx. 50% cover. There are no areas with

Common name	Scientific name	Threatened fauna species surveys				Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)	Compliance with TBDC requirements & specific survey guidelines, where applicable
		Survey method (traps, bioacoustics etc)	**Timing of survey – within recommended period?** (BAM-C / TBDC)		**Effort** (hours & no. people)			
								predominantly native cover. Extent of areas classed as native vegetation due to >15% native plant cover in the groundlayer (zones 1330a & 1330c) is 13.1ha. Surveys were conducted prior to release of the survey guidelines, so are generally compliant, but do not meet every particular. Surveys were conducted at 12 locations over three survey days in October 2021 and November 2022. Total rocks turned = 681 . Survey days varied from cloudy to full sun, temperatures did not exceed 25°C. Surveys were conducted at various times of day, with three sessions in the 2 hours prior to dusk.
Glossy Black Cockatoo	*Calyptorhynchus lathami*	Dedicated survey to detect breeding birds	☒ Yes	☐ No	20 minutes of dedicated survey x 1 person	No	No	TBDC survey: Jan to Sep. A diurnal survey was conducted on 13th August 2021 in the patch of remnant woodland to look for signs of breeding birds

Common name	Scientific name	Threatened fauna species surveys				Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)	Compliance with TBDC requirements & specific survey guidelines, where applicable
		Survey method (traps, bioacoustics etc)	**Timing of survey – within recommended period?** (BAM-C / TBDC)		**Effort** (hours & no. people)			
					+ additional surveys.			using tree hollows. Additional bird surveys were conducted in early October 2021 and in November 2022.
Striped Legless Lizard	*Delmar impar*	Diurnal searches under rocks and grass clumps	☒ Yes	☐ No	12 x 10min searches with 2 to 3 surveyors at each location = total 310 person-minutes	No	No	TBDC survey: Sep to Dec. DPE Survey Guide (Nov 2022): Sep to Dec Habitat surveys with a minimum of 120 person-minutes per 50 ha, replicated weekly for 8 weeks or daily for 10 days. And pitfall traps or use of artificial cover. This species is described in the TBDC as occurring in natural grasslands, but is also known to occur in grasslands with a significant content of exotic grasses. 'Significant content' is not defined. Grasslands with <15% native content are classed as not-native by DPE and it is assumed that such areas are degraded beyond the 'significant content' tolerance of this species.

Common name	Scientific name	Threatened fauna species surveys				Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)	Compliance with TBDC requirements & specific survey guidelines, where applicable
		Survey method (traps, bioacoustics etc)	**Timing of survey – within recommended period?** (BAM-C / TBDC)		**Effort** (hours & no. people)			
								On this basis, extent of habitat (zones 1330a & 1330c) is 13.1ha. Surveys were conducted prior to release of the survey guidelines, so are generally compliant with the habitat search component, but did not include additional methods (noting that pitfall traps could not safely be used in paddocks currently grazed by stock). Surveys were conducted at 12 locations over three survey days in October 2021 and November 2022, with a total survey effort of 310 person-minutes.
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	Dedicated survey to detect breeding birds	☒ Yes	☐ No	120 person-minutes of dedicated survey	No	No	TBDC survey: Jul to Dec. Breeding habitat is live large old trees AND presence of a large stick nest or adults observed nesting or duetting. Diurnal bird surveys were conducted in August 2021, October 2021 and November 2022 to

Common name	Scientific name	Threatened fauna species surveys				Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)	Compliance with TBDC requirements & specific survey guidelines, where applicable
		Survey method (traps, bioacoustics etc)	**Timing of survey – within recommended period?** (BAM-C / TBDC)		**Effort** (hours & no. people)			
								look for signs of breeding birds and stick nests.
Little Eagle	*Hieraaetus morphnoides*	Dedicated survey to detect breeding birds	☒ Yes	☐ No	120 person-minutes of dedicated survey	No	No	TBDC survey: Aug to Oct. Breeding habitat is live large old trees AND presence of a large stick nest or adults observed nesting or duetting. Diurnal bird surveys were conducted in August 2021, October 2021 and November 2022 to look for signs of breeding birds and stick nests.
Key's Matchstick Grasshopper	*Keyacris scurra*		☐ Yes	☐ No		Assumed present	Yes	Not surveyed. It is probable that historic and ongoing grazing management of the land would prevent this species from occurring. Surveys are recommended prior to lodgement of future development applications.
Southern Myotis	*Myotis macropus*	Anabat recording	☒ Yes	☐ No	55 recording nights	No	No	TBDC survey: Oct to Mar. Surveys conducted in October 2021 & November 2022

Common name	**Scientific name**	**Threatened fauna species surveys**				**Present**	**Further assessment required (BAM Subsections 5.2.5 and 5.2.6)**	**Compliance with TBDC requirements & specific survey guidelines, where applicable**
		Survey method (traps, bioacoustics etc)	**Timing of survey – within recommended period?** (BAM-C / TBDC)		**Effort** (hours & no. people)			
Koala	*Phascolarctos cinereus*	Diurnal inspection of all trees within the subject land.	☒ Yes	☐ No	not calculated	Assumed present	Yes	Surveys conducted on site do not meet current guidelines to demonstrate absence. Koalas are not expected to occur on the subject land due to the limited extent and isolation of habitats, and lack of any Koala records on the Bionet (sightings) database within 20km of the subject land. Further surveys are recommended prior to lodgement of future development applications for the land.
Superb Parrot	*Polytelis swainsonii*	Dedicated survey to detect breeding birds.	☒ Yes	☐ No	120 person-minutes of dedicated survey	No	No	TBDC survey: Sep to Nov. Diurnal bird surveys were conducted in August 2021, October 2021 and November 2022 to look for signs of breeding birds using tree hollows.

5.4 Expert reports

No Expert Reports have been used or relied upon for this assessment.

5.5 More appropriate local data (where relevant)

No local data has been used in this assessment.

5.6 Area or count, and location of suitable habitat for a species credit species (a species polygon)

Two species credit fauna species are assumed present within the subject land. Both are assessed by area. The species polygons are shown on Figure 6 (Species polygons). Polygons are based on the entirety of the vegetation zones for which each species is assumed present, as set out in Table 11 (page 34) and described in Ch 5.1.2.1 (pg37).

Table 2 Results for present species (recorded within the subject land)

Common name	**Scientific name**	**Biodiversity risk weighting** (BAM-C & TBDC*)	**SAII entity**** (BAM-C & TBDC)	**Habitat constraints / microhabitats present on the subject land / vegetation zone**	**Abundance – No. individual plants present on subject land** (flora with unit of measure of count)	**Extent (ha) of suitable habitat present on site** (flora or fauna with unit of measure of area)	**TBDC species specific recommendations e.g. buffers, general comments** (where relevant)	**Habitat condition** (vegetation integrity score for each vegetation zone in the polygon – area species only)
Key's Matchstick Grasshopper		High (2)	No	PCT 1330a woodland (moderate) PCT 1330c grassland (cleared woodland)	n/a	1.4ha (retained) 11.4ha	none.	33.3 10.4
Koala	*Phascolarctos cinereus*	High (2)	No	PCT 1330a woodland (moderate) PCT 1330b woodland (poor)	n/a	1.4ha (retained) 0.7ha	Refer to the Koala (Phascolarctos cinereus): Biodiversity Assessment Method Survey Guide for information on targeted survey requirements and mapping species polygons.	33.3 19.2

Table 3 Results for EPBC Act listed species present (recorded within the subject land)

Common name	**Scientific name**	**Abundance – No. individual plants present on subject land** (flora with unit of measure as count)	**Extent (ha) of suitable habitat present on site** (flora or fauna with unit of measure as area)
Koala	*Phascolarctos cinereus*	n/a	1.4ha (retained) 0.7 ha

6. Identifying prescribed impacts

Table 18 Prescribed impacts identified

Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature. Where relevant, threatened species or fauna that are part of a TEC or EC, that are at risk of vehicle strike
Karst, caves, crevices, cliffs, rocks or other geological features of significance	☐Yes / ☒No	The subject land does not contain geological features of significance. The nearest such habitat appears to be the Bungonia complex approximately 30km to the east.	n/a
Human-made structures	☒Yes / ☐No	Existing sheds are clustered near the existing dwelling and are in regular use for current farming activities.	Sheds could potentially be used for roosting by a range of microchiropteran bat species. No threatened species appear to be using these structures (based on field survey).
Non-native vegetation	☒Yes / ☐No	Exotic vegetation consists of heavily grazed pastures, and landscaped areas around the existing dwelling.	This vegetation is not likely to be of value for any threatened species.
Habitat connectivity	☒Yes / ☐No	Woodland within the subject land is essentially an isolated patch, separated from nearby woodland to the east by the existing dwelling, managed gardens and lawn, and Crookwell Road. Remnant trees may provide some canopy connectivity for flying fauna such as birds and bats, but would not be part of a wildlife corridor.	Relevant threatened species (refer to Tables 11 & 16) are all highly mobile species that would not be affected by minor variations in woodland connectivity.
Waterbodies, water quality and hydrological processes	☒Yes / ☐No	Three first and second order streams (Strahler classification) run through the subject land. All three are ephemeral grassy swales with in-line farm dams. There are four farm dams within the subject land.	The streams and dams are not specifically associated with areas of native vegetation on the subject land. There are no threatened entities known or likely to use these features.
Wind turbine strikes (wind farm development only)	☐Yes / ☒No	n/a	n/a
Vehicle strikes	☒Yes / ☐No	Subdivision would increase traffic in and through the subject land.	All native fauna present within the subject land could be considered part of the TEC present.

Stage 2: Impact assessment (biodiversity values and prescribed impacts)

7. Avoid and minimise impacts

7.1 Avoid and minimise direct and indirect impacts

7.1.1 Project location

The Planning Proposal would apply to the entire property. Land zones have been proposed in response to opportunities and constraints identified during the planning process (refer to Ch7.1.2 below), with the primary area of biodiversity value on the property to be retained as a conservation reserve.

7.1.2 Project design

A biodiversity constraints study was carried out across the subject property prior to development of the masterplan (Hayes Env, Feb 2022). The findings of the study were provided to Council and discussed with Council's biodiversity officer during a pre-lodgement meeting for the project in March 2022, and a general agreement made on the avoid and minimise strategy.

The avoid and minimise strategy was subsequently forwarded to the Department of Planning and Environment (DPE) regional Biodiversity and Conservation Division (BCD) for comment. The BCD responded in April 2022 with advice that they were broadly supportive of the strategy. The BCD recommended formal protection of avoided areas through conditions of consent, conservation covenant or other legal instrument.

The masterplan was designed to avoid and minimise impacts on biodiversity in accordance with the strategy and the advice of Council and the BCD. It contains the following:

i Retention of a 1.9ha conservation reserve on the hilltop in the southern part of the property. The reserve would retain the entirety of the existing patch of woodland in moderate condition (1.4ha) and would also include adjacent areas of native grassland (0.3ha), thus achieving regular (straightened) reserve boundaries by adding land to the reserve rather than by 'trimming' edges of the woodland patch.

ii Addition of a 25m wide 'handle' to the eastern side of the reserve to enable tree retention and planting to maintain canopy connectivity of the reserve to remnant woodland occurring on lands further to the east.

iii Creation of three larger lots, each approximately 1,800m^2 in size (proposed lots 50, 51 & 52), to the east of the reserve handle to enable retention of mature hollow-bearing trees, and maintain canopy connectivity of the reserve to remnant woodland occurring on lands further to the east.

iv Security of the reserve through zoning of the area as RE1, and placement of a conservation covenant across it. It is recommended that a Vegetation Management Plan be prepared for the reserve at the development application stage, to address mitigation of impacts (discussed in Chapter 8.4 below), and to develop a plan to avoid long term loss of canopy density from senescence.

v It is recommended that conservation covenants also be placed on each of proposed Lots 50, 51 & 52 at the development application stage. These covenants shall identify trees that must be retained, and specify a method by which presence of mature native trees is retained in the long term.

Refer to Figure 3 (Development layout).

7.2 Avoid and minimise prescribed impacts

7.2.1 Project location

The Planning Proposal would apply to the entire property. Land zones have been proposed in response to opportunities and constraints identified during the planning process (refer to Ch7.1.2), including consideration of prescribed impacts (identified in Ch6).

7.2.2 Project design

The masterplan was designed to avoid and minimise impacts on biodiversity as discussed in Ch 7.1.2 above. The following features avoid and minimise relevant prescribed impacts:

* human made structures – no threatened species appear to be using these structures. It is recommended that a further inspection of sheds be conducted by a bat specialist prior to demolition, to rescue any individuals that may be roosting in these structures. This measure should be conditioned upon any future development consents.
* habitat connectivity – the masterplan would place the primary woodland patch on the property within a designated reserve, with a 'handle' and larger lots sizes to the east to enable a vegetated connection to areas of habitat to the east.
* waterbodies, water quality and hydrological processes – all streams within the property would be retained within managed open space corridors. There is opportunity for improvement of biodiversity and hydrological values along these corridors at the development application stage.
* vehicle strikes – the existing condition and location of the subject land does not suggest that vehicle strikes would be a significant impact resulting from rezoning and development of the property. However, potential impacts on native fauna should be considered and ameliorative measures implemented at the development application stage.

7.3 Other measures considered

No other measures have been considered for this planning proposal stage and not selected for implementation.

7.4 Summary of measures to avoid and minimise impacts

Table 19 Avoidance and minimisation measures for direct, indirect and prescribed impacts

Action	Outcome (Describe the outcome of implementing the measure, with reference to specific entities identified in Sections 4 and 5)	Timing	Responsibility
Designation of a conservation reserve to retain the patch of woodland in moderate condition on the central knoll.	Avoid loss of moderate condition woodland and habitats.	At rezoning stage.	Planning authority
Placement a conservation covenant across the conservation reserve.	Ensure enduring protection of biodiversity values within the conservation reserve.	At rezoning stage.	Planning authority
Preparation of a vegetation management plan for the conservation reserve.	To improve biodiversity values within the conservation reserve and maintain vegetation integrity in the long term.	At the development application stage.	Development application proponent
Placement of conservation covenants across the large lots to the east of the conservation reserve.	Maintain connectivity of habitats on the site to nearby areas to the east.	Prior to release of an occupation certificate, and/or prior to sale of the affected Lots.	Development application proponent
Preparation of wildlife management protocols for tree and structure removal from the property.	Avoid and minimise impacts on native fauna that may be present at the time of clearing/demolition.	Prior to release of a construction certification.	Development application proponent

8. Impact assessment

8.1 Direct impacts

8.1.1 Residual direct impacts

The extent of residual direct impacts on native vegetation is shown on Figure 7 (Residual impacts on native vegetation).

Table 20 Summary of residual direct impacts

Direct impact (Describe the impact on PCT/TEC/EC or threatened species and their habitat)	**BC Act status**	**EPBC Act status**	**SAII entity**	**Project phase/timing of impact** (e.g. construction, operation, rehabilitation)	**Extent** (ha, number of individuals)
PCT 1330/CEEC box-gum woodland: - woodland (moderate) – entire area (1.4ha) retained.	CE	-	Yes	n/a	0
- woodland (poor) – assumed total removal of native vegetation in this zone (0.7ha).	CE	-	Yes	construction	0.7 ha
- grassland (cleared woodland) – small area (0.3ha) retained, assumed total removal of remainder (11.4ha)	CE	-	Yes	construction	11.4 ha
Key's Matchstick Grasshopper – retention of 1.4ha of moderate condition assumed habitat, assumed total loss of 11.4ha of grassland assumed habitat.	V	V	No	construction	11.4 ha
Koala *Phascolarctos cinereus* – retention of 1.4ha of moderate condition assumed habitat, assumed total loss of 0.7ha of poor condition assumed habitat (with some of this area to be replanted to maintain connectivity).	E	E	No	construction	0.7 ha

8.1.2 Change in vegetation integrity score

Table 21 Impacts to vegetation integrity

Vegetation zone	PCT ID	Management zone	Area (ha)	Before development				After development				Change
				Composition	Structure	Function	VI score	Composition	Structure	Function	VI score	Change in VI score
1330b	1330	remove	0.7	7.2.1	24.9	39.7	19.2	0	0	0	0	-19.2
1330c	1330	remove	11.4	26.9	23.2	1.8	10.4	0	0	0	0	-10.4

8.2 Indirect impacts

Native vegetation to be retained within the subject land (*ie* the conservation reserve) would be subject to ongoing indirect impacts related to residential development.

Detailed plans will be required at the development application stage to address standard matters relating to stormwater management, wastewater, asset protection zones and landscaping.

It is recommended that additional plans include a Vegetation Management Plan for the conservation reserve, and wildlife management protocols to minimise risk of injury to wildlife during site clearing and demolition works.

A further detailed assessment of indirect impacts upon biodiversity would be required at the development application stage.

Table 22 Summary of residual indirect impacts

Indirect impact (Describe impact, e.g. transport of weeds and pathogens form the site to adjacent vegetation)	**Impacted entities** (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	**Extent** (ha or zone reference)	**Frequency**	**Duration** (long-term/ short-term/ medium-term)	**Project phase/ timing of impact** (e.g. construction, operation, rehabilitation)	**Likelihood and consequences**
Inadvertent physical damage to adjacent vegetation	PCT 1330 (Box-gum woodland – CEEC); Key's Matchstick Grasshopper (E/-); Koala (E/E)	1330a – 1.4ha	unknown	ongoing risk	construction, ongoing occupation	negligible long term impact with implementation of vegetation management plan.
Reduced viability of habitat due to edge effects	PCT 1330 (Box-gum woodland – CEEC); Key's Matchstick Grasshopper (E/-); Koala (E/E)	1330a – 1.4ha	n/a	long term	ongoing occupation	relatively minor increase in existing impact.
Reduced viability of habitat due to noise, dust or light spill	PCT 1330 (Box-gum woodland – CEEC); Koala (E/E)	1330a – 1.4ha	unknown	long term	construction, ongoing occupation	moderate increase in existing impact.
Spread of diseases and weeds	PCT 1330 (Box-gum woodland – CEEC); Key's Matchstick Grasshopper (E/-); Koala (E/E)	1330a – 1.4ha	unlikely	ongoing risk	construction, ongoing occupation	relatively minor increase in existing impact/risk.
Loss of food and shelter for fauna	PCT 1330 (Box-gum woodland – CEEC); Key's Matchstick Grasshopper (E/-); Koala (E/E)	1330a – 1.4ha	unlikely	ongoing risk	ongoing occupation	negligible increase in existing impact/risk with implementation of vegetation management plan.
Loss of breeding habitat	PCT 1330 (Box-gum woodland – CEEC); Key's Matchstick Grasshopper (E/-)	1330a – 1.4ha	unlikely	ongoing risk	ongoing occupation	negligible increase in existing impact/risk with implementation of vegetation management plan.
Trampling of threatened flora species	none					n/a
Inhibition of nitrogen fixation and	not relevant					n/a

Indirect impact (Describe impact, e.g. transport of weeds and pathogens form the site to adjacent vegetation)	**Impacted entities** (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	**Extent** (ha or zone reference)	**Frequency**	**Duration** (long-term/ short-term/ medium-term)	**Project phase/ timing of impact** (e.g. construction, operation, rehabilitation)	**Likelihood and consequences**
increased soil salinity						
Fertiliser drift	PCT 1330 (Box-gum woodland – CEEC); Key's Matchstick Grasshopper (E/-); Koala (E/E)	1330a – 1.4ha	unlikely	ongoing risk	ongoing occupation	negligible increase in existing risk with implementation of vegetation management plan.
Rubbish dumping	PCT 1330 (Box-gum woodland – CEEC)	1330a – 1.4ha	unknown	ongoing risk	ongoing occupation	relatively minor increase in existing risk.
Wood collection	PCT 1330 (Box-gum woodland – CEEC)	1330a – 1.4ha	unlikely	ongoing risk	ongoing occupation	negligible increase in existing risk.
Removal of rocks	not relevant					n/a
Increase in predators	PCT 1330 (Box-gum woodland – CEEC); Key's Matchstick Grasshopper (E/-); Koala (E/E)	1330a – 1.4ha	unlikely	ongoing risk	ongoing occupation	moderate increase in existing risk.
Increase in pest animal populations	PCT 1330 (Box-gum woodland – CEEC)	1330a – 1.4ha	unknown	ongoing risk	ongoing occupation	moderate increase in existing risk.
Changed fire regime	PCT 1330 (Box-gum woodland – CEEC); Key's Matchstick Grasshopper (E/-); Koala (E/E)	1330a – 1.4ha	unlikely	ongoing risk	ongoing occupation	negligible increase in existing risk.
Disturbance to specialist breeding and foraging habitat	none					n/a

8.3 Prescribed impacts

8.3.1 Human-made structures

8.3.1.1 Nature

The subject land contains sheds that could potentially be used for roosting by a range of threatened microchiropteran bat species.

8.3.1.2 Extent

There are several sheds of various sizes located within the subject land. All are currently in regular use for farming activities.

8.3.1.3 Duration

Removal during subdivision works.

8.3.1.4 Consequences

Field survey indicates it is not likely that these sheds are in use or are an important roosting resource. Impacts on individuals that may be roosting at the time of demolition would be minimised through implemention of a wildlife management protocol.

8.3.2 Habitat connectivity

8.3.2.1 Nature

Woodland within the subject land has a tenuous connection across Crookwell Road to larger areas of woodland to the east.

8.3.2.2 Extent

Not relevant.

8.3.2.3 Duration

Minor variation in connectivity to be created during construction.

8.3.2.4 Consequences

Development design would maintain and potentially enhance habitat connectivity. Relevant threatened fauna would not be likely to be significantly affected by the modification to connectivity.

8.3.3 Waterbodies, water quality and hydrological processes

8.3.3.1 Nature

Several first and second order streams run through the property. All run through cleared paddocks and contain in-line farm dams.

8.3.3.2 Extent

Not relevant.

8.3.3.3 Duration

There is potential for impacts on water quality during construction works, and also ongoing water quality impacts during occupation of the property.

8.3.3.4 Consequences

All streams within the property would be retained within managed open space corridors. There is opportunity for improvement of biodiversity and hydrological values along these corridors at the development application stage.

8.3.3.5 Maximum predicted offset liability

None anticipated. To be assessed at the development application stage when detailed plans are available.

8.3.4 Vehicle strikes

Table 23 Residual prescribed impacts – vehicle strikes

Threatened fauna or protected fauna that are part of a TEC that are at risk of vehicle strike (identified in Section 6)	SAII entity	Likelihood	Estimated vehicle strike rates	Consequences
Protected fauna that are part of Box-Gum Woodland TEC	No	relatively minor increase in existing risk.	unlikely.	relatively minor increase in impact/risk.

8.4 Mitigating residual impacts – management measures and implementation

Mitigation measures include:

* preparation of a Vegetation Management Plan for retained vegetation in the conservation reserve to protect and enhance biodiversity values in this area from the increased risk of certain indirect impacts.
* preparation of wildlife management protocols to minimise risk to individual animals during clearing and demolition works on the property.

These plans would be prepared at the development application stage when detailed site plans and reports are available. No further mitigation strategies appear warranted at this stage.

8.5 Adaptive management strategy for uncertain impacts (where relevant)

An adaptive management strategy should be incorporated into the Vegetation Management Plan for the conservation reserve, to manage uncertain and unexpected future impacts on this area.

9. Serious and irreversible impacts

9.1 Assessment for serious and irreversible impacts on biodiversity values

Table 24 Entities at risk of an SAII

Common name	Scientific name	Reason for inclusion in assessment
Box-Gum Woodland	*White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions*	Included in current list of entities at risk of an SAII and is likely to be impacted by the proposal

9.1.1 Additional impact assessment provisions for TECs at risk of an SAII

9.1.1.1 Box-Gum Woodland

1. Actions to avoid and minimise direct and indirect impacts

Refer to Chapter 7.1 of the BDAR.

2. Current status (excluding impacts of the proposal)

Table 24 Current status – Box-Gum Woodland

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
Current total geographic extent (ha) of the TEC in NSW	250,729 ha	NSW TSSC Conservation Assessment (Tozer & Simpson, 2020).	Low confidence due to uncertainty in mapping, and rate of ongoing clearing since mapping.
Estimated reduction in geographic extent of the TEC since 1970	93%	NSW TSSC Conservation Assessment (Tozer & Simpson, 2020).	Low confidence, for reasons stated above.

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
Extent of reduction in ecological function, describing the degree of environmental degradation or disruption to biotic processes (Principle 2) SAII Principle 2 is selected in the TBDC - <50 individuals or <250 individuals where threats are known. TBDC description states that the TEC "*has been drastically reduced in area and highly fragmented because of clearance for cropping and pasture improvement*", and "*The condition of remnants ranges from relatively good to highly degraded, such as paddock remnants with weedy understories and only a few hardy natives left*." The TBCD states that intact stands are rare. The NSW TSSC Conservation Assessment (Tozer & Simpson, 2020) states "*it has undergone a very large historical reduction in geographic distribution (since approximately 1750) and has experienced disruption of biotic processes of relative severity >90% over more than 90% of its distribution since 1750*."			
Evidence of restricted geographic distribution (Principle 3) based on the TEC's geographic range in NSW – not applicable			
Extent of occurrence (ha)			
Area of occupancy (ha)			
Number of threat-defined locations			

3. Impact assessment

Table 25 Impact assessment – Box-Gum Woodland

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
Impact on the geographic extent of the TEC (Principles 1 and 3)			
Area of TEC to be impacted by the proposal (ha)	direct = 12.4 ha indirect = 1.4 ha total = 13.8 ha	N/A	N/A

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
Area of TEC to be impacted by the proposal as a % of the current geographic extent in NSW (%)	total = 0.00006%	N/A	N/A
Direct/indirect impacts likely as a result of the proposal to contribute to loss of flora/fauna species characteristic of the TEC.	No impacts likely to result in further loss of flora/fauna species characteristic of the TEC.	N/A	N/A
Impacts likely to contribute to further environmental degradation or disruption of biotic processes (Principle 2)			
Remaining extent of isolated areas of TEC (ha)	42.7 ha of woodland	Based on woodland patch size of 43.4 ha calculated using GIS and aerial imagery, minus 0.7 ha direct loss of woodland	Reasonable confidence within accuracy limits of GIS.
Average distance between remaining remnants – remnant is retained (m)	Approx 50m, across Crookwell Road	Measured using GIS and aerial imagery.	Reasonable confidence within accuracy limits of GIS.
Average distance between remaining remnants – remnant is removed (m)	Approx 120m between proposed conservation reserve and the remainder of the patch across Crookwell Road, to be mitigated through retention of open space and larger residential lots with covenants to retain trees to maintain or improve current connectivity (refer to Ch7.1).	Measured using GIS and aerial imagery.	Reasonable confidence within accuracy limits of GIS.
Estimated maximum dispersal distance of species associated with the TEC (km)	Substantially greater than extent of fragmentation within the subject land and surrounding areas.	Aerial imagery. Author's general knowledge of ecology.	Reasonable confidence given the existing condition and fragmentation of vegetation within the

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
			subject land. Species currently able to persist must be reasonably mobile or have good dispersal ability across fragmented landscapes.
Area to perimeter ratio of remaining remnants (ratio)	Improved ratio, from 1:721 (current) to 1:457.	Aerial imagery.	High confidence based on recent high resolution aerial imagery and site inspections.
Vegetation integrity analysis			
Vegetation Zone b (Composition score)	7.2	N/A	N/A
Vegetation Zone b (Structure score)	24.9	N/A	N/A
Vegetation Zone b (Function score)	39.7	N/A	N/A
Vegetation Zone c (Composition score)	26.9	N/A	N/A
Vegetation Zone c (Structure score)	23.2	N/A	N/A
Vegetation Zone c (Function score)	1.8	N/A	N/A

10. Impact summary

10.1 Determine an offset requirement for impacts

10.1.1 Impacts on native vegetation and TECs or ECs (ecosystem credits)

Table 26 Impacts that do not require offset – ecosystem credits

Vegetation zone	PCT name	TEC	Impact area (ha)	TEC association	Entity at risk of an SAII?	Current VI score
PCT 1330c	Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion	Box-Gum Woodland	11.4	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	Yes	10.4

Table 27 Impacts that require an offset – ecosystem credits

Vegetation zone	PCT name	TEC	Impact area (ha)	Current VI score	Future VI score	Change in VI score	Biodiversity risk weighting	Number of ecosystem credits required
PCT 1330b	Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion	Box-Gum Woodland	0.7	19.2	0	-19.2	2.5	8
							Total credits	8

10.1.2 Impacts on threatened species and their habitat (species credits)

Table 28 Impacts that require an offset – species credits

Common name	Scientific name	BC Act status	EPBC Act status	Loss of habitat (ha) or individuals	Biodiversity risk weighting	Number of species credits required
Key's Matchstick Grasshopper	*Keyacris scurra*	E	-	11.4	2.0	59
Koala	*Phascolarctos cinereus*	E	E	0.7ha	2.0	7
					Total credits	66

10.1.3 Indirect and prescribed impacts

Residual indirect and prescribed impacts would affect a very limited extent of already highly modified and degraded vegetation. The impacts are generally a slight increase to an existing impact on the property.

A further assessment of indirect and prescribed impacts should be carried out at the development application stage when detailed plans are available.

No additional offsets appear warranted at this stage.

10.2 Impacts that do not need further assessment

Table 29 Impacts that do not need further assessment for ecosystem credits

Impact	Location within subject land	Justification why no further assessment is required
Loss of 11.4ha of PCT 1330c grassland	Scattered patches as shown on Figure 8	VI score of 10.4 is below offset threshold.

11. Biodiversity credit report

Refer to Appendix E (Credit reports).

11.1 Ecosystem credits

Table 30 Ecosystem credit class and matching credit profile

Eco-system credit	Attributes shared with matching credits						
	PCT name	**PCT vegetation class**	**PCT vegetation formation**	**Associated TEC or EC**	**Offset trading group** (BAM Section 10.2, Tables 4 & 5)	**Hollow bearing trees present?**	**IBRA subregion** (in which proposal is located)
1330	Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion	Southern Tableland Grassy Woodlands	Grassy Woodlands	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	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. This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698	No	Monaro

11.2 Species credits

Table 31 Species credit class and matching credit profile

Species credit	Attributes shared with matching credits				
	Name of threatened species	Kingdom	BC Act status	EPBC Act status	IBRA region
Keyacris scurra	Key's Matchstick Grasshopper	Animal	E	-	Monaro
Phascolarctos cinereus	Koala	Animal	E	E	Monaro

12. References

Development Masterplan, prepared by Southern Regional Land Engineering (SRLE), December 2022;

Landscape scheme, prepared by Habit8 Landscape Architecture and Urbanism, 08/02/2023;

Tozer M. and Simpson C. 2020. *Conservation Assessment of White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland*. NSW Threatened Species Scientific Committee.

Strategic Bush Fire Study and accompanying *Strategic Bush Fire Study Site Plan*, prepared by SOWDES, 19/11/2022;

Water Cycle Management Study, prepared by SEEC, 22/12/2022.

13. Figures

Figure 1 Site map

Aerial image is from Nearmap (15/02/2022). The entire map area is within the IBRA subregion - Monaro (SEH16), and is in Goulburn Mulwaree Local Government Area.

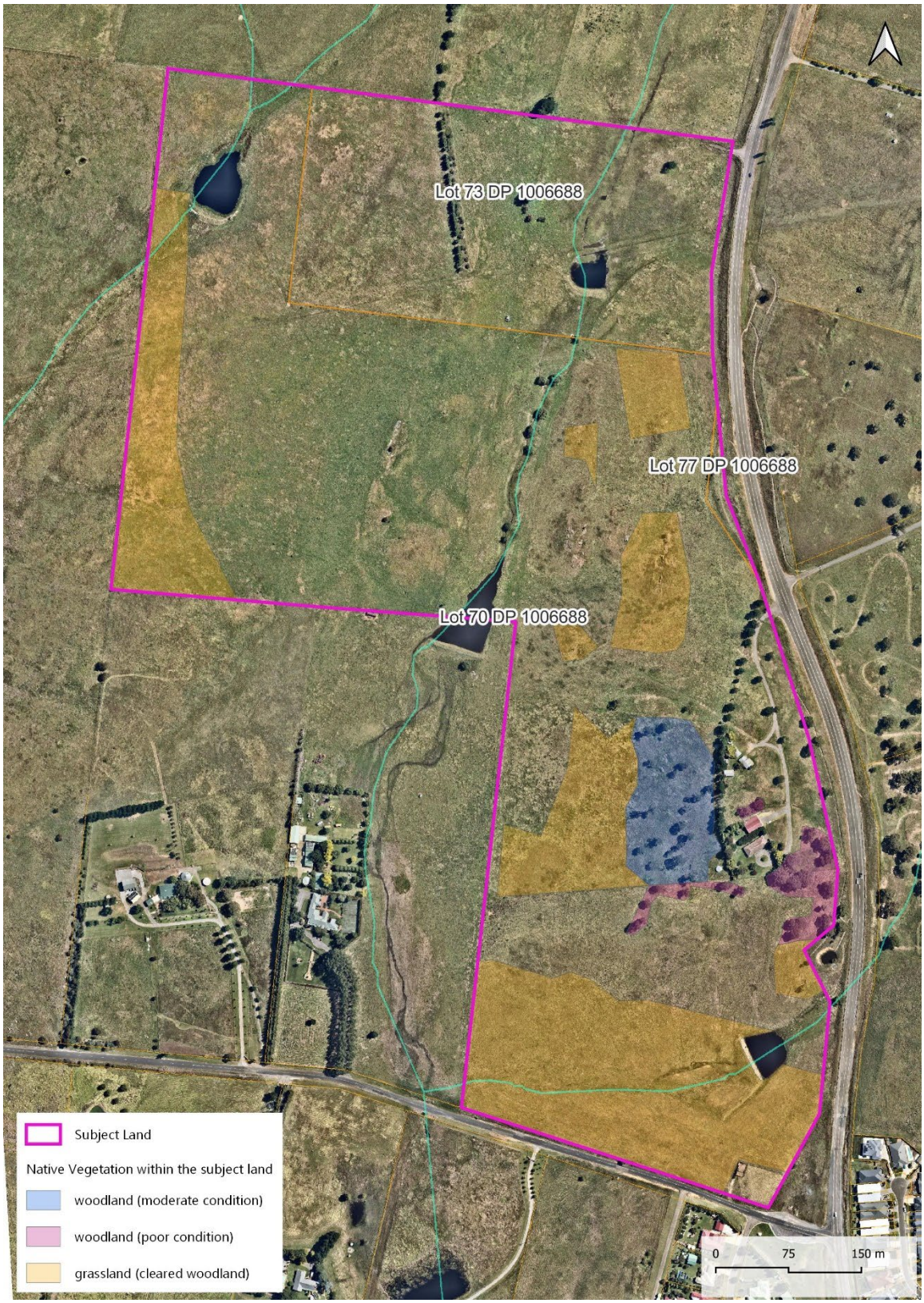


Figure 2 Location map

Aerial image is from Nearmap (15/02/2022). The entire map area is within the Goulburn Mulwaree Local Government Area.

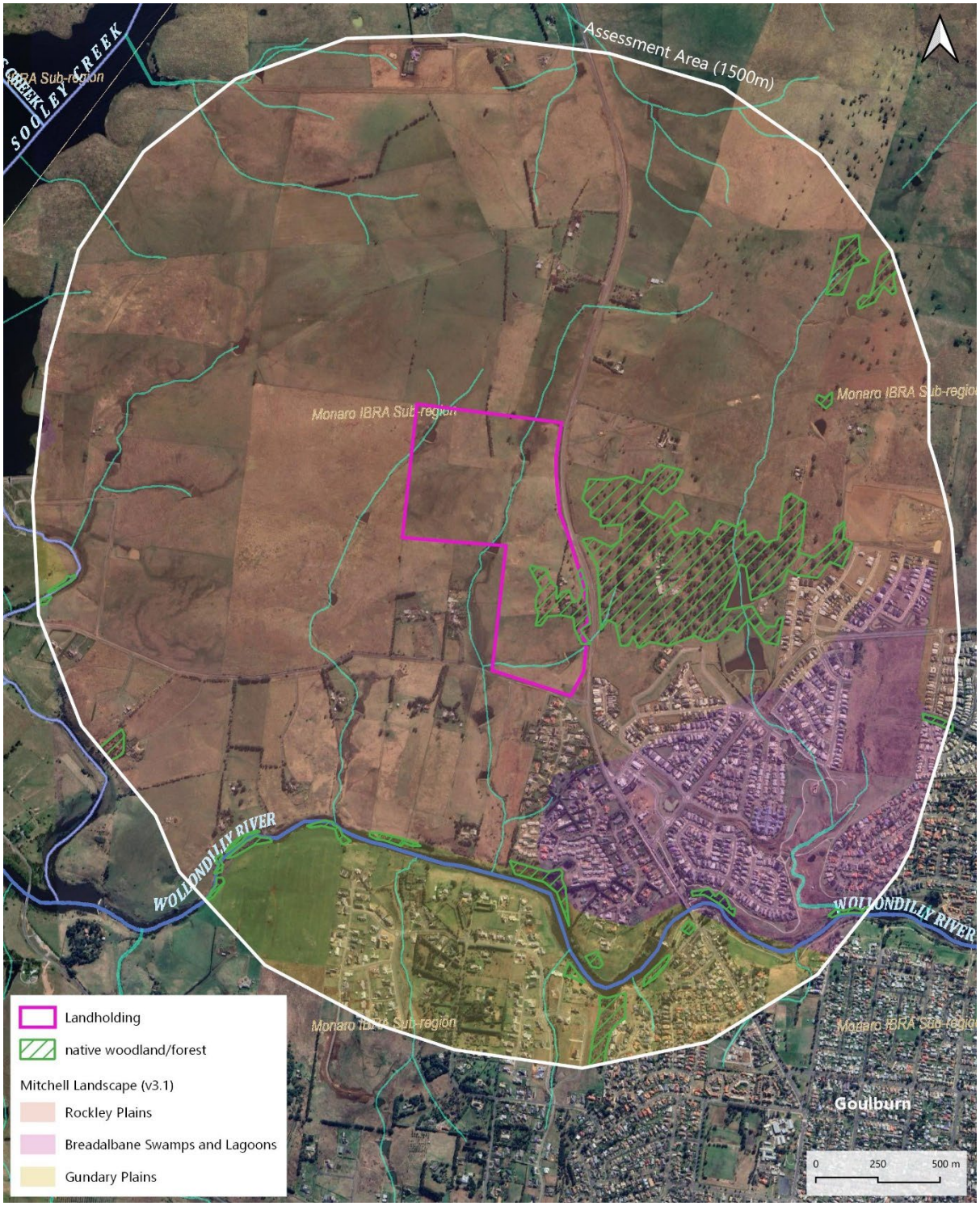


Figure 3 Development layout.

Underlying aerial image is from Nearmap (15/02/2022). Masterplan design prepared by Southern Regional Land Engineering (SRLE), December 2022.

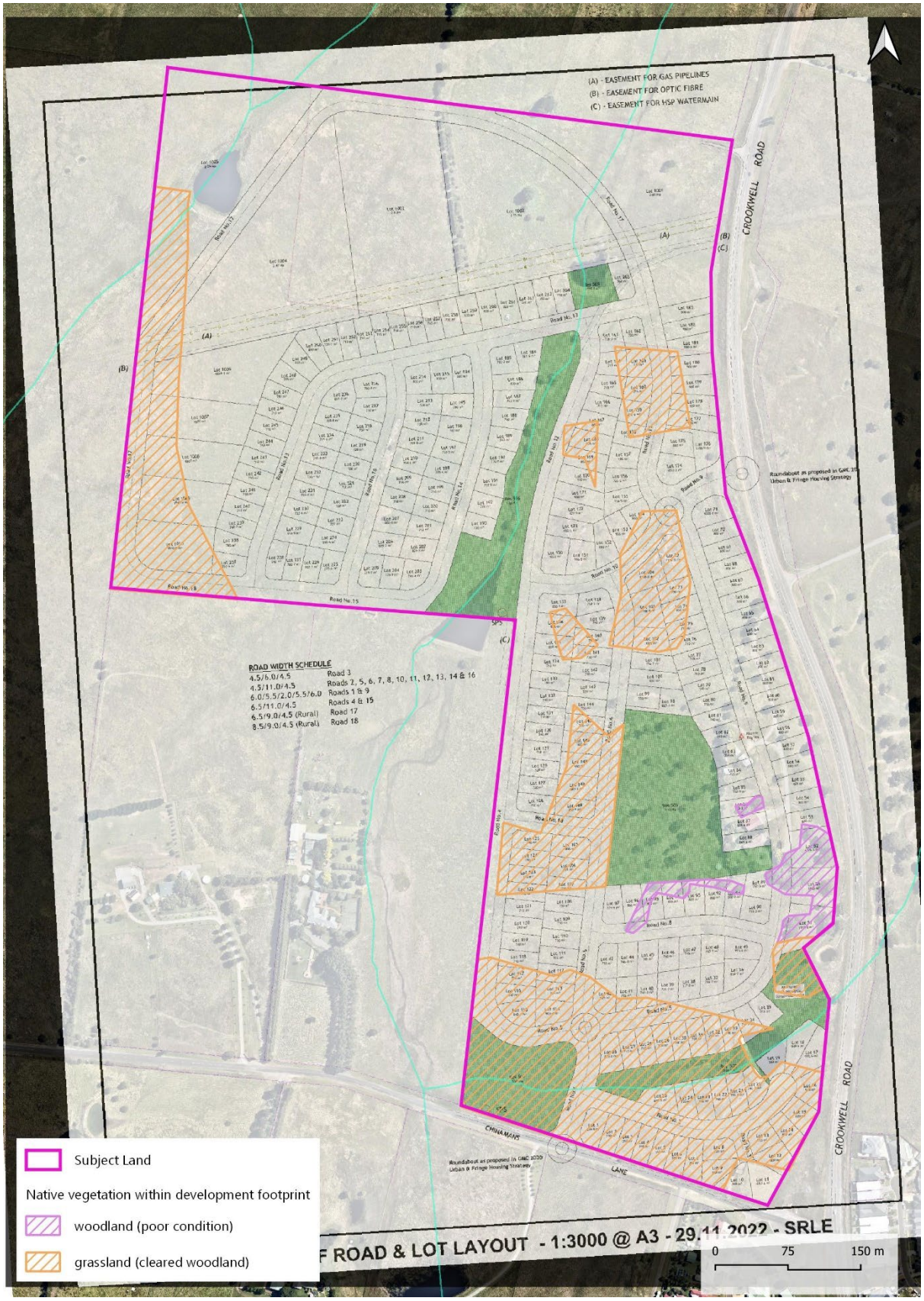


Figure 4 Flora field survey locations

Aerial image is from Nearmap (15/02/2022). BAM-VIS plots are 50m x 20m.

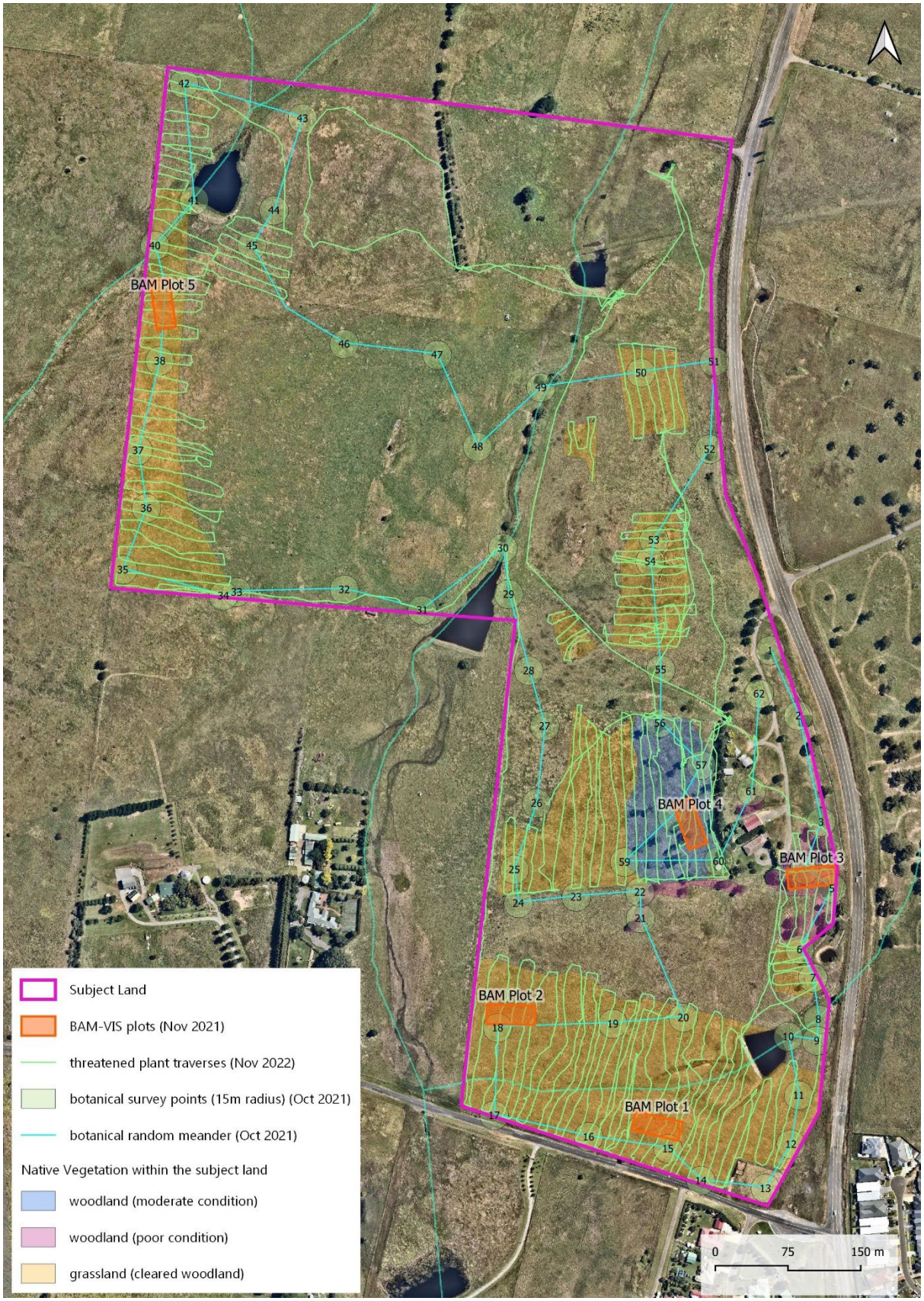


Figure 5 Fauna field survey locations

Aerial image is from Nearmap (15/02/2022).

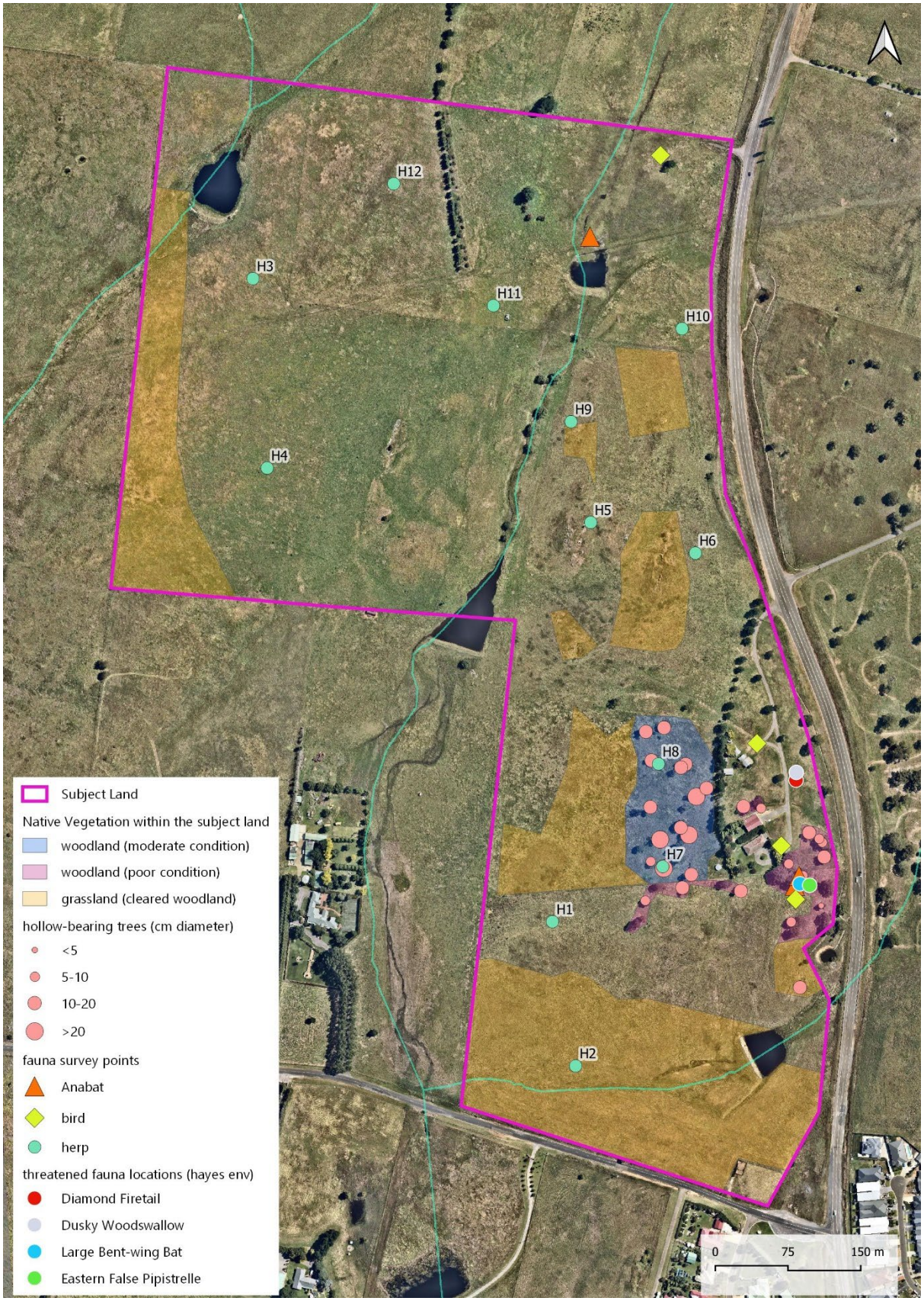


Figure 6 Species polygons

Aerial image is from Nearmap (15/02/2022).

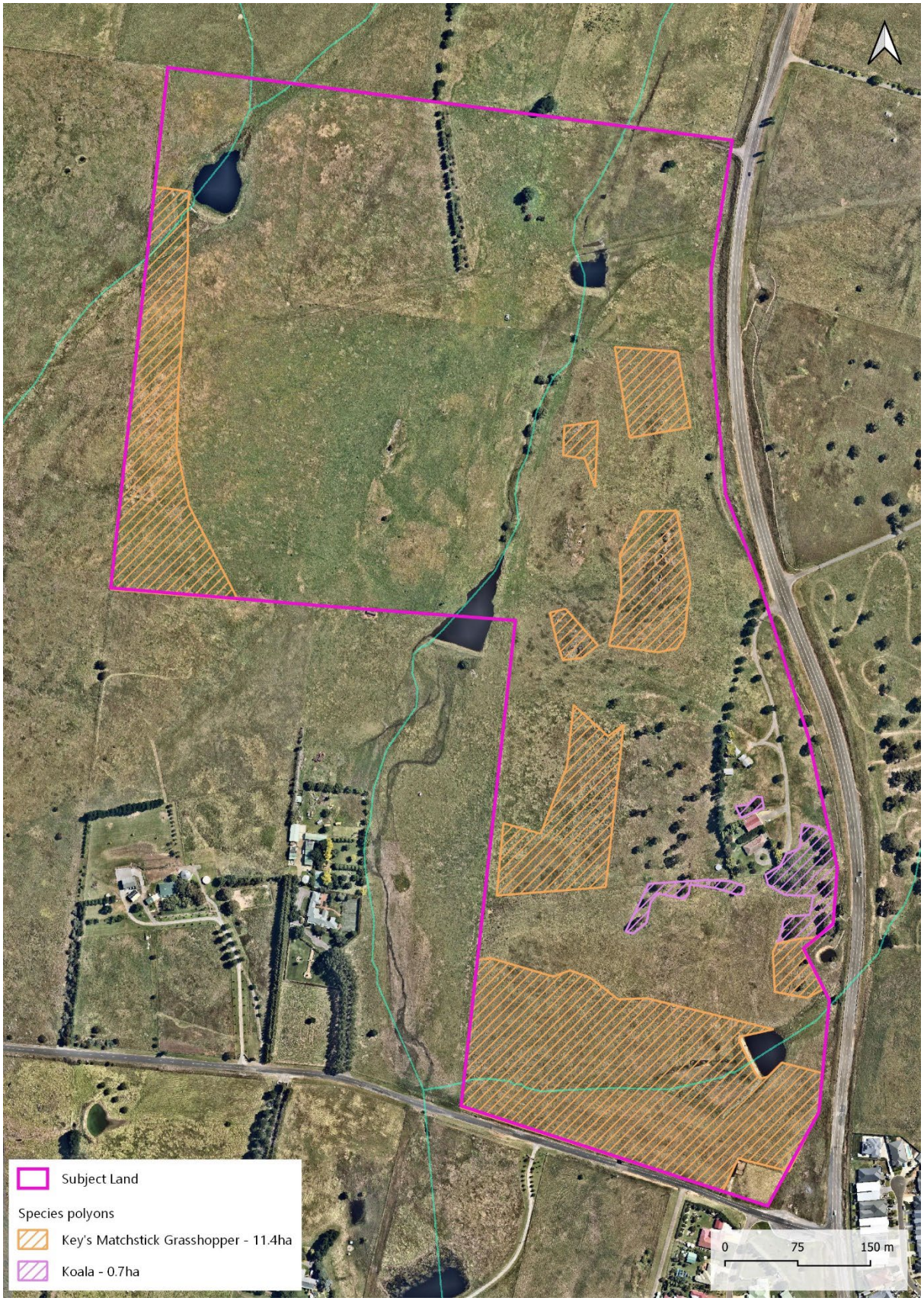


Figure 7 Residual impacts on native vegetation

Aerial image is from Nearmap (15/02/2022).

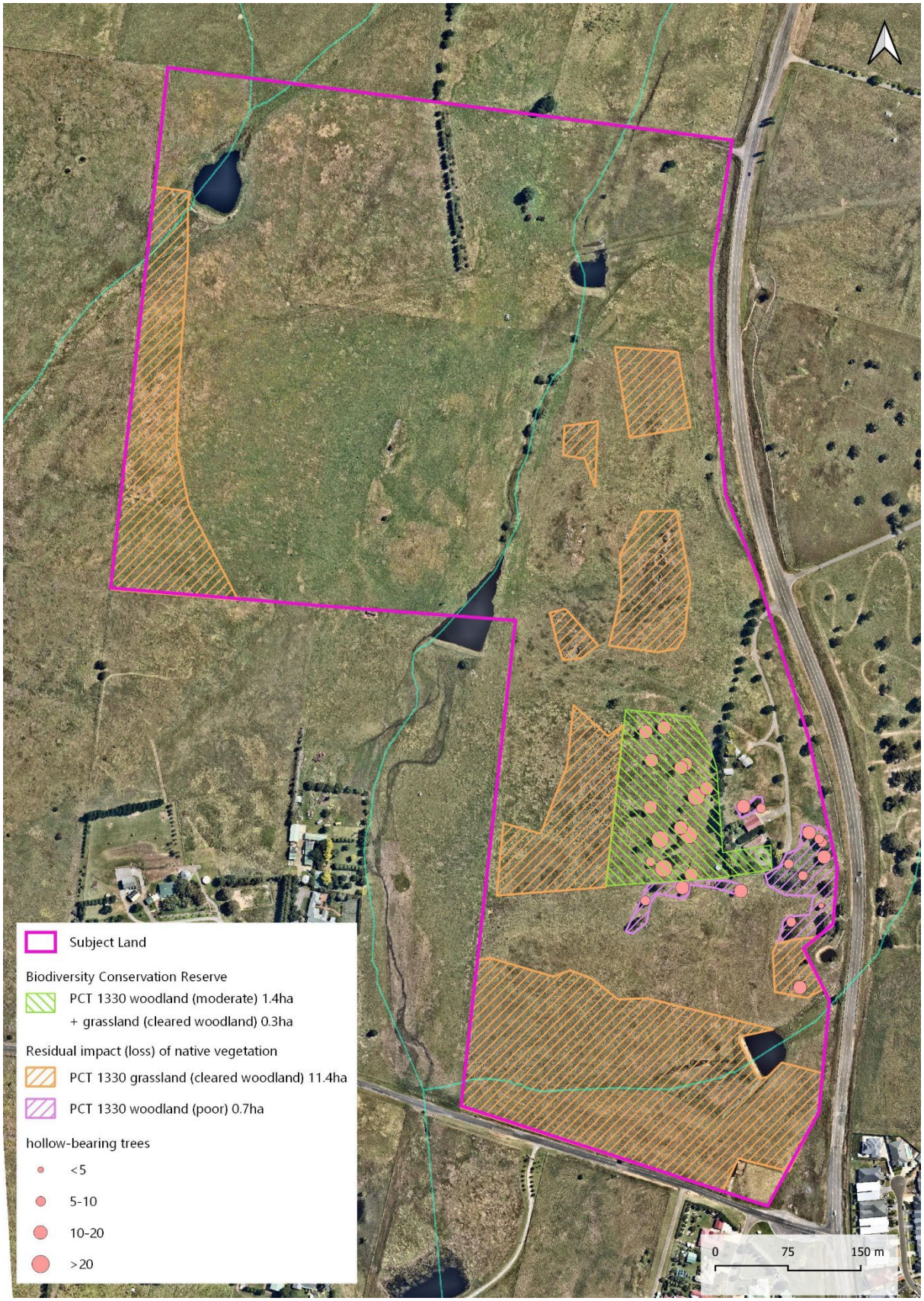
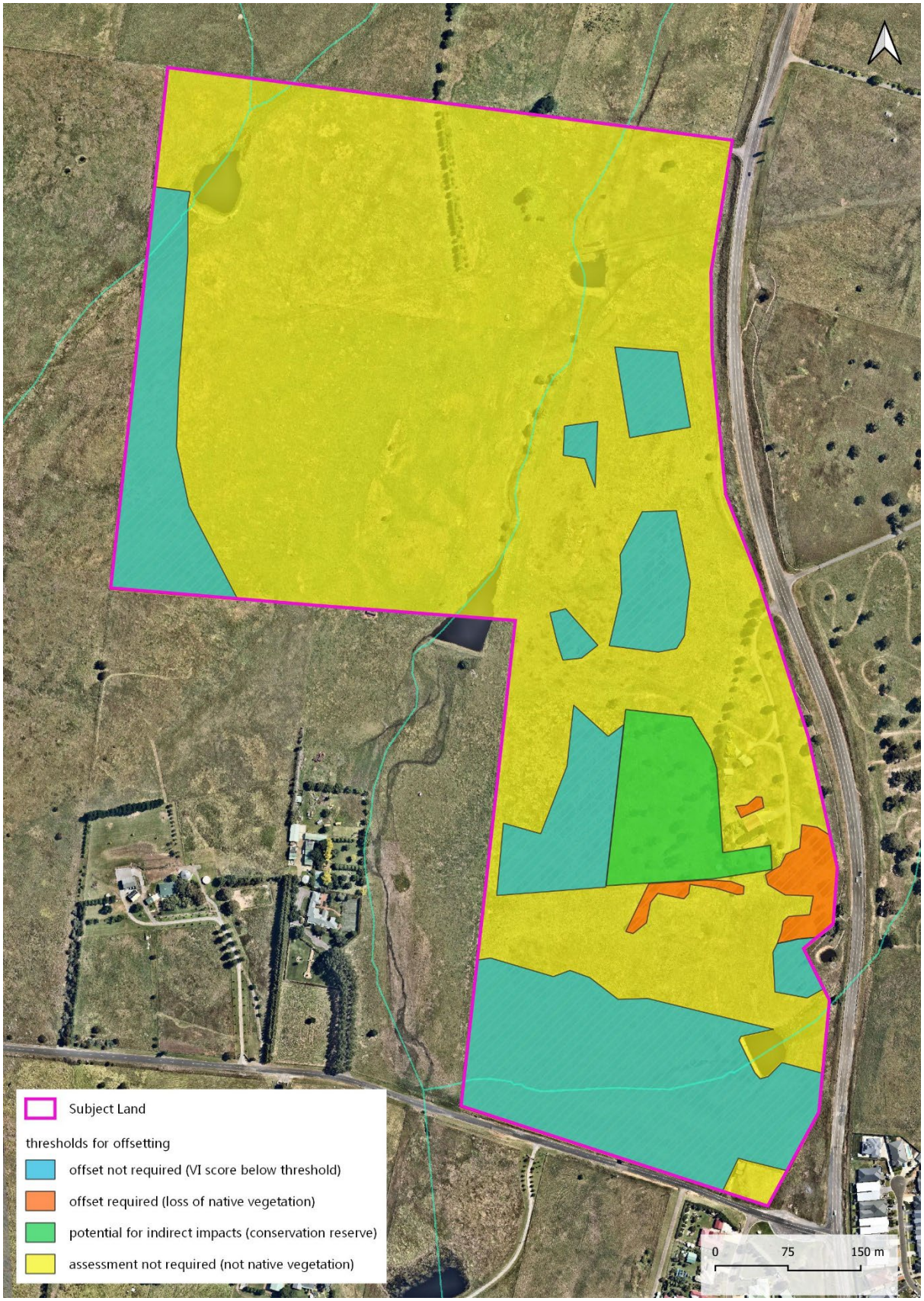


Figure 8 Thresholds for Assessment and Off-setting

Aerial image is from Nearmap (15/02/2022).



Appendix A: BDAR requirements compliance

Table 32 Assessment of compliance with BDAR minimum information requirements

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
Introduction	Chapters 2 and 3	**Information**	
		Introduction to the biodiversity assessment including:	–
		☒ brief description of the proposal	Ch 1.1.1, pg 1
		☒ identification of subject land boundary, including: ☒ operational footprint ☒ construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure	Ch 1.1.3. pg 1
		☒ general description of the subject land	Ch 1.1.3, pg 1
		☒ sources of information used in the assessment, including reports and spatial data	Ch 1.1.4, pg 2; & Ch 1.5, pg 3
		☒ identification and justification for entering the BOS	Ch 1.2, pg 2
		Maps and tables	
		☒ Map of the subject land boundary showing the final proposal footprint, including the construction footprint for any clearing associated with temporary/ancillary construction facilities and infrastructure	Figure 1; & Figure 3

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
Landscape	Sections 3.1 and 3.2, Appendix E	**Information**	
		Identification of site context components and landscape features, including:	–
		☒ general description of subject land topographic and hydrological setting, geology and soils	Ch 1.1.3, pg 1 Ch 3.2, pg 14
		☒ per cent native vegetation cover in the assessment area (as described in BAM Section 3.2)	Ch 3.3, pg 15
		☒ IBRA bioregions and subregions (as described in BAM Subsection 3.1.3(2.))	Ch 3.2.1, pg 14
		☒ rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3(3.) and Appendix E)	Ch 3.2.2, pg 14
		☒ wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3(3.))	Ch 3.2.2, pg 14
		☒ connectivity of different areas of habitat (as described in BAM Subsection 3.1.3(5–6.))	Ch 3.2.3, pg 14
		☒ karst, caves, crevices, cliffs, rocks and other geological features of significance and for vegetation clearing proposals, soil hazard features (as described in BAM Subsections 3.1.3(7.) and 3.1.3(12.))	Ch 3.2.4, pg 15
		☐ areas of outstanding biodiversity value occurring on the subject land and assessment area (as described in BAM Subsection 3.1.3(8–9.)) – *not applicable*	Ch 3.2.5, pg 11
		☐ any additional landscape features identified in any SEARs for the proposal – *not applicable*	Ch 3.2.7, pg 11
		☒ NSW (Mitchell) landscape on which the subject land occurs	Ch 3.2.6, pg 15
		☒ details of field reconnaissance undertaken to confirm the extent and condition of landscape features and native vegetation cover (as described in Operational Manual Stage 1 Section 2.4)	Ch 2.1, pg 5
		Maps and tables	
		☒ Site Map ☒ Property boundary ☒ Boundary of subject land ☒ Cadastre of subject land (including labelling of Lot and DP or section plan if relevant) ☒ Landscape features identified in BAM Subsection 3.1.3	Figure 1
		☒ Location Map ☒ Digital aerial photography at 1:1,000 scale or finer	Figure 2

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ Boundary of subject land ☒ Assessment area (i.e. the subject land and either 1500 m buffer area or 500 m buffer for linear development) ☒ Landscape features identified in BAM Subsection 3.1.3 ☒ Additional detail (e.g. local government area boundaries) relevant at this scale	
		Landscape features identified in BAM Subsection 3.1.3 and to be shown on the Site Map and/or Location Map include:	–
		☒ IBRA bioregions and subregions ☒ rivers, streams and estuaries ☐ wetlands and important wetlands – *none relevant* ☒ connectivity of different areas of habitat ☐ karst, caves, crevices, cliffs, rocks and other geological features of significance and if required, soil hazard features – *none relevant* ☐ areas of outstanding biodiversity value occurring on the subject land and assessment area – *none relevant* ☐ any additional landscape features identified in any SEARs for the proposal – *none relevant* ☒ NSW (Mitchell) landscape on which the subject land occurs	Figure 1; & Figure 2
		Data	
		☐ All report maps as separate jpeg files – *This is a preliminary BDAR for a planning proposal – jpeg files can be provided if required.*	–
		Individual digital shape files of - *This is a preliminary BDAR for a planning proposal – shape files can be provided if required.*	–
		☐ subject land boundary	–
		☐ assessment area (i.e. subject land and 1500 m buffer area) boundary	–
		☐ cadastral boundary of subject land	–
		☐ areas of native vegetation cover	–
		☐ landscape features	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
Native vegetation	Chapter 4, Appendix A and Appendix H	**Information**	
		☒ Identify native vegetation extent within the subject land, including cleared areas and evidence to support differences between mapped vegetation extent and aerial imagery (as described in BAM Section 4.1(1–3.) and Subsection 4.1.1)	Ch 4.1 pg17; & Figure 1
		☒ Provide justification for all parts of the subject land that do not contain native vegetation (as described in BAM Subsection 4.1.2)	Ch 4.1.2 pg17
		☒ Review of existing information on native vegetation including references to previous vegetation maps of the subject land and assessment area (described in BAM Section 4.1(3.) and Subsection 4.1.1)	Ch 2.2.1 pg5
		☒ Describe the systematic field-based floristic vegetation survey undertaken in accordance with BAM Section 4.2	Ch 2.2.3 pg6
		☐ Where relevant, describe the use of more appropriate local data, provide reasons that support the use of more appropriate local data and include the written confirmation from the decision-maker that they support the use of more appropriate local data (as described in BAM Subsection 1.4.2 and Appendix A) – *not relevant*	
		For each PCT within the subject land, describe:	–
		☒ PCT name and ID	Ch 4.2 pg17; & Figure 1
		☒ vegetation class	Ch 4.2.2 – Table 5
		☒ extent (ha) within subject land	Ch 4.2.2 – Table 5
		☒ evidence used to identify a PCT including any analyses undertaken, references/sources, existing vegetation maps (BAM Section 4.2(1–3.))	Ch 2.2; & Ch 4.2.2.3 pg21
		☒ plant species relied upon for identification of the PCT and relative abundance of each species	Ch 4.2.2.1 & 4.2.2.3 & Appendix C
		☒ if relevant, TEC status including evidence used to determine vegetation is the TEC (BAM Subsection 4.2.2(1–2.))	Ch 4.2.2.4 & 4.2.2.5, pg22
		☒ estimate of per cent cleared value of PCT (BAM Subsection 4.2.1(5.))	Ch 4.2.2 – Table 5

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Describe the vegetation integrity assessment of the subject land, including:	–
		☒ identification and mapping of vegetation zones (as described in BAM Subsection 4.3.1)	Ch 4.4 pg24; & Figure 1
		☒ description of vegetation zones within the subject land (as described in Operational Manual Stage 1 Table 2 and Subsection 3.3.2)	Ch 4.4; & Figure 1
		☒ area (ha) of each vegetation zone	Ch 4.4 pg24
		☒ assessment of patch size (as described in BAM Subsection 4.3.2)	Table 7 pg25
		☒ survey effort (i.e. number of vegetation integrity survey plots) as described in BAM Subsection 4.3.4(1–2.)	Table 7 pg25
		☐ use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsection 4.3.3(5.)) - *not relevant*	Ch 4.5.3 pg26
		Where use of more appropriate local benchmark data is proposed (as described in BAM Subsection 1.4.2, BAM Subsection 4.3.3(5.) and BAM Appendix A): - *not relevant*	–
		☐ identify the PCT or vegetation class for which local benchmark data will be applied	
		☐ identify published sources of local benchmark data (if benchmarks obtained from published sources)	
		☐ describe methods of local benchmark data collection (if reference plots used to determine local benchmark data)	
		☐ provide justification for use of local data rather than BioNet Vegetation Classification benchmark values	
		☐ provide written confirmation from the decision-maker that they support the use of local benchmark data	
		Maps and tables	
		☒ Map of native vegetation extent within the subject land at scale not greater than 1:10,000 including identification of all areas of native vegetation including areas that are ground cover only, cleared areas (as described in BAM Section 4.1(1–3.)) and all parts of the subject land that do not contain native vegetation (BAM Subsection 4.1.2)	Figure 1 & Figure 8
		☒ Map of PCTs within the subject land (as described in BAM Section 4.2(1.))	Figure 1 & Figure 7
		☒ Map of vegetation zones within the subject land (as described in BAM Subsection 4.3.1)	Figure 1
		☒ Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCT boundaries	Figure 4

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ Map of TEC distribution on the subject land and table of TEC listing, status and area (ha) –	Figure 1; & Table 6 pg23
		☒ Map of patch size locations for each native vegetation zone and table of patch size areas (as described in BAM Subsection 4.3.2)	Figure 2; & Table 7 pg25
		Table of current vegetation integrity scores for each vegetation zone within the site and including:	–
		☒ composition condition score ☒ structure condition score ☒ function condition score ☒ presence of hollow bearing trees	Table 8 pg26
		Data	
		☐ All report maps as separate jpeg files - *This is a preliminary BDAR for a planning proposal – jpeg files can be provided if required.*	–
		☐ Plot field data (MS Excel format) - *This is a preliminary BDAR for a planning proposal – excel files can be provided if required.*	-
		☒ Plot field datasheets	Appendix C
		Digital shape files of: - *This is a preliminary BDAR for a planning proposal – shape files can be provided if required.*	–
		☐ PCT boundaries within subject land	–
		☐ TEC boundaries within subject land	–
		☐ vegetation zone boundaries within subject land	–
		☐ floristic vegetation survey and vegetation integrity plot locations	–
Threatened species	Chapter 5	**Information**	
		Identify ecosystem credit species likely to occur on the subject land, including:	–
		☒ list of ecosystem credit species derived from the BAM-C (as described in BAM Subsection 5.1.1 and Section 5.2(1.))	Ch 5.1.1 – Table 9 pg27
		☒ justification and supporting evidence for exclusion of any ecosystem credit species based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	Ch 5.1.1.1 pg30
		☒ justification for addition of any ecosystem credit species to the list –	Ch 5.1.1.2 pg31

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Identify species credit species likely to occur on the subject land, including:	–
		☒ list of species credit species derived from the BAM-C (as described in BAM Subsection 5.1.1)	Ch 5.1.2 - Tables 10 & 11
		☒ justification and supporting evidence for exclusions based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	Ch 5.1.2.1 pg37
		☒ justification and supporting evidence for exclusions based on degraded habitat constraints and/or microhabitats on which the species depends (as described in BAM Subsection 5.2.2)	Ch 5.1.1.1 pg37
		☒ justification for addition of any species credit species to the list	Ch 5.1.1.2 pg39
		From the list of candidate species credit species, identify:	–
		☒ species assumed present within the subject land (if relevant) (as described in BAM Subsection 5.2.4(2.a.)) -	Ch 5.2 – Tables 12 & 13 pgs40&41
		☐ species present within the subject land on the basis of being identified on an important habitat map for a species (as described in BAM Subsection 5.2.4(2.d.)) – *not relevant*	
		☒ species for which targeted surveys are to be completed to determine species presence (BAM Subsection 5.2.4(2.b.))	
		☐ species for which an expert report is to be used to determine species presence (BAM Subsection 5.2.4(2.c.)) - *not relevant*	
		Present the outcomes of species credit species assessments from:	–
		☒ threatened species survey (as described in BAM Section 5.2.4)	Ch 5.3 - Table 14
		☐ expert reports (if relevant) including justification for presence of the species and information used to make this determination (as described in BAM Subsection 5.2.4, Section 5.3, Box 3) – *not relevant*	
		Where survey has been undertaken include detailed information on:	–
		☒ survey method and effort (as described in BAM Section 5.3)	Ch 2.3 pg7 & 2.4 pg9; Figures 4 & 5
		☒ justification of survey method and effort (e.g. citation of peer-reviewed literature) if approach differs from the department's taxa-specific survey guides or where no relevant guideline has been published	Ch 2.3 & Ch 2.4
		☒ timing of survey in relation to requirements in the TBDC or the department's taxa-specific survey guides. Where survey was undertaken outside these guides include justification for the timing of surveys	Ch 5.3 – Table 14 pg42
		☒ survey personnel and relevant experience	Declarations - xii

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ describe any limitations to surveys and how these were addressed/overcome	Ch 2.6 pg 12
		Where an expert report has been used in place of survey (as described in BAM Section 5.3, Box 3), include: - *not relevant*	–
		☐ justification of the use of an expert report ☐ identify the expert, provide evidence of their expert credentials and departmental approval of expert status ☐ all requirements of Box 3 have been addressed in the expert report	
		Where use of local data is proposed (BAM Subsection 1.4.2): - *not relevant*	–
		☐ identify relevant species ☐ identify data to be amended ☐ identify source of information for local data, e.g. published literature, additional survey data, etc. ☐ justify use of local data in preference to VIS Classification or TBDC data	
		☐ provide written confirmation from the decision-maker that they support the use of local data	
		Species polygon completed for species credit species present within the subject land (assumed present or determined on the basis of survey, expert report or important habitat map) ensuring that: -	Figure 6
		☒ the unit of measure for each species is documented	Ch 5.6 pg 53
		for species assessed by area:	–
		☒ the polygon includes the extent of suitable habitat for the target species within the subject land (as described in BAM Subsection 5.2.5)	Figure 6
		☒ a description of, and evidence-based justification for, the habitat constraints, features or microhabitats used to map the species polygon including reference to information in the TBDC for that species and any buffers applied	Ch 5.6 Table 16 pg53 Figure 6 pg73 Table 11 pg34, Ch 5.1.2.1 pg37
		for species assessed by counts of individuals: - *not relevant*	–
		☐ the number of individual plants present on the subject land (as described in BAM Subsection 5.2.5(3.))	
		☐ the method used to derive this number (i.e. threatened species survey or expert report) and evidence-based justification for the approach taken	
		☐ the polygon includes all individuals located on the subject land with a buffer of 30 m around the	

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		individuals or groups of individuals on the subject land	
		☒ Identify the biodiversity risk weighting for each species credit species identified as present within the subject land (as described in BAM Section 5.4)	Table 16 pg53
		Maps and tables	
		☒ Table showing ecosystem credit species in accordance with BAM Subsection 5.1.1, and identifying:	Table 9 pg27
		☒ the ecosystem credit species removed from the list	Ch 5.1.1.1 pg30
		☒ the sensitivity to gain class of each species	Table 9 pg27
		☒ Table detailing species credit species in accordance with BAM Section 5.2 and identifying:	Tables 10 & 11
		☒ the species credit species removed from the list of species because the species is considered vagrant, out of geographic range or the habitat or microhabitat features are not present	Tables 10 & 11 Ch 5.1.2.1 pg37
		☒ the candidate species credit species not recorded on the subject land as determined by targeted survey, expert report or important habitat map	Tables 12, 13, 14 & 15 Ch 5.1.2.1 pg37
		☒ Table detailing species credit species recorded or assumed as present within the subject land, habitat constraints or microhabitats associated with the species, counts of individuals (flora)/extent of suitable habitat (flora and fauna) (as described in BAM Subsection 5.2.6) and biodiversity risk weighting (BAM Section 5.4)	Table 16 pg53
		☒ Map indicating the GPS coordinates of all individuals of each species recorded within the subject land and the species polygon for each species (as described in BAM Subsection 5.2.5)	Figures 5 & 6
		Data	
		☐ Digital shape files of suitable habitat identified for survey for each candidate species credit species – *This is a preliminary BDAR for a planning proposal – shape files can be provided if required.*	
		☒ Survey locations including GPS coordinates of any plots, transects, grids	locations shown on Figures 4 & 5
		☐ Digital shape files of each species polygon including GPS coordinates of located individuals - *This is a preliminary BDAR for a planning proposal – shape files can be provided if required.*	-
		☐ Species polygon map in jpeg format - *This is a preliminary BDAR for a planning proposal – jpeg files can be provided if required.*	-
		☐ Expert reports and any supporting data used to support conclusions of the expert report – *not relevant*	
		☒ Field datasheets detailing survey information including prevailing conditions, date, time, equipment used, etc.	Appendix C

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
Prescribed impacts	Chapter 6	**Information**	
		Identify potential prescribed biodiversity impacts on threatened entities, including:	–
		☐ karst, caves, crevices, cliffs, rocks and other geological features of significance (as described in BAM Subsection 6.1.1) – *not relevant* ☒ occurrences of human-made structures and non-native vegetation (as described in BAM Subsection 6.1.2) ☒ corridors or other areas of connectivity linking habitat for threatened entities (as described in BAM Subsection 6.1.3) ☒ waterbodies or any hydrological processes that sustain threatened entities (as described in BAM Subsection 6.1.4)	Table 18 pg55
		☐ protected animals that may use the proposed wind farm development site as a flyway or migration route (as described in BAM Subsection 6.1.5) – *not relevant*	
		☒ where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community (as described in BAM Subsection 6.1.6) –	Table 18
		☒ Identify a list of threatened entities that may be dependent upon or may use habitat features associated with any of the prescribed impacts –	Table 18
		☒ Describe the importance of habitat features to the species including, where relevant, impacts on life cycle or movement patterns (e.g. Subsection 6.1.3)	Table 18
		Where the proposed development is for a wind farm: – *not relevant*	–
		☐ identify a candidate list of protected animals that may use the development site as a flyway or migration route, including: resident threatened aerial species, resident raptor species and nomadic and migratory species that are likely to fly over the proposal area (as described in BAM Subsection 6.1.5)	
		☐ provide details of targeted survey for candidate species of wind farm developments undertaken in accordance with BAM Subsection 6.1.5(2–3.)	
		☐ predict the habitual flight paths for nomadic and migratory species likely to fly over the subject land and map the likely habitat for resident threatened aerial and raptor species (BAM Subsection 6.1.5(4.))	

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Where the proposal may result in vehicle strike: –	–
		☒ identify a list of threatened fauna or protected fauna species that are part of a TEC and at risk of vehicle strike due to the proposal	Table 18
		Maps and tables	
		☒ Map showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.) – *waterbodies, vegetation and structures are clear on the aerial image base for Figure 1.*	Figure 1
		☐ Map showing location of potential vehicle strike locations – *detailed design not confirmed at this planning proposal stage*	
		☐ Maps of habitual flight paths for nomadic and migratory species likely to fly over the site and maps of likely habitat for threatened aerial species resident on the site (for wind farm developments only) – *not relevant*	
		Data	
		☐ Digital shape files of prescribed impact feature locations – *not relevant*	
		☐ Prescribed impact features map in jpeg format - *This is a preliminary BDAR for a planning proposal – jpeg files can be provided if required.*	
Avoid and minimise impacts	Chapter 7	**Information**	
		Demonstration of efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the proposal location in accordance with Chapter 7, including an analysis of alternative:	Ch 7 pg 56
		☐ modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology – *not relevant at this planning proposal stage*	
		☐ routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route – *not relevant*	
		☐ alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location - *not relevant*	
		☒ alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site	Ch 7.1.1 & 7.2.1
		☒ Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design (as described in BAM Sections 7.1 and 7.2)	Ch 7.1.2 & 7.2.2

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ Identification of any other site constraints that the proponent has considered in determining the location and design of the proposal (as described in BAM Subsection 7.2.1(3.))	Ch 7.1 & 7.2
		☐ Detail measures or options considered but not implemented because they are not feasible and/or practical (e.g. due to site constraints) – *not relevant*	
		Maps and tables	
		☒ Table of measures to be implemented to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility	Table 19 pg58
		☐ Map of alternative footprints considered to avoid or minimise impacts on biodiversity values; and of the final proposal footprint, including construction and operation – *not applicable*	
		☒ Maps demonstrating indirect impact zones where applicable	Figure 8
		Data	
		Digital shape files of: - *This is a preliminary BDAR for a planning proposal – shape files can be provided if required.*	–
		☐ alternative and final proposal footprint	–
		☐ direct and indirect impact zones	–
		☐ Maps in jpeg format - *This is a preliminary BDAR for a planning proposal – jpeg files can be provided if required.*	–
Assessment of impacts	Chapter 8, Sections 8.1 and 8.2	**Information**	
		☒ Determine the impacts on native vegetation and threatened species habitat, including a description of direct impacts of clearing of native vegetation, threatened ecological communities and threatened species habitat (as described in BAM Section 8.1)	Ch 8.1 pg59 Table 20
		Assessment of indirect impacts on vegetation and threatened species and their habitat including (as described in BAM Section 8.2):	Ch 8.2 pg60 Table 22
		☒ description of the nature, extent, frequency, duration and timing of indirect impacts of the proposal	Table 22
		☒ documenting the consequences to vegetation and threatened species and their habitat including evidence-based justifications	Table 22
		☒ reporting any limitations or assumptions, etc. made during the assessment	Table 22
		☒ identification of the threatened entities and their habitat likely to be affected –	Table 22

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Assessment of prescribed biodiversity impacts (as described in BAM Section 8.3) including:	Ch 8.3 pg63
		assessment of the nature, extent frequency, duration and timing of impacts on the habitat of threatened species or ecological communities associated with:	–
		☐ karst, caves, crevices, cliffs, rocks and other features of geological significance – *not relevant*	
		☒ human-made structures	Ch 8.3.1 pg63
		☐ non-native vegetation - *not relevant*	
		☒ connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	Ch 8.3.2 pg63
		☒ movement of threatened species that maintains their life cycle	Ch 8.3.2 pg63
		☒ water quality, waterbodies and hydrological processes that sustain threatened species and threatened ecological communities	Ch 8.3.3 pg63
		☐ assessment of the impacts of wind turbine strikes on protected animals - *not relevant*	
		☒ assessment of the impacts of vehicle strikes on threatened species of animals or on animals that are part of a TEC	Ch 8.3.4 pg65
		☒ evaluate the consequences of prescribed impacts	Ch 8.3
		☒ describe impacts that are uncertain	throughout relevant sections & Ch 8.5
		☒ document limitations to data, assumptions and predictions	throughout relevant sections
		Maps and tables	
		☒ Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts	Table 21 pg60
		Data	
		N/A	–
Mitigation and management of impacts	Chapter 8, Sections 8.4 and 8.5	**Information**	
		Identification of measures to mitigate or manage impacts in accordance with the recommendations in BAM Sections 8.4 and 8.5 including: - *to be developed at the development application stage when detailed plans and reports are available.*	Ch 8.4 pg65

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ techniques, timing, frequency and responsibility ☐ identify measures for which there is risk of failure ☐ evaluate the risk and consequence of any residual impacts	
		☐ document any adaptive management strategy proposed	
		Identification of measures for mitigating impacts related to:	
		☐ displacement of resident fauna (as described in BAM Subsection 8.4.1(2.)) ☐ indirect impacts on native vegetation and habitat (as described in BAM Subsection 8.4.1(3.)) ☐ mitigating prescribed biodiversity impacts (as described in BAM Subsection 8.4.2)	
		☐ Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM Section 8.5) -	
		Maps and tables	
		☐ Table of measures to be implemented before, during and after construction to mitigate and manage impacts of the proposal, including action, outcome, timing and responsibility	
		Data	
		N/A	–
Impact summary	Chapter 9	**Information**	
		Identification and assessment of impacts on TECs and threatened species that are at risk of a serious and irreversible impacts (SAII, in accordance with BAM Section 9.1) including: -	Ch 9 pg66
		☒ addressing all criteria in Subsection 9.1.1 for each TEC listed as at risk of an SAII present on the subject land	
		☒ for each TEC, report the extent of the TEC in NSW	
		☒ addressing all criteria in Subsection 9.1.2 for each threatened species at risk of an SAII present on the subject land	
		☒ for each threatened species, report the population size in NSW – *not relevant*	
		☒ documenting assumptions made and/or limitations to information ☒ documenting all sources of data, information, references used or consulted ☒ clearly justifying why any criteria could not be addressed	
		☒ Identification of impacts requiring offset in accordance with BAM Section 9.2	Ch10.1 Table 27 pg70

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1(3.)	Ch10.1 Table 26 pg70
		☒ Identification of areas not requiring assessment in accordance with BAM Section 9.3	Figure 8
		Maps and tables	
		☒ Map showing the extent of TECs at risk of an SAII within the subject land	Figure 3
		☒ Map showing location of threatened species at risk of an SAII within the subject land - *all native vegetation*	Figure 1
		Map showing location of:	
		☒ impacts requiring offset	Figure 8
		☒ impacts not requiring offset	Figure 8
		☒ areas not requiring assessment	Figure 8
		Data	
		Digital shape files of: - *This is a preliminary BDAR for a planning proposal – shape files can be provided if required.*	
		☐ extent of TECs at risk of an SAII within the subject land	
		☐ location of threatened species at risk of an SAII within the subject land	
		☐ boundary of impacts requiring offset	
		☐ boundary of impacts not requiring offset	
		☐ boundary of areas not requiring assessment	
		☐ Maps in jpeg format - *This is a preliminary BDAR for a planning proposal – jpeg files can be provided if required.*	
Impact summary	Chapter 10	**Information**	
		Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including:	–
		☒ future vegetation integrity score for each vegetation zone within the subject land (Equation 25 and Equation 26 in BAM Appendix H) ☒ change in vegetation integrity score (BAM Subsection 8.1.1) ☒ number of required ecosystem credits for the direct impacts of the proposal on each vegetation zone within the subject land (BAM Subsection 10.1.2)	Table 27 pg70

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ biodiversity risk weighting for each	Table 27
		☒ number of required species credits for each candidate threatened species that is directly impacted on by the proposal (BAM Subsection 10.1.3) -	Table 28 pg71
		Maps and tables	
		☒ Table of PCTs requiring offset and the number of ecosystem credits required	Table 30 pg73
		☒ Table of threatened species requiring offset and the number of species credits required -	Table 31 pg74
		Data	
		☐ Submitted proposal in the BAM Calculator - *This is a preliminary BDAR for a planning proposal – it has not been finalised and submitted*	
Biodiversity credit report	Chapter 10	**Information**	
		☒ Description of credit classes for ecosystem credits and species credits at the development or clearing site or land to be biodiversity certified (BAM Section 10.2)	Ch 11 - Tables 30 & 31 pg73
		☒ BAM credit report in pdf format	Appendix E
		Maps and tables	
		☒ Table of credit class and matching credit profile	Tables 30 & 31
		Data	
		☒ BAM credit report in pdf format	Appendix E

Appendix B: Matters of national environmental significance

MNES relevant to the project:

Native vegetation within the subject land is a plant community type associated with *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland*, which is listed as critically endangered under the EPBC Act. However, none of the vegetation zones within the subject land meet the minimum condition critieria to be included within the EPBC Act listing. Refer to Ch 4.2.2.5.

Six of the threatened fauna species predicted to occur (ecosystem credit species) are listed as threatened under the Commonwealth EPBC Act (refer to Ch 5.1.1 and Table 9):

* Regent Honeyeater (foraging) *Anthochaera phrygia*;
* Spotted-tailed Quoll *Dasyurus maculatus*;
* White-throated Needletail *Hirundapus caudacutus*;
* Swift Parrot (foraging) *Lathamus discolor*;
* Superb Parrot (foraging) *Polytelis swainsonii*
* Grey-headed Flying-fox (foraging) *Pteropus poliocephalus*.

These six species are mobile and wide-ranging and do not reside or breed within the subject land, based on a combination of lack of records, lack of resources and habitat constraints.

One candidate threatened species (species credit species) assumed to utilise the subject land, the Koala *Phascolarctos cinereus*, is listed as endangered under the EPBC Act. This species is not considered likely to occur, but is assumed present for this assessment due to insufficient survey to demonstrate absence under current guidelines. Refer to Ch 5.6 and Table 18. Further surveys are recommended prior to lodgement of future development applications for the land.

Measures to avoid and minimise impacts on MNES:

Measures to avoid and minimise impacts on biodiversity and MNES are described in Chapter 7 of this BDAR.

Impacts to MNES:

The proposed masterplan would result in a loss of approximately 12.4ha of native vegetation providing habitat for the six predicted ecosystem credit species listed under the EPBC Act, with additional indirect impacts on approximately 1.7ha of retained vegetation within the conservation reserve. Refer to Chapters 8.1 and 8.2.

The loss includes approximately 0.7ha of woodland habitat for the Koala.

The proposed masterplan also has potential to increase the effect of the prescribed impact of connectivity for threatened fauna between the conservation reserve and habitats across Crookwell Road to the east.

Mitigation measures relevant to MNES:

Mitigation measures are discussed in Chapter 8.4. Relevant management plans would be prepared at the development application stage when detailed site plans and reports are available.

Impacts to connectivity would be mitigated through development design, with creation of larger lots and open space to enable tree retention, and covenants to ensure retention of canopy connectivity between the patch of woodland within the proposed conservation area and areas of woodland across Crookwell Road to the east, in the long term.

Final offset requirements for MNES:

Based on current BAM-Calculator outputs, impacts on predicted ecosystem credit species would be offset through retirement of 8 ecosystem credits (PCT 1330).

Impacts on the Koala, if relevant following further surveys, would be offset through retirement of 7 species credits.

Refer to Chapter 10.1.

Appendix C: Vegetation survey data

Table 33 Vegetation survey data and locations

5	4	3	2	1	**plot**
1330	1330	1330	1330	1330	**pct**
11.7	1.4	0.7	11.7	11.7	**area**
various	43.4	43.4	various	various	**patchsize**
cleared	moderate	poor	cleared	cleared	**condition class**
55	55	55	55	55	**zone**
746862	747364	747468	747198	747191	**easting**
6154839	6154322	6154232	6154111	6154101	**northing**
352	160	84	271	283	**bearing**
0	1	2	0	0	**compTree**
0	0	0	0	0	**compShrub**
4	4	0	7	6	**compGrass**
2	3	2	6	6	**compForbs**
0	0	0	0	0	**compFerns**
0	0	0	0	0	**compOther**
0	3	15	0	0	**strucTree**
0	0	0	0	0	**strucShrub**
10	33.35	0	17.45	21	**strucGrass**
1.1	1.6	0.2	0.6	1.5	**strucForbs**
0	0	0	0	0	**strucFerns**
0	0	0	0	0	**strucOther**
0	2	3	0	0	**funLargeTrees**
0	1	0	0	0	**funHollowtrees**
8.4	11	12	10.8	12	**funLitterCover**
0	56	1	0	0	**funLenFallenLogs**
x	x	x	x	x	**funTreeStem5to9**
x	x	x	x	x	**funTreeStem10to19**
x	x	x	x	x	**funTreeStem20to29**
x	✓	✓	x	x	**funTreeStem30to49**
x	n/a	n/a	x	x	**funTreeStem50to79**
x	x	x	x	x	**funTreeRegen**
4.6	3.2	66.1	0	8.2	**funHighThreatExotic**
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	**Plot-based vegetation survey?**
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	**Vegetation integrity survey?**

8.40 – 9.30

BAM Plot – Field Survey Form

Site Sheet no: 1 of

Survey Name	Plot Identifier	Recorders
Kingsdale	BAM 1	R Hoga + D Clarke

Date	Zone	Datum	IBRA region	Photo #	Zone ID
1/11/21	55	MGA56	Monaro SEH16	✓	

Easting	Northing	Plot Dimensions (e.g. 20 x 20 in 20 x 50)	Orientation of midline from the 0 m point.
747191	6154101	20x20 20x50	283° Magnetic W

Likely Vegetation Class	Confidence: H M L
grassland.	

Plant Community Type	EEC:	Confidence: H M L

Record easting and northing from the plot marker. If applicable, orient picket so that perforated rib points along direction of midline.
Dimensions (Shape) of 0.04 ha base plot inside 0.1 ha FA plot should be identified, magnetic bearing taken along midline.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	0
	Shrubs	0
	Grasses etc.	6
	Forbs	6
	Ferns	0
	Other	0
Sum of Cover of native vascular plants by growth form group	Trees	0
	Shrubs	0
	Grasses etc.	21
	Forbs	1.5
	Ferns	0
	Other	0
High Threat Weed cover %		8.2

This table may be completed after entering data into available tools. It is not required while in the field

BAM Attribute (20 x 50 m plot)	Stem Classes and Hollows		
dbh	Euc*	Non Euc	Hollows†
80 + cm			
50 – 79 cm			
30 – 49 cm	no trees.		Hollows 20cm+
20 – 29 cm			
10 – 19 cm			
5 – 9 cm			
< 5 cm			This size class records tree regeneration
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0 Tally space		total 0

Record **living** eucalypt* (Euc*) and **living native** non-eucalypt (Non Euc) stems separately

Data needed is presence only (tick) unless a 'large tree' for that veg class.

* includes all species of *Eucalyptus*, *Corymbia*, *Angophora*, *Lophostemon* and *Syncarpia*

† For **hollows** count only the presence of a stem containing hollows, not the count of hollows in that stem. Only count as 1 stem per tree where tree is multi-stemmed. The hollow-bearing stem may be a dead stem.

Each size class is noted as present by the **living tree stems** only. Depending on the Vegetation Class, DBH values and counts may be needed for a size class. For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate if it is required by the large tree category for that vegetation class.

Hollows at least 20cm across are recorded for the purposes of habitat of some threatened species.

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	10 10 5 25 10	a b c d e	a b c d e	a b c d e
Average of the 5 subplots	12%			

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots located on alternate sides and 5 m from the plot midline at the locations 5, 15, 25, 35, and 45 m along the midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Within these 1 m x 1 m plots assessors may also record the cover of rock, bare ground and cryptogam soil crusts. Collection of these data is optional - the data do not currently contribute to assessment scores. they hold potential value for future vegetation integrity assessment attributes and benchmarks, and for enhancing PCT description

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code
Clearing (inc. logging)		
Cultivation (inc. pasture)		
Soil erosion		
Firewood / CWD removal		
Grazing (identify native/stock)		
Fire damage		
Storm damage		
Weediness		
Other		

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Free Text Section for brief site description

open managed paddock
variable grasses to knee high
some sheep tracks.

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m^2 plot: Sheet 2_ of 2_		Survey Name	Plot Identifier	Recorders
Date	01/11/2021	407 Crookwell Road, Kingsdale	Hayes 001	Dan Clarke

6

GF Code	*Species name*	N, E or HTE		Cover	Abund	Stratum	vou cher
F	**Hypochaeris radicata*	E		2	1000	Ground	
F	**Centaurea melitensis*	E		0.1	500	Ground	
F	**Trifolium subterraneum*	E		10	500	Ground	
F	*Wahlenbergia communis*	N	FG	0.1	100	Ground	
D	**Vulpia myuros*	E		20	2000	Ground	
G	**Bromus molliformis*	HTE		5	1000	Ground	
G	*Austrostipa bigeniculata*	N	GG	10	250	Ground	
F	*Euchiton sphaericus*	N	FG	0.1	200	Ground	
G	*Austrostipa scabra*	N	GG	5	500	Ground	
F	*Crassula sieberiana*	N	FG	1	2000	Ground	
F	*Oxalis exilis*	N	FG	0.1	200	Ground	
G	**Avena barbata*	HTE		0.1	100	Ground	
F	*Cotula australis*	N	FG	0.1	500	Ground	
G	**Bromus diandrus*	HTE		1	250	Ground	
G	*Chloris truncata*	N	GG	0.25	250	Ground	
F	**Paronychia brasiliana*	E		0.1	200	Ground	
F	**Trifolium arvense*	E		0.25	100	Ground	
G	**Poa compressa*	E		0.1	1000	Ground	
G	*Bothriochloa* sp.	N	GG	0.5	200	Ground	
D	**Aira cupaniana*	E		0.1	500	Ground	
F	**Conyza* sp.	E		0.1	10	Ground	
F	**Romulea rosea*	E		0.1	50	Ground	
V	*Juncus bufonius*	N	GG	0.25	500	Ground	
G	**Lolium perenne*	HTE		2	500	Ground	
F	**Cerastium glomeratum*	E		0.1	2	Ground	
F	*Stuartina muelleri*	N	FG	0.1	500	Ground	
G	**Eleusine tristachya*	E		0.25	200	Ground	
F	**Lactuca serriola*	E		0.1	10	Ground	
F	**Trifolium glomeratum*	E		0.1	10	Ground	
F	**Arenaria leptoclados*	E		0.1	20	Ground	
G	**Holcus lanatus*	E		0.1	20	Ground	
G	*Rytidosperma racemosum*	N	GG	5	1000	Ground	
G	**Nassella trichotoma*	HTE		0.1	10	Ground	

GF Code: see Growth Form definitions in Appendix 4 (can be worked out later) **N:** native, **E:** exotic, **HTE:** high threat exotic
Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*
Abundance: For species with cover less than or equal to 5% count or estimate the number of individuals or shoots of each species within the plot using the following intervals: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 50, 100, 500, 1000, 1500, 2000 etc. Numbers above 20 are estimates.
Stratum: not for entry to calculator, to assist with PCT identification.
Print more copies of this sheet to allow for higher species counts at a plot. All species at a plot need to be recorded.

Paddock location with some native grasslayer component to about 20% cover. Exotic species dominant with native grasses and herbs present.

E: 747198 N: 6154111 55H

9:45 – 10.4

BAM Plot – Field Survey Form

Site Sheet no: 1 of

		Survey Name	Plot Identifier	Recorders
Date	1/11/21	Kingsdale	BAT 2	R Hogan D Clarke.
Zone	Datum	IBRA region	Monaro SEH16	Photo # ✓	Zone ID
55				
Easting	Northing	Plot Dimensions	Orientation of midline from the 0 m point.	
-34.725202	149.699623	20x20 (e.g. 20 x 20 in 20 x 50)	20x20 20x50	271° W (magnetic)
Likely Vegetation Class		grassland.		Confidence: H M L
Plant Community Type			EEC:	Confidence: H M L

Record easting and northing from the plot marker. If applicable, orient picket so that perforated rib points along direction of midline.
Dimensions (Shape) of 0.04 ha base plot inside 0.1 ha FA plot should be identified. magnetic bearing taken along midline.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	0
	Shrubs	0
	Grasses etc.	7
	Forbs	6
	Ferns	0
	Other	0
Sum of Cover of native vascular plants by growth form group	Trees	0
	Shrubs	0
	Grasses etc.	17.45
	Forbs	0.6
	Ferns	0
	Other	0
High Threat Weed cover %		0

This table may be completed after entering data into available tools. It is not required while in the field

BAM Attribute (20 x 50 m plot)	Stem Classes and Hollows		
dbh	Euc*	Non Euc	Hollows†
80 + cm			
50 – 79 cm			
30 – 49 cm			Hollows 20cm+
20 – 29 cm			
10 – 19 cm			
5 – 9 cm			
< 5 cm			This size class records tree regeneration
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		total 0

no trees

Record **living** eucalypt* (Euc*) and **living native** non-eucalypt (Non Euc) stems separately

Data needed is presence only (tick) unless a 'large tree' for that veg class.

* includes all species of *Eucalyptus*, *Corymbia*, *Angophora*, *Lophostemon* and *Syncarpia*

† For **hollows** count only the presence of a stem containing hollows, not the count of hollows in that stem. Only count as 1 stem per tree where tree is multi-stemmed. The hollow-bearing stem may be a dead stem.

Each size class is noted as present by the **living tree stems** only. Depending on the Vegetation Class, DBH values and counts may be needed for a size class. For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate if it is required by the large tree category for that vegetation class.

Hollows at least 20cm across are recorded for the purposes of habitat of some threatened species.

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	15 2 2 15 20	a b c d e	a b c d e	a b c d e
Average of the 5 subplots	10.8%			

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots located on alternate sides and 5 m from the plot midline at the locations 5, 15, 25, 35, and 45 m along the midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Within these 1 m x 1 m plots assessors may also record the cover of rock, bare ground and cryptogam soil crusts. Collection of these data is optional - the data do not currently contribute to assessment scores, they hold potential value for future vegetation integrity assessment attributes and benchmarks, and for enhancing PCT description

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code
Clearing (inc. logging)		
Cultivation (inc. pasture)		
Soil erosion		
Firewood / CWD removal		
Grazing (identify native/stock)		
Fire damage		
Storm damage		
Weediness		
Other		

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Free Text Section for brief site description

open managed paddock
variety of grasses
some scattered rocks and small boulders.
sheep tracks

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m^2 plot: Sheet 2_ of 2_		Survey Name	Plot Identifier	Recorders
Date	01/11/2021	407 Crookwell Road, Kingsdale	Hayes 002	Dan Clarke

GF Code	*Species name*	N, E or HTE		Cover	Abund	Stratum	vou cher
G	**Nassella trichotoma*	E		0.1	10	Ground	
G	**Lolium perenne*	E		15	2000	Ground	
G	**Bromus molliformis*	E		15	2000	Ground	
F	**Trifolium subterraneum*	E		10	1000	Ground	
G	*Austrostipa scabra*	N	GG	10	1000	Ground	
F	**Centaurea melitensis*	E		0.25	1000	Ground	
F	**Erodium cicutarium*	E		0.1	500	Ground	
F	**Onopordum acanthium*	E		0.1	20	Ground	
F	**Lactuca serriola*	E		0.1	20	Ground	
G	**Hordeum glaucum*	E		1	500	Ground	
F	**Brassica tournefortii*	E		0.1	20	Ground	
F	*Crassula sieberiana*	N	FG	0.1	1000	Ground	
G	**Poa compressa*	E		0.25	500	Ground	
G	*Austrostipa bigeniculata*	N	GG	5	500	Ground	
G	**Bromus diandra*	E		0.5	200	Ground	
F	**Hypochaeris radicata*	E		1	1000	Ground	
F	*Rumex brownii*	N	FG	0.1	20	Ground	
F	*Goodenia pinnatifida*	N	FG	0.1	100	Ground	
G	*Chloris truncata*	N	GG	1	200	Ground	
F	**Paronychia brasiliana*	E		0.25	1000	Ground	
G	**Holcus lanatus*	E		0.5	200	Ground	
F	**Trifolium arvense*	E		0.1	50	Ground	
F	*Plantago hispida*	N	FG	0.1	50	Ground	
F	*Oxalis exilis*	N	FG	0.1	20	Ground	
F	**Trifolium glomeratum*	E		0.1	100	Ground	
D	**Vulpia myuros*	E		1	500	Ground	
G	**Avena barbata*	E		0.1	20	Ground	
R	*Lomandra filiformis* subsp. *coriacea*	N	GG	0.1	50	Ground	
F	**Plantago lanceolata*	E		1	500	Ground	
F	**Trifolium repens*	E		0.1	20	Ground	
G	**Dactylis glomerata*	E		0.1	20	Ground	
G	*Poa sieberiana*	N	GG	0.1	50	Ground	
G	*Aristida ramosa*	N	GG	0.25	100	Ground	
F	**Cirsium vulgare*	E		0.1	2	Ground	
G	*Rytidosperma racemosum*	N	GG	1	500	Ground	
G	**Eleusine tristachya*	E		0.25	100	Ground	
F	*Convolvulus erubescens*	N	FG	0.1	1	Ground	

GF Code: see Growth Form definitions in Appendix 4 (can be worked out later) **N:** native, **E:** exotic, **HTE:** high threat exotic
Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*
Abundance: For species with cover less than or equal to 5% count or estimate the number of individuals or shoots of each species within the plot using the following intervals: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 50, 100, 500, 1000, 1500, 2000 etc. Numbers above 20 are estimates.
Stratum: not for entry to calculator, to assist with PCT identification.
Print more copies of this sheet to allow for higher species counts at a plot. All species at a plot need to be recorded.

Paddock location with some native grasslayer component to about 20% cover. Exotic species dominant with native grasses and herbs present.

E: 747468 N: 6154232 55H

11 – 11.30

BAM Plot – Field Survey Form

Site Sheet no:

Survey Name	Plot Identifier	Recorders
Kingsdale	BAM 3	R Hogan D Clake.

Date	Zone	Datum	IBRA region	Photo #	Zone ID
1/11/21	55		Monaro SEH16	✓	

Easting	Northing	Plot Dimensions (e.g. 20 x 20 in 20 x 50)	Orientation of midline from the 0 m point.
734.724054	6149.702532	20x20 20x50	84° E

Likely Vegetation Class	Confidence: H M L
open woodland - degraded	

Plant Community Type	EEC:	Confidence: H M L
box-gum.	✓	

Record easting and northing from the plot marker. If applicable, orient picket so that perforated rib points along direction of midline.
Dimensions (Shape) of 0.04 ha base plot inside 0.1 ha FA plot should be identified, magnetic bearing taken along midline.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	2
	Shrubs	0
	Grasses etc.	0
	Forbs	2
	Ferns	0
	Other	0
Sum of Cover of native vascular plants by growth form group	Trees	15
	Shrubs	0
	Grasses etc.	0
	Forbs	0.2
	Ferns	0
	Other	0
High Threat Weed cover %		66.1

This table may be completed after entering data into available tools. It is not required while in the field.

BAM Attribute (20 x 50 m plot)	Stem Classes and Hollows		
dbh	Euc*	Non Euc	Hollows†
80 + cm			0
50 – 79 cm	III (3)		
30 – 49 cm	II (2)		Hollows 20cm+
20 – 29 cm			
10 – 19 cm			
5 – 9 cm			
< 5 cm			This size class records tree regeneration
Length of logs (m) (≥10 cm diameter, >50 cm in length)	1		total 1M

Record **living** eucalypt* (Euc*) and **living native** non-eucalypt (Non Euc) stems separately

Data needed is presence only (tick) unless a 'large tree' for that veg class.

* includes all species of *Eucalyptus*, *Corymbia*, *Angophora*, *Lophostemon* and *Syncarpia*

† For **hollows** count only the presence of a stem containing hollows, not the count of hollows in that stem. Only count as 1 stem per tree where tree is multi-stemmed. The hollow-bearing stem may be a dead stem.

Each size class is noted as present by the **living tree stems** only. Depending on the Vegetation Class, DBH values and counts may be needed for a size class. For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate if it is required by the large tree category for that vegetation class.

Hollows at least 20cm across are recorded for the purposes of habitat of some threatened species.

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	10 20 0 20 10	a b c d e	a b c d e	a b c d e
Average of the 5 subplots	12%			

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots located on alternate sides and 5 m from the plot midline at the locations 5, 15, 25, 35, and 45 m along the midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Within these 1 m x 1 m plots assessors may also record the cover of rock, bare ground and cryptogam soil crusts. Collection of these data is optional - the data do not currently contribute to assessment scores, they hold potential value for future vegetation integrity assessment attributes and benchmarks, and for enhancing PCT description

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code
Clearing (inc. logging)		
Cultivation (inc. pasture)		
Soil erosion		
Firewood / CWD removal		
Grazing (identify native/stock)		
Fire damage		
Storm damage		
Weediness		
Other		

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Free Text Section for brief site description

mature trees
large trunks but not tall
mostly exotic understorey

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m^2 plot: Sheet 2_ of 2_	Survey Name	Plot Identifier	Recorders
Date: 01/11/2021	407 Crookwell Road, Kingsdale	Hayes 003	Dan Clarke

	GF Code	*Species name*	N, E or HTE	Cover	Abund	Stratum	voucher
TG	T	*Eucalyptus bridgesiana*	N	5	1	Upper	
TG	T	*Eucalyptus melliodora*	N	10	2	Upper	
	G	**Hordeum glaucum*	HTE	60	2000+	Ground	
	F	**Onopordum acanthium*	E	2	50	Ground	
	F	**Arctotheca calendula*	E	2	500	Ground	
	F	**Erodium moschatum*	E	0.1	50	Ground	
	F	**Lepidium africanum*	E	0.1	100	Ground	
	F	**Malva parviflora*	E	0.1	50	Ground	
	G	**Lolium perenne*	E	15	2000	Ground	
	F	**Erodium cicutarium*	E	0.1	100	Ground	
	F	**Trifolium subterraneum*	E	1	500	Ground	
	F	**Lactuca serriola*	E	0.1	20	Ground	
	G	**Bromus molliformis*	HTE	5	1000	Ground	
	G	**Poa compressa*	E	0.1	20	Ground	
	F	**Trifolium glomeratum*	E	0.1	50	Ground	
FG	F	*Erodium crinitum*	N	0.1	2	Ground	
	G	**Bromus catharticus*	HTE	1	100	Ground	
	F	**Paronychia brasiliana*	E	0.1	200	Ground	
	F	**Lycium ferocissimum*	HTE	0.1	1	Ground	
	F	**Polycarpon tetraphyllum*	E	0.1	10	Ground	
FG	F	*Einadia polygonoides*	N	0.1	1	Ground	
	F	**Hypochaeris radicata*	E	0.1	50	Ground	
	G	**Poa annua*	E	0.1	2	Ground	
	F	**Stellaria media*	E	0.1	1	Ground	

GF Code: see Growth Form definitions in Appendix 4 (can be worked out later) **N:** native, **E:** exotic, **HTE:** high threat exotic
Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*
Abundance: For species with cover less than or equal to 5% count or estimate the number of individuals or shoots of each species within the plot using the following intervals: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 50, 100, 500, 1000, 1500, 2000 etc. Numbers above 20 are estimates.
Stratum: not for entry to calculator, to assist with PCT identification.
Print more copies of this sheet to allow for higher species counts at a plot. All species at a plot need to be recorded.

Scattered native canopy trees with strong exotic groundlayer – mainly Barley Grass (*Hordeum glaucum*).
***Eucalyptus blakelyi* is in 20 x 50 m plot but not 20 x 20 m.**

E: 747364 N: 6154322 55H

11.40 – 12.30

BAM Plot – Field Survey Form

Site Sheet no: 1 of

		Survey Name	Plot Identifier	Recorders
Date	1/11/21	Kingsdale	BAM14	RHoga D Clarke.
Zone	Datum	IBRA region	Monaro SEH16	Photo # ✓	Zone ID
55				
Easting	Northing	Plot Dimensions (e.g. 20 x 20 in 20 x 50)	20x20 20x50	Orientation of midline from the 0 m point.	160° S Magnetic
-34.723267	149.701369				
Likely Vegetation Class		open woodland.			Confidence: H M L
Plant Community Type		box-gum		EEC: ✓	Confidence: H M L

Record easting and northing from the plot marker. If applicable, orient picket so that perforated rib points along direction of midline.
Dimensions (Shape) of 0.04 ha base plot inside 0.1 ha FA plot should be identified, magnetic bearing taken along midline.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	1
	Shrubs	0
	Grasses etc.	4
	Forbs	3
	Ferns	0
	Other	0
Sum of Cover of native vascular plants by growth form group	Trees	3
	Shrubs	0
	Grasses etc.	33.35
	Forbs	1.6
	Ferns	0
	Other	0
High Threat Weed cover %		3.2

This table may be completed after entering data into available tools. It is not required while in the field.

BAM Attribute (20 x 50 m plot)	Stem Classes and Hollows		
dbh	Euc*	Non Euc	Hollows†
80 + cm	1		1
50 – 79 cm	1		
30 – 49 cm	11		Hollows 20cm+
20 – 29 cm			
10 – 19 cm			
5 – 9 cm			
< 5 cm			This size class records tree regeneration
Length of logs (m) (≥10 cm diameter, >50 cm in length)	13+17+20+6		total 56m

Record **living** eucalypt* (Euc*) and **living native** non-eucalypt (Non Euc) stems separately

Data needed is presence only (tick) unless a 'large tree' for that veg class.

* includes all species of *Eucalyptus*, *Corymbia*, *Angophora*, *Lophostemon* and *Syncarpia*

† For **hollows** count only the presence of a stem containing hollows, not the count of hollows in that stem. Only count as 1 stem per tree where tree is multi-stemmed. The hollow-bearing stem may be a dead stem.

Each size class is noted as present by the **living tree stems** only. Depending on the Vegetation Class, DBH values and counts may be needed for a size class. For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate if it is required by the large tree category for that vegetation class.

Hollows at least 20cm across are recorded for the purposes of habitat of some threatened species.

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	5 10 15 15 10	a b c d e	a b c d e	a b c d e
Average of the 5 subplots	11%			

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots located on alternate sides and 5 m from the plot midline at the locations 5, 15, 25, 35, and 45 m along the midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Within these 1 m x 1 m plots assessors may also record the cover of rock, bare ground and cryptogam soil crusts. Collection of these data is optional - the data do not currently contribute to assessment scores, they hold potential value for future vegetation integrity assessment attributes and benchmarks, and for enhancing PCT description.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code
Clearing (inc. logging)		
Cultivation (inc. pasture)		
Soil erosion		
Firewood / CWD removal		
Grazing (identify native/stock)		
Fire damage		
Storm damage		
Weediness		
Other		

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Free Text Section for brief site description

open woodland ± native trees
native understorey
grazed by sheep

400 m^2 plot: Sheet 2_ of 2_		Survey Name	Plot Identifier	Recorders
Date	01/11/2021	407 Crookwell Road, Kingsdale	Hayes 004	Dan Clarke

	GF Code	*Species name*	N, E or HTE	Cover	Abund	Stratum	voucher
GG	G	*Austrostipa scabra*	N	30	2000	Ground	
	S	**Lycium ferocissimum*	HTE	1	1	Ground	
TG	T	*Eucalyptus mannifera*	N	3	1	Upper	
	F	**Paronychia brasiliana*	E	5	2000	Ground	
FG	F	*Crassula sieberiana*	N	1	2000	Ground	
	F	**Hypochaeris radicata*	E	3	2000	Ground	
	F	**Trifolium subterraneum*	E	5	1000	Ground	
	D	**Aira cupaniana*	E	0.1	100	Ground	
GG	G	*Chloris truncata*	N	0.25	200	Ground	
FG	F	*Erodium crinitum*	N	0.5	200	Ground	
	D	**Vulpia myuros*	E	1	500	Ground	
GG	G	*Austrostipa bigeniculata*	N	3	250	Ground	
	F	**Centaurea melitensis*	E	0.5	1000	Ground	
	G	**Hordeum glaucum*	E	0.5	200	Ground	
	F	**Erodium cicutarium*	E	0.1	100	Ground	
	F	**Trifolium arvense*	E	0.1	50	Ground	
FG	F	*Spergularia brevifolia*	N	0.1	100	Ground	
	G	**Bromus catharticus*	HTE	2	200	Ground	
	G	**Holcus lanatus*	HTE	0.1	50	Ground	
	F	**Cirsium vulgare*	E	0.1	2	Ground	
	F	**Hypochaeris glabra*	E	1	1000	Ground	
	G	**Nassella trichotoma* (sprayed)	HTE	0.1	10	Ground	
	G	**Poa compressa*	E	0.1	100	Ground	
	F	**Trifolium glomeratum*	E	0.1	100	Ground	
GG	G	*Rytidosperma pilosum*	N	0.1	50	Ground	

GF Code: see Growth Form definitions in Appendix 4 (can be worked out later) **N:** native, **E:** exotic, **HTE:** high threat exotic
Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*
Abundance: For species with cover less than or equal to 5% count or estimate the number of individuals or shoots of each species within the plot using the following intervals: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 50, 100, 500, 1000, 1500, 2000 etc. Numbers above 20 are estimates.
Stratum: not for entry to calculator, to assist with PCT identification.
Print more copies of this sheet to allow for higher species counts at a plot. All species at a plot need to be recorded.

Upper woodland area with solid cover of native grasses. Generally low diversity. Canopy is *Eucalyptus mannifera*

E: 746862 N: 6154839 55H

12.50 -

BAM Plot – Field Survey Form

Site Sheet no: 1 of

		Survey Name	Plot Identifier	Recorders
Date	1/11/21	Kingsdale	BAM 5	R Hoga D Clarke
Zone	Datum	IBRA region	Monaro SEH16	Photo #	Zone ID
55					
Easting	Northing	Plot Dimensions (e.g. 20 x 20 in 20 x 50)	20x20 in 20x50	Orientation of midline from the 0 m point.	352° N
-34.718726	149.695746				
Likely Vegetation Class		grassland.			Confidence: H M L
Plant Community Type				EEC:	Confidence: H M L

Record easting and northing from the plot marker. If applicable, orient picket so that perforated rib points along direction of midline.
Dimensions (Shape) of 0.04 ha base plot inside 0.1.ha FA plot should be identified, magnetic bearing taken along midline.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	0
	Shrubs	0
	Grasses etc.	4
	Forbs	2
	Ferns	0
	Other	0
Sum of Cover of native vascular plants by growth form group	Trees	0
	Shrubs	0
	Grasses etc.	10
	Forbs	1.1
	Ferns	0
	Other	0
High Threat Weed cover %		4.6

This table may be completed after entering data into available tools. It is not required while in the field.

BAM Attribute (20 x 50 m plot)	Stem Classes and Hollows		
dbh	Euc*	Non Euc	Hollows†
80 + cm			
50 – 79 cm			
30 – 49 cm			Hollows 20cm+
20 – 29 cm			
10 – 19 cm			
5 – 9 cm			
< 5 cm			This size class records tree regeneration
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		total 0

no trees

Record **living** eucalypt* (Euc*) and **living native** non-eucalypt (Non Euc) stems separately

Data needed is presence only (tick) unless a 'large tree' for that veg class.

* includes all species of *Eucalyptus*, *Corymbia*, *Angophora*, *Lophostemon* and *Syncarpia*

† For **hollows** count only the presence of a stem containing hollows, not the count of hollows in that stem. Only count as 1 stem per tree where tree is multi-stemmed. The hollow-bearing stem may be a dead stem.

Each size class is noted as present by the **living tree stems** only. Depending on the Vegetation Class, DBH values and counts may be needed for a size class. For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate if it is required by the large tree category for that vegetation class.

Hollows at least 20cm across are recorded for the purposes of habitat of some threatened species.

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	15 10 10 5 2	a b c d e	a b c d e	a b c d e
Average of the 5 subplots	8.4%			

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots located on alternate sides and 5 m from the plot midline at the locations 5, 15, 25, 35, and 45 m along the midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Within these 1 m x 1 m plots assessors may also record the cover of rock, bare ground and cryptogam soil crusts. Collection of these data is optional - the data do not currently contribute to assessment scores, they hold potential value for future vegetation integrity assessment attributes and benchmarks, and for enhancing PCT description

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code
Clearing (inc. logging)		
Cultivation (inc. pasture)		
Soil erosion		
Firewood / CWD removal		
Grazing (identify native/stock)		
Fire damage		
Storm damage		
Weediness		
Other		

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Free Text Section for brief site description

open managed grassland
some scattered rocks.
sheep tracks.

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m^2 plot: Sheet 2_ of 2_		Survey Name	Plot Identifier	Recorders
Date	01/11/2021	407 Crookwell Road, Kingsdale	Hayes 005	Dan Clarke

	GF Code	*Species name*	N, E or HTE	Cover	Abund	Stratum	vou cher
GG	G	*Austrostipa scabra*	N	5	250	Ground	
GG	G	*Austrostipa bigeniculata*	N	3	200	Ground	
	G	**Dactylis glomerata*	HTE	3	500	Ground	
	G	**Bromus molliformis*	HTE	0.5	200	Ground	
	D	**Vulpia myuros*	E	30	2000+	Ground	
	F	**Hypochaeris radicata*	E	2	2000	Ground	
FG	F	*Crassula sieberiana*	N	1	2000	Ground	
	F	**Trifolium subterraneum*	E	10	1000	Ground	
	F	**Centaurea melitensis*	E	0.25	1000	Ground	
	G	**Holcus lanatus*	HTE	0.5	100	Ground	
	F	**Trifolium arvense*	E	0.1	20	Ground	
FG	F	*Erodium crinitum*	N	0.1	50	Ground	
	F	**Euchiton sphaericus*	E	0.1	50	Ground	
	D	**Aira cupaniana*	E	0.1	200	Ground	
	G	**Nassella trichotoma*	HTE	0.5	20	Ground	
GG	G	*Lachnagrostis filiformis*	N	1	200	Ground	
	F	**Arctotheca calendula*	E	0.25	500	Ground	
	F	**Gamochaeta coarctata*	E	0.1	200	Ground	
GG	G	*Rytidosperma* sp.	N	1	250	Ground	
	F	**Paronychia brasiliana*	E	0.1	250	Ground	
	F	**Trifolium glomeratum*	E	0.1	20	Ground	
	G	**Lolium perenne*	HTE	0.1	100	Ground	

GF Code: see Growth Form definitions in Appendix 4 (can be worked out later) **N:** native, **E:** exotic, **HTE:** high threat exotic
Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*
Abundance: For species with cover less than or equal to 5% count or estimate the number of individuals or shoots of each species within the plot using the following intervals: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 50, 100, 500, 1000, 1500, 2000 etc. Numbers above 20 are estimates.
Stratum: not for entry to calculator, to assist with PCT identification.
Print more copies of this sheet to allow for higher species counts at a plot. All species at a plot need to be recorded.

Paddock location with some native grasslayer component to about 20% cover. Exotic species dominant with native grasses and herbs present.

Appendix D: Fauna survey data

Table 34 Fauna species recorded within the subject land.

Common Name	Family and Scientific Name	Detection method
MAMMALS		
	Vespertilioidae	
Gould's Wattled Bat	*Chalinolobus gouldii*	Confident call obtained through use echolocation detector
Chocolate Wattled Bat	*Chalinolobus morio*	Confident call through use echolocation detector
(v) Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	Probable/possible call obtained through use echolocation detector
Long-eared Bat	*Nyctophilus sp.*	Probable/possible call obtained through use echolocation detector Specific ID cannot be obtained through calls
Eastern Broad-nosed Bat	*Scotorepens orion*	Probable/possible call obtained through use echolocation detector
Large Forest Bat	*Vespadelus darlingtoni*	Confident call obtained through use echolocation detector
Southern Forest Bat	*Vespadelus regulus*	Confident call obtained through use echolocation detector
Little Forest Bat	*Vespadelus vulturnus*	Confident call obtained through use echolocation detector
	Miniopteridae	
(V) Large Bent-winged Bat	*Miniopterus orianae oceanensis*	Confident call obtained through use echolocation detector
	Molossidae	
White-striped Freetail Bat	*Austronomus australis*	Confident call obtained through use echolocation detector
	Muridae	
* House Mouse	*Mus musculus*	Observed during ground debris searches sheltering under sheet corrugated iron
	Leporidae	
* Rabbit	*Oryctolagus cuniculus*	Incidentally recorded running across site.
* Brown Hare	*Lepus capensis*	Incidentally recorded running across site.
BIRDS		
	Anatidae	
Pacific Black Duck	*Anas superciliosa*	Observed
Australian Wood Duck	*Chenonetta jubata*	Observed
Chestnut Teal	*Anas castanea*	Observed
	Columbidae	
* Rock Dove	*Columba livia*	Observed

Common Name	Family and Scientific Name	Detection method
Crested Pigeon	*Ocyphaps lophotes*	Observed
	Phalacrocoracidae	
Little Pied Cormorant	*Phalacrocorax melanoleucos*	Observed
	Ardeidae	
White-faced Heron	*Egretta novaehollandiae*	Observed
	Accipitridae	
Black-shouldered Kite	*Elanus axillaris*	Observed
	Falconidae	
Nankeen Kestrel	*Falco cenchroides*	Observed
	Charadriidae	
Masked Lapwing	*Vanellus miles*	Observed
	Cacatuidae	
Galah	*Eolophus roseicapillus*	Observed
Little Corella	*Cacatua sanguinea*	Observed
Sulphur-crested Cockatoo	*Cacatua galerita*	Observed
	Psittacidae	
Rainbow Lorikeet	*Trichoglossus haematodus*	Observed
Eastern Rosella	*Platycercus eximius*	Observed
Red-rumped Parrot	*Psephotus haematonotus*	Observed
	Maluridae	
Superb Fairy-wren	*Malurus cyaneus*	Observed
	Acanthizidae	
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*	Observed
	Pardalotidae	
Striated Pardalote	*Pardalotus striatus*	Heard calling
	Meliphagidae	
Red Wattlebird	*Anthochaera carunculata*	Observed
Noisy Friarbird	*Philemon corniculatus*	Observed
White-plumed Honeyeater	*Lichenostomus pencillatus*	Observed
Noisy Miner	*Manorina melanocephala*	Observed
	Campephagidae	
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	Observed
	Artamidae	
(V) Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	Observed
Grey Butcherbird	*Cracticus torquatus*	Observed
Australian Magpie	*Cracticus tibicen*	Observed
Pied Currawong	*Strepera graculina*	Observed
	Rhipiduridae	

Common Name	Family and Scientific Name	Detection method
Grey Fantail	*Rhipidura albiscapa*	Observed
Willie Wagtail	*Rhipidura leucophrys*	Observed
	Corvidae	
Australian Raven	*Corvus coronoides*	Observed
	Monarchidae	
Magpie-lark	*Grallina cyanoleuca*	Observed
	Hirundinidae	
Welcome Swallow	*Hirundo neoxena*	Observed
Tree Martin	*Petrochelidon nigricans*	Observed
	Sturnidae	
* Common Starling	*Sturnus vulgaris*	Observed
* Common Myna	*Sturnus tristis*	Observed
	Estrildidae	
(V) Diamond Firetail	*Stagonopleura guttata*	Observed
	Passeridae	
* House Sparrow	*Passer domesticus*	Observed
	Motacillidae	
Australasian Pipit	*Anthus naovaeseelandiae*	Observed
	Fringillidae	
* European Goldfinch	*Carduelis carduelis*	Observed
REPTILES		
	Scincidae	
Robust Ctenotus	*Ctenotus robustus*	Recorded during ground debris searches
Cunningham's Skink	*Egernia cunninghami*	Recorded during ground debris searches
Three-toed Skink	*Saiphos equalis*	Recorded during ground debris searches
	Agamidae	
Bearded dragon	*Pogona barbata*	Incidentally recorded
AMPHIBIANS		
	Limnodynastidae	
Spotted Grass Frog	*Limnodynastes tasmaniensis*	Recorded during ground debris searches
	Myobatrachidae	
Common Eastern Froglet	*Crinia signifera*	Heard calling
Smooth Toadlet	*Uperoleia laevigata*	Recorded during ground debris searches
	Hylidae	
Eastern Dwarf Tree Frog	*Litoria fallax*	Heard calling

Appendix E: Credit reports

Attached (reports dated 22nd February 2023, not finalised):

* Credits summary report
* Biodiversity credit report (Like-for-like)
* Candidate threatened species report
* Predicted species report.

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00027110/BAAS17090/21/00027111	Proposed Rezoning - 407 and 457 Crookwell Road Kingsdale	01/02/2023
Assessor Name	Report Created	BAM Data version *
Rebecca Hogan	22/02/2023	57
Assessor Number	BAM Case Status	Date Finalised
BAAS17090	Open	To be finalised
Assessment Revision	Assessment Type	BOS entry trigger
0	Part 4 Developments (General)	BOS Threshold: Area clearing threshold

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

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

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

Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion												
1	1330_cleared	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	10.4	10.4	11.4	PCT Cleared - 94%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	0

2	1330_poor	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	19.2	19.2	0.7	PCT Cleared - 94%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	8
											Subtotal	**8**
											Total	**8**

Species credits for threatened species

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

Keyacris scurra / Key's Matchstick Grasshopper (Fauna)									
1330_cleared	10.4	10.4	11.4	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Endangered	Not Listed	False	59
								Subtotal	**59**
Phascolarctos cinereus / Koala (Fauna)									
1330_poor	19.2	19.2	0.7			Endangered	Endangered	False	7
								Subtotal	**7**

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00027110/BAAS17090/21/00027111

Proposal Name
Proposed Rezoning - 407 and 457 Crookwell Road Kingsdale

BAM data last updated *
01/02/2023

Assessor Name
Rebecca Hogan

Assessor Number
BAAS17090

BAM Data version *
57

Proponent Names

Report Created
22/02/2023

BAM Case Status
Open

Assessment Revision
0

Assessment Type
Part 4 Developments (General)

Date Finalised
To be finalised

BOS entry trigger
BOS Threshold: Area clearing threshold

* 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.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

BAM Biodiversity Credit Report (Like for like)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands 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 Highla	12.1	0	8	8

1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347,	-	1330_cleared	No	0	Monaro, Bungonia, Crookwell, Kybeyan-Gourock, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	-	1330_poor	No	8	Monaro, Bungonia, Crookwell, Kybeyan-Gourock, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698					

Species Credit Summary

BAM Biodiversity Credit Report (Like for like)

Species	Vegetation Zone/s	Area / Count	Credits
Keyacris scurra / Key's Matchstick Grasshopper	**1330_cleared**	11.4	59.00
Phascolarctos cinereus / Koala	**1330_poor**	0.7	7.00

Credit Retirement Options

Like-for-like credit retirement options

Keyacris scurra / Key's Matchstick Grasshopper	Spp	IBRA subregion
	Keyacris scurra / Key's Matchstick Grasshopper	Any in NSW
Phascolarctos cinereus / Koala	Spp	IBRA subregion
	Phascolarctos cinereus / Koala	Any in NSW

BAM Candidate Species Report

Proposal Details

Assessment Id 00027110/BAAS17090/21/00027111	Proposal Name Proposed Rezoning - 407 and 457 Crookwell Road Kingsdale	BAM data last updated * 01/02/2023
Assessor Name Rebecca Hogan	Report Created 22/02/2023	BAM Data version * 57
Assessor Number BAAS17090	Assessment Type Part 4 Developments (General)	BAM Case Status Open
Assessment Revision 0	Date Finalised To be finalised	BOS entry trigger BOS Threshold: Area clearing threshold

* 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.

List of Species Requiring Survey

Name	Presence	Survey Months
Aprasia parapulchella Pink-tailed Legless Lizard	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Caladenia tessellata Thick Lip Spider Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Calyptorhynchus lathami Glossy Black-Cockatoo	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Delma impar Striped Legless Lizard	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Eucalyptus macarthurii Paddys River Box, Camden Woollybutt	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Hieraaetus morphnoides Little Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Keyacris scurra Key's Matchstick Grasshopper	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Lepidium hyssopifolium Aromatic Peppercress	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?

Leucochrysum albicans var. tricolor Hoary Sunray	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Myotis macropus Southern Myotis	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascolarctos cinereus Koala	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Polytelis swainsonii Superb Parrot	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Prasophyllum petilum Tarengo Leek Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Rutidosis leptorrhynchoides Button Wrinklewort	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?

Swainsona recta Small Purple-pea	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Swainsona sericea Silky Swainson-pea	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Thesium australe Austral Toadflax	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

Common Name	Scientific Name
Little Eagle	Hieraaetus morphnoides

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Golden Sun Moth	Synemon plana	Refer to BAR
Grey-headed Flying-fox	Pteropus poliocephalus	Habitat constraints
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Squirrel Glider	Petaurus norfolcensis	Habitat degraded
Swift Parrot	Lathamus discolor	Habitat constraints

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00027110/BAAS17090/21/00027111	Proposed Rezoning - 407 and 457 Crookwell Road Kingsdale	01/02/2023
Assessor Name	**Report Created**	**BAM Data version ***
Rebecca Hogan	22/02/2023	57
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS17090	Part 4 Developments (General)	Open
Assessment Revision	**BOS entry trigger**	**Date Finalised**
0	BOS Threshold: Area clearing threshold	To be finalised

* 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.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Black Falcon	Falco subniger	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
Diamond Firetail	Stagonopleura guttata	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
Eastern False Pipistrelle	Falsistrellus tasmaniensis	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
Flame Robin	Petroica phoenicea	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
Glossy Black-Cockatoo	Calyptorhynchus lathami	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion

Large Bent-winged Bat	Miniopterus orianae oceanensis	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
Little Lorikeet	Glossopsitta pusilla	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
Regent Honeyeater	Anthochaera phrygia	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
Scarlet Robin	Petroica boodang	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
Speckled Warbler	Chthonicola sagittata	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
Superb Parrot	Polytelis swainsonii	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
Swift Parrot	Lathamus discolor	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
White-bellied Sea-Eagle	Haliaeetus leucogaster	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
White-throated Needletail	Hirundapus caudacutus	1330-Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion

Threatened species Manually Added

Common Name	Scientific Name
Eastern False Pipistrelle	Falsistrellus tasmaniensis

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C