



consulting.macrozamia.com.au
info@macrozamia.com.au

Biodiversity Development Assessment Report Proposed 7 Lot residential Subdivision Southdown Road Marulan, NSW

Lot 11 DP 1271846

Ngunnawal Country



Prepared by Pat Guinane,
BAM Accredited Assessor Number BAAS19018
Macrozamia Environmental

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Summary

Description of proposal

The development proposed is the subdivision of one lot into a 7 lot residential subdivision. The site has a land use history of agriculture and minimal development. The subject land is located in the Southern Tablelands of NSW on the northern extent of the Village of Marulan in a rural – residential transition area. The proposal will accommodate services to each resultant lot and require the construction of a short road.

BAM Triggers

The development as proposed triggers entry into the BOS for the following criteria;

Area clearing threshold, the proposal will require clearing of up to 1.7ha of native vegetation which exceeds the 2500m² native vegetation clearing threshold for this site.

Plant Community Types and Vegetation Zones

One plant community type was identified on the site, in one distinct condition state, 3373 Goulburn Tableland Box-Gum Grassy Forest_Moderate. A very small area of trees occurs however not a large enough area to define an independent vegetation zone. Exotic grasses and forbs occur across the site.

Threatened matters

Plant Community Type 3373 Goulburn Tableland Box-Gum Grassy Forest is a part of the BC Act listed 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*.

Targeted surveys were undertaken for one threatened species, Key's Matchstick Grasshopper, which was recorded on the site.

No threatened fauna or flora species were assumed present.

Serious and irreversible impact species

No species were found likely to occur on the subject land that are listed as at risk of a Serious and Irreversible Impact.

Avoidance and Minimise Impacts

During the design phase impacts to biodiversity have been avoided and minimised as practical while delivering a sustainable and much needed residential asset to the community, the site chosen for the residential development is appropriate given its zoning and proximity to existing developed residential areas, impacts to existing biodiversity on the subject land have been avoided where possible by concentrating development in parts of the site where biodiversity value is lowest and reducing intensity of development to a cluster around the proposed road which has been shortened and made a no through road so as to further reduce impacts on biodiversity.

Impact mitigation

Several measures to mitigate residual impacts to biodiversity are prescribed in section 8.4, these measures ensure resident fauna are appropriately managed, vegetation not to be cleared is sufficiently protected and measures to ensure no net loss of biodiversity through planting of indigenous trees in subdivision landscaping.

Offsets

Offsets required for biodiversity impacts are proposed through the purchase and retirement of biodiversity credits. Appendix C provides the credit reports from the BAM-C detailing credits required to offset impacts of the proposal.

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Abbreviations

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
EC	ecological community listed under the EPBC Act
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
NPW Act	National Parks and Wildlife Act 1974 (NSW)
NSW	New South Wales
PCT	plant community type
SAII	serious and irreversible impact
SEARs	Secretary's Environmental Assessment Requirements
TBDC	Threatened Biodiversity Data Collection
TEC	threatened ecological community
VEC	vulnerable ecological community
Vegetation SEPP	State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 (NSW)

Declarations

i. Certification under clause 6.15 Biodiversity Conservation Act 2016

I certify that this report has 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:  _____

Date: 19 December 2023

BAM Assessor Accreditation no: BAAS19018

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

Pat Guinane

Bachelor of Environmental Science (Management)

Diploma of Natural Resource Management

BAM Accredited Assessor since 2019

Twenty three years experience in environmental impact assessment consulting in NSW and Victoria preparing ecological assessment documentation for approvals for a range of projects and undertaking ecological surveys (flora and fauna)

Six years teaching at NSW TAFE and ACT CIT in Conservation and Land Management Diploma subjects including Plant Identification, Animal Identification, Wildlife Management and GIS.

Periodic work with NSW Environment Department in various ecology and GIS projects

Three years fulltime Assessment Officer for the Commonwealth Environment department, responsible for assessing EPBC referrals.

Authors and contributors

Name	BAM Assessor Accreditation no. (if relevant)	Position/Role	Tasks performed	Relevant qualifications
Pat Guinane	BAAS19018	Lead Assessor & Report author	Report preparation BAM-C data entry and analysis figure preparation BAM plot surveys targeted threatened flora surveys	B. Env. Sci. Dip. Nat. Res. Mgt.

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:  _____

Date: 19 December 2023

BAM Assessor Accreditation no: BAAS19018

Stage 1: Biodiversity assessment

1 Introduction

1.1 Proposed development

1.1.1 Development overview

Macrozamia Environmental has been engaged by the proponent of a residential subdivision to prepare this report to support their development application to Goulburn Mulwaree Council.

The development is located on a cleared parcel of land that has resulted from the past subdivision of agricultural lands in the growing northwest side of the Village of Marulan in the Southern Tablelands of NSW. Since its previous subdivision the lot has remained vacant as surrounding lands are developed for residential use.

The proposed 7 lot residential subdivision (the proposal) is a local development under Part 4 of the Environmental Planning and Assessment Act 1979. Part 4 development is subject to the thresholds of the Biodiversity Offset Scheme (BOS) as specified by the NSW Biodiversity Conservation Act 2016 (BC Act) and the Biodiversity Conservation Regulation 2017 (BC Regulation).

The proposed development triggers the BOS due to exceedance of the 2500m² native vegetation clearing trigger that applies to this site.

1.1.2 Location

The proposal is located among existing, recently established residential development located 2km to the northwest of the Village of Marulan, see Figure 1, in an area that has been in transition from rural to residential over the past 15 years.

The subject land is the whole of Lot 11 DP1271846, Southdown Road, Marulan, it is a 1.7ha gently sloping, irregularly shaped parcel of land supporting native and exotic vegetation, a small patch of trees and pioneering understory.

The site location and context are detailed in Figure 1 Site Map and Figure 2 Location Map.

1.1.3 Proposed development and the subject land

The site is currently un-developed apart from boundary fencing, services are available at the boundary at Southdown Road, a sealed local road. The minimum lot size of the land is 2000m², is zoned R5 Large Lot Residential under the Goulburn Mulwaree Local Environmental Plan 2009 and is surrounded by similar lands.

It is proposed to develop the site through subdivision into 7 residential lots ranging in size from 2000m² to 3000m², and provide infrastructure and services and a 63m long access road with cul-de-sacs, See Figure 3 Development Layout.

The development will create 7 new building envelopes, one per resultant lot, and the construction of a sealed and drained access road. Clearing and grubbing will be required for the development footprint along with excavation for essential services such as underground electricity, reticulated water & sewerage, and telecommunication infrastructure.

1.2 Biodiversity Offsets Scheme entry

The proposal triggers entry into the BOS for the following criteria;

Area clearing threshold, the proposal will require clearing of 1.7ha of native vegetation which exceeds the 2500m² native vegetation clearing threshold for this site.

No part of the site is included on the Biodiversity Values Map, the nearest included lands are 730m to the southeast in the Jaorimin Creek riparian area. See Figure 4 Biodiversity Values Map.

1.3 Excluded impacts

No part of the site or proposal are eligible for exclusion from assessment.

1.4 Matters of national environmental significance

Matters protected under the Commonwealth EPBC Act have been considered along with BC Act listed matters. The action does not result in a significant impact to any MNES, it is not a controlled action under the EPBC Act and does not require referral to the Commonwealth Minister for decision.

1.5 Information sources

The following information sources were used in the development of this BDAR:

- Proposal concept plans prepared by Laterals Planning, August 2023
- Commonwealth Government Species Profiles and Threats (SPRAT) database <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>
- Commonwealth Department of Climate Change, Energy, the Environment and Water Protected Matters Search Tool <https://pmst.awe.gov.au/#/map?lng=131.50634765625003&lat=-28.671310915880834&zoom=5&baseLayers=Imagery,ImageryLabels>
- NSW Threatened Biodiversity Database Collection (TBDC) <https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet>
- Australia's IBRA Bioregions and sub-bioregions <http://environment.gov.au/land/nrs/science/ibra/australias-bioregions-maps>
- Department of Environment and Climate Change NSW (DECC) (2002). Descriptions for NSW (Mitchell) Landscapes, Version 2.
- NSW Biodiversity Offsets and Agreement Management System (BOAMS), including BAM Calculator
- NSW Government SEED Mapping
- ePlanning spatial viewer <https://www.planningportal.nsw.gov.au/spatialviewer>
- NSW Biodiversity Values Map
- State Vegetation Type Map (SVTM) Dec 2022
- NSW Spatial Services SixMaps <https://maps.six.nsw.gov.au>
- Goulburn Mulwaree Local Environment Plan 2009
- BAM 2020

2 Methods

2.1 Site context methods

2.1.1 Landscape features

Landscape features were considered using a range of online mapping tools, see Section 1.5 above, to gain an understanding of the general nature of the site context and landscape features that relate to the subject land. Field investigations on the subject land and publicly accessible parts of surrounding lands were undertaken on 26 November 2023 to confirm or clarify findings of desktop research.

Other inspections on or in the vicinity of the subject land were undertaken on 22 January 2023, 23 April 2022 and 24 December 2021 which all contribute to the authors understanding of the site context and understanding of the nature of the landscape and biodiversity of the assessment area.

2.1.2 Native vegetation cover

Aerial photography produced by Nearmap 2023 was used to determine native vegetation cover along with vegetation mapping provided by the SVTM 2022. Ground truthing on publicly accessible areas within the assessment area, with the use of a drone mounted camera as well as familiarity with several nearby freehold lands previously surveyed confirmed native vegetation cover.

2.2 Native vegetation, threatened ecological communities and vegetation integrity methods

2.2.1 Existing information

The TBDC and SCTM were considered to shortlist the likely and possible PCTs and TECs occurring in the landscape. An earlier draft BDAR for a different project on the same site Dated December 2021 and Goulburn Mulwaree Council's comments on that BDAR dated April 2022 were also considered.

2.2.2 Mapping native vegetation extent

Vegetation mapping on the subject land was undertaken by traversing the site on foot and recording the actual extent of native vegetation with a handheld gis tablet, during site investigations. Vegetation stratification into vegetation zones based on prima facie PCT and condition was undertaken in order to define zones for plot base surveys, this could be estimated with sufficient confidence following a random meander survey, considering assemblages of plants present and extent of disturbance from past land management, the absence of trees and familiarity with local vegetation communities.

2.2.3 Plot-based vegetation survey

BAM plots were surveyed in accordance with Section 4.2.1 of the BAM 2020 by a BAM accredited assessor.

Table 3 of Section 4.3.4 of the BAM requires a minimum of;

- One plot in vegetation zones of <2ha

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Following desktop assessment and multiple site investigations one vegetation zone was identified across one PCT.

Plot locations are identified in Appendix B Vegetation survey data and illustrated on Figure 5 Field Survey Locations.

The following PCT & vegetation zones were identified.

- 1.7 ha of PCT 3373 *Goulburn Tableland Box-Gum Grassy Forest* Moderate condition
Randomly located floristic plots, see Figure 5 Field survey locations, of 20m x 20m (400m²) were sited within each vegetation zone. A random number generator was used to determine location and orientation while avoiding ecotones and disturbed boundaries as much as practical given the shape of the zone. These plots were used to assess composition and structure attributes and cover of high threat exotic (HTE) species.

2.2.4 Vegetation integrity survey

The same randomly selected plot sites were used for vegetation integrity survey, vegetation integrity plots of 20m x 50m (1000 m²) were located on the above-described floristic plots, The 1000m² plots were used to assess function attributes including; count of number of large trees, tree stem size classes, measured as diameter at breast height (DBH), regeneration based on the presence of living trees with stems <5 cm DBH, the total length in metres of fallen logs over 10 cm in diameter.

Five 1m² subplots were located along each side of the 50m midline to assess average litter cover, bare ground, cryptogram and rock cover.

2.3 Threatened flora survey methods

No predicted flora species credit species identified as requiring survey.

2.4 Threatened fauna survey methods

The Key's Matchstick Grasshopper, *Keyacris scurra* was considered to have potential to make use of the habitats on the site and required survey.

2.4.1 Review of existing information

The Threatened Biodiversity Database Collection including the Office of Environment and Heritage Species Profiles and NSW Scientific Committee determinations were used to gain a full understanding of the species.

2.4.2 Habitat constraints assessment

Given the relatively small size and accessible nature of the subject site all parts were inspected on foot in detail to consider any potential habitat constraints. The Key's Matchstick Grasshopper is;

generally reliant on an understorey of tussock grasses, typically Themeda triandra or other disturbance-sensitive species for shelter and possibly food, but may use similar grasses. Food sources include a range of dicotyledon species. Species known to form part of the diet include Aira caryophylla (Silver hairgrass), Scirpus sp. (sedges), Wurmbia dioica (Early Nancy), Bulbine bulbosa (Native Leek), Calochilus paludosus (Red Beard Orchid), Rumex crispus (Curled Dock), Acetosella vulgaris/Rumex acetosella (Sorrel), Cerastium glomeratum (Mouse-ear Chickweed),

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Ranunculus lappaceus (Common Buttercup), *Rosa rubiginosa* (Sweet Briar), *Acaena ovina* (Orchid), *Trifolium subterraneum* (Subterranean Clover), *Trifolium arvense* (Haresfoot Clover), *Poranthera microphylla*, *Stackhousia monogyna* (Creamy Candles), *Hibbertia sericea*, *Lavandula stoechas* (Lavender), *Salvia verbenaca* (Vervain), *Verbascum thapsus* (Great Mullein), *Sherardia arvensis* (Field Madder), *Galium tricornatum* (Rough Fruited Bedstraw), *Helichrysum apiculatum* (Common Everlasting), *Ozothamnus retusus* or *O. scaber* (*Helichrysum bilobum*), *Podolepis jaceoides* (*Podolepis acuminata*) (Showy Copper-wire Daisy) and *Craspedia uniflora*

Several of these flora species are present on the site however the far northwestern corner was found to rarely support these species and is generally dominated by *Holcus lanatus*, it was considered these areas were not likely to be suitable habitat for *Keyacris scurra* and appropriate to exclude this area from its species polygon.

2.4.3 Field surveys

A survey was designed according to the following survey methodology developed by Goulburn Mulwaree Council following consultation with entomologist Dr Roger Farrow;

- Surveys should be conducted between August and November (inclusive) and February to April.
- Surveys should take place between 10.00 am and 4.00 pm on warm, sunny days when the grasshoppers are likely to be active.
- The survey technique involves slow walking, shuffling transects with careful observation of the ground immediately in front of the feet.
- Transects to be in parallel, about 5 metres apart, across the area of suitable habitat, covering about 100 m.
- Suitable habitat is defined as Themeda dominated native grassland, derived native grassland, and open grassy woodland (with a groundcover layer dominated by native grasses and forbs), and open dry forest with an understory of heaths and some perennial grasses.
- Survey transects can be discontinued if a *Keyacris* is visually confirmed. If presence is confirmed, no further survey effort is required.

A 100m transect was commenced however within 45m and 11 minutes of survey 8 *Keyacris scurra* individuals were found and the formal survey discontinued in line with the BAM Guidelines.

Grasshoppers appearing to be *Keyacris scurra* were photographed in place, where possible gently restrained by hand and photographs used to confirm identification with particular attention being placed on the absence of wing buds and the presence of a triangular gap between the base of the head and the thorax, which is present on all matchstick grasshoppers, insuring specimens recorded were not the easily confused nymph of *Acrida conica*.

One experienced ecologist undertook the whole of the survey who has recent experience, over the previous 11 months surveying and identifying *Keyacris scurra* including recording the species at 3 other sites in the Southern Tablelands in this time.

2.5 Weather conditions

Recent years have been wetter than average, this may change the typical floral composition of the site though is unlikely to have impacted the detectability of target species. Days leading up to surveys and during surveys experienced a wide variety of weather conditions

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including heavy rain, heat waves significant winds and thunderstorms. Table 1 documents conditions at the time of survey.

Table 1 Environmental conditions during threatened species surveys

Survey undertaken (e.g. method / targeted species)	Date	Time	Temp	Wind	Rainfall	Other conditions relevant to the species
Targeted flora survey for; <i>Keyacris scurra</i>	26 Nov. 2023	Betwe en 060	26 °C during survey 10°C to 27°C rec. YGLB	Calm	Rain not recorded on day of survey Periodic rain had occurred over previous week	4 oktas, low cumulus. Lighting was adequate to effectively identify target species & radiant heat sufficient for grasshopper activity.

3 Site context

3.1 Assessment area

As a site-based development, 1500m buffer was applied to the subject land to define the assessment area as identified in 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. A discussion of relevant landscape features is provided below, these have been used where applicable in the BAM Calculator for assessment of this proposal.

3.2.1 IBRA bioregions and IBRA subregions

Bioregions are large, geographically distinct areas of land with common characteristics such as geology, landform patterns, climate, ecological features, and flora and fauna communities.

The assessment area occurs wholly within the central eastern portion of the Bungonia IBRA subregion, 1.8km from the adjoining subregion Burragorang, within the greater South Eastern Highlands IBRA bioregion. The South Eastern Highlands bioregion lies just inland from the coastal bioregions of the South East Corner and the Sydney Basin, bounded by the Australian Alps and South Western Slopes bioregions to the south and west. The South Eastern Highlands Bioregion includes most of the Australian Capital Territory and extends south into Victoria.

3.2.2 Rivers, streams, estuaries and wetlands

The subject land drains to the northwest of the study site on adjoining allotments and via an un-named second order perennial waterway to Jaorimin Creek (3rd order waterway) approximately 1.5km downstream, before the Wollondilly River confluence 19km downstream part of the greater Hawksbury Nepean Catchment. Jaorimin Creek is located at the edge of the catchment divide 1.6km from the boundary with the Shoalhaven River Catchment.

The unnamed second order waterway identified to the west of subject land along with 1st and 3rd order unnamed waterways to the north of the subject land form tributaries of Jaorimin Creek.

No wetlands or surface water features occur on the subject land.

3.2.3 Habitat connectivity

Habitat forming connectivity for flora and fauna consists of a patch of native woodland located at the southwest of the subject land. This patch is contiguous with a band of woody vegetation upstream on the unnamed waterway adjoining the southwest boundary. Limited connectivity between the grassy box-gum woodland adjoining the subject land and the downstream section mapped at Jaorimin Creek riparian corridor exists.

Dispersal potential for flora species and less mobile fauna species is predominantly restricted to within the riparian section of the unnamed waterway to the west. However highly mobile fauna species are likely to utilise adjacent habitat connectivity corridors to disperse through the landscape. Habitat corridors for aquatic species are limited to the unnamed

waterways, which are ephemeral, and therefore, mobility is limited to periods of high rainfall when the waterways have flow. The waterways adjoining the southwest boundary of the subject land flow into Jaorimin Creek and from there towards Wollondilly River allowing a moderate degree of connectivity associated with surface water and riparian corridors.

The surrounding lands are developed for residential uses offering associated landscaping, being gardens and dwelling curtilage, connectivity to fauna that are well adapted to these environments.

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

No karst or cave features occur in the assessment area. No coastal cliffs occur in this area or significant areas of cliffs or exposed rock and crevice.

3.2.5 Areas of outstanding biodiversity value

No areas of outstanding biodiversity value, as identified under the BC Act occur within the subject land, assessment area or nearby.

3.2.6 NSW (Mitchell) landscape

The subject land and assessment area occur on the boundary of the Wollondilly - Bindook Tablelands and Gorges (western third) and the Bungonia Tableland and Gorge (eastern two thirds) NSW (Mitchell) landscapes.

3.3 Native vegetation cover

Vegetation within the subject land, and within the 1500 metre buffer assessment area, was assessed using aerial photogram interpretation, field investigation and SVTM mapping. Table 2 summarises the extent of native vegetation cover within the assessment area and Figure 2 Location Map shows native vegetation cover.

Table 2 Native vegetation cover in the assessment area

Assessment area (ha)	853.9
Total area of native vegetation cover (ha)	361.2
Percentage of native vegetation cover (%)	42.3
Class (0-10, >10-30, >30-70 or >70%)	>30-70

4 Native vegetation, threatened ecological communities and vegetation integrity

4.1 Native vegetation extent

The entirety of the subject land is native vegetation for the purpose of assessing native vegetation extent. It is likely the site was a grassy woodland community prior to clearing for agriculture, a small patch consisting of two mature and two juvenile Argyle Apple (*Eucalyptus cinerea*) trees occur in a small clump along with regenerating Green Wattles (*Acacia decurrens*). The native shrub Sifton Bush (*Cassinia sifton*) is widespread and the majority of the site is secondary native grassland of varying degrees of native and exotic composition. See Figure 6 Native vegetation extent.

4.1.1 Changes to the mapped native vegetation extent

Native vegetation extent does not vary from aerial imagery and gis mapping resources. Vegetation on the site is *Not Classified* in the SVTM mapping, aerial photography shows a grassland on the site that is atypical of an exotic pasture and a pioneering understory of *Cassinia sifton* is discernible.

4.1.2 Areas that are not native vegetation

No areas of the subject land can be considered devoid of all native vegetation.

4.2 Plant community types

4.2.1 Overview

Vegetation within the subject land has been assessed as aligning with the BioNet Vegetation Classification PCTs identified within Table 3 and their extent is shown in Figure 7 Plant community types. Detailed descriptions of each PCT are provided in the following subsections.

Table 3 PCTs identified within the subject land

PCT ID	PCT name	Subject land area (ha)
3373	Goulburn Tableland Box-Gum Grassy Forest	1.70
Total area		1.70

4.2.2 Goulburn Tableland Box-Gum Grassy Forest

This PCT is described as

A mid-high to tall dry sclerophyll grassy open forest to woodland of northern parts of the Southern Tablelands, occurring from Canberra and Queanbeyan north to Pejar and east to Durran Durra and Canyonleigh, with a northern outlier at Golspie. It is found in landscape positions with moderately deep soil profiles, particularly footslopes of gently undulating low hills, on a wide range of substrates including sedimentary (sandstone, arenite, greywacke, shale), acid volcanic (ignimbrite, rhyolite) and granitic rocks. This PCT is found at elevations of 600-850 metres asl with mean annual rainfall of 650-800 mm. Remnants of this community often have a long history of disturbance and the tree canopy may be sparse to

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very sparse, commonly including *Eucalyptus melliodora* and occasionally with *Eucalyptus macrorhyncha*, *Eucalyptus blakelyi* or *Eucalyptus dives*. A very sparse shrub stratum commonly includes scattered *Lissanthe strigosa*, *Pimelea curviflora*, *Melichrus urceolatus* or *Hibbertia obtusifolia*, while the ground layer is predominantly grassy and commonly includes *Themeda triandra*, *Microlaena stipoides*, *Poa sieberiana*, *Elymus scaber* and *Aristida ramosa*, with occasional high cover of *Rytidosperma laeve*. Common forbs include *Lomandra filiformis*, *Lomandra multiflora* subsp. *multiflora*, *Goodenia hederacea*, *Hydrocotyle laxiflora*, *Oxalis perennans*, *Chrysocephalum apiculatum*, *Tricoryne elatior*, *Gonocarpus tetragynus* and *Hypericum gramineum*. In lower landscape positions subject to cold air drainage this community may be replaced by PCT 3338, while on stony dry hills it commonly grades into PCT 3747

There are few diagnostic species available on the site to confidently identify the PCT that vegetation on the subject site is derived from due to a nearly absent Tree Growth form layer. Trees occurring are *Eucalyptus cinerea* which occurs with moderate to low frequency scores in PCT 3373 as well as other possible PCTs. Along with shrub and groundcover species present, they are consistent with PCT 3373 though not diagnostic of it.

Goulburn Tableland Box-Gum Grassy Forest does occur in the landscape, on soils and topography consistent with the subject site and it has been mapped by the SVTM immediately to the southwest of the subject site and for these reasons this PCT has been selected. Details relevant to the BAM-C for this community are detailed in Table 4, photo 4-1 shows this PCT on the subject land.

This PCT is associated with the following listings

- BC Act 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 &
- EPBC Act Critically Endangered Ecological Community;
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

Table 4 PCT 3373 Goulburn Tableland Box-Gum Grassy Forest

PCT ID	3373
PCT name	Goulburn Tableland Box-Gum Grassy Forest
Vegetation formation	Grassy Woodlands
Vegetation class	Southern Tableland Grassy Woodlands
Per cent cleared value (%)	92
Extent within subject land (ha)	1.7



Photo 2 PCT 3373 Goulburn Tableland Box-Gum Grassy Forest, example on subject land, Argyle Apple tree in midground, Sifton Bush understory and variety of grasses – both exotic and native.

4.2.3 Condition states

No distinct condition states for PCT 3373 Goulburn Tableland Box-Gum Grassy Forest have been stratified. There is variation in the exotic composition of the grassland however it is never dramatic enough or over a large enough area to warrant separate vegetation zones. A very small part of the site supports a canopy approximately 75m², this area is too small to define a separate vegetation zone and apply the BAM.

4.2.4 Justification of PCT selection

NSW SVTM mapping of PCTs does map PCT 3373 Goulburn Tableland Box-Gum Grassy Forest immediately to the southwest and this vegetation community is known to occur in the local area on landscape positions with moderately deep soil profiles, particularly foot slopes of gently undulating low hills, consistent with the subject land. While diagnostic species such as *Eucalyptus melliodora* & *E. blakelyi* are absent, the trees present, *Eucalyptus cinerea*, is known to occur in this PCT particularly in the Marulan – Bungonia - Tallong districts. Other species present are consistent with this PCT.

4.3 Alignment with TECs

This PCT is associated with the following listings;

- BC Act 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

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South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Boxgum Woodland) &

- EPBC Act Critically Endangered Ecological Community;

White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

The vegetation on the site is consistent with the BC Act Listing for a highly modified example of Boxgum Woodland. It does not meet the criteria for the EPBC listing as it lacks a predominately native ground layer and does not contain at least 12 native, non-grass understorey species.

4.4 Vegetation zones

No distinct condition states for PCT 3373 Goulburn Tableland Box-Gum Grassy Forest have been stratified. There is variation in the exotic composition of the grassland however it is never dramatic enough or over a large enough area to warrant separate vegetation zones. The one vegetation zone present is detailed in Table 6 Vegetation zones and patch sizes and their distribution illustrated in Figure 7 Vegetation zones.

Table 6 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
3373_Mod	3373 Goulburn Tableland Box-Gum Grassy Forest	Moderate, sparse to absent canopy, simple understory, high weed composition	15.99	<input type="checkbox"/> <5 ha <input type="checkbox"/> 5–24 ha <input type="checkbox"/> 25–100 ha <input checked="" type="checkbox"/> >100 ha	1	1	1	1

4.5 Vegetation integrity (vegetation condition)

4.5.1 Vegetation integrity survey plots

Each vegetation integrity plot was selected randomly while being spaced across the subject land and contained within the most typical examples of the vegetation being sampled in line with Section 4.3.4 *Sample vegetation integrity survey plots* of the BAM which require plots to be located so as to capture attributes relevant to that vegetation zone, not within 50m of ecotones or disturbed areas and spread across any discontinuous vegetation zones.

For PCT 3373_Mod, 1 plot, was sampled to represent the zone adequately across its spatial area.

Photos of each plot from its midline are provided in Appendix D.

4.5.2 Scores

Table 7 below details scores generated by the BAM-C as a result of the data collected from vegetation integrity plots.

Table 7 Vegetation integrity scores

Vegetation zone ID	Composition condition score	Structure condition score	Function condition score	Vegetation integrity score	Hollow bearing trees present?
PCT 3373_Mod	63.9	57.9	15	38.1	No

4.5.3 Use of benchmark data

The BAM Calculator standard PCT benchmark data was used to assess vegetation integrity attributes for each zone.

5 Habitat suitability for threatened species

5.1 Identification of threatened species for assessment

5.1.1 Ecosystem credit species

Ecosystem credit species generated by the BAM-C with consideration of nearby records and available habitats has been detailed in Table 9 below.

Table 9 Predicted ecosystem credit species

Species	Retained for further Assessment?	Reason for exclusion	Sensitivity to gain class	BC Act listing status	EPBC Act listing status.	Vegetation Zones
Anthochaera phrygia Regent Honeyeater (Foraging)	Yes	--	High Sensitivity to Gain	Critically Endangered	Critically Endangered	PCT 3373_ Mod
Artamus cyanopterus cyanopterus Dusky Woodswallow	Yes	--	Moderate Sensitivity to Gain	Vulnerable	Not Listed	PCT 3373_ Mod
Callocephalon fimbriatum Gang-gang Cockatoo (Foraging)	Yes	--	Moderate Sensitivity to Gain	Vulnerable	Endangered	PCT 3373_ Mod
Calyptorhynchus lathami Glossy Black-Cockatoo (Foraging)	No	Absence of Allocasuarina and casuarina species	High Sensitivity to Gain	Vulnerable	Vulnerable	--
Chthonicola sagittata Speckled Warbler	Yes	--	High Sensitivity to Gain	Vulnerable	Not Listed	PCT 3373_ Mod
Climacteris picumnus victoriae Brown Treecreeper (eastern subspecies)	Yes	--	High Sensitivity to Gain	Vulnerable	Not Listed	PCT 3373_ Mod

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Species	Retained for further Assessment?	Reason for exclusion	Sensitivity to gain class	BC Act listing status	EPBC Act listing status.	Vegetation Zones
Daphoenositta chrysoptera Varied Sittella	Yes	--	Moderate Sensitivity to Gain	Vulnerable	Not Listed	PCT 3373_ Mod
Dasyurus maculatus Spotted-tailed Quoll	Yes	--	High Sensitivity to Gain	Vulnerable	Endangered	PCT 3373_ Mod
Falco subniger Black Falcon	Yes	--	Moderate Sensitivity to Gain	Vulnerable	Not Listed	PCT 3373_ Mod
Glossopsitta pusilla Little Lorikeet	Yes	--	High Sensitivity to Gain	Vulnerable	Not Listed	PCT 3373_ Mod
Grantiella picta Painted Honeyeater	No	Mistletoes not present at a density of greater than five mistletoes per hectare	Moderate Sensitivity to Gain	Vulnerable	Vulnerable	--
Haliaeetus leucogaster White-bellied Sea-Eagle (Foraging)	No	Not within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines	High Sensitivity to Gain	Vulnerable	Not Listed	--
Hieraetus morphnoides Little Eagle (Foraging)	Yes	--	Moderate Sensitivity to Gain	Vulnerable	Not Listed	PCT 3373_ Mod

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Species	Retained for further Assessment?	Reason for exclusion	Sensitivity to gain class	BC Act listing status	EPBC Act listing status.	Vegetation Zones
Hirundapus caudacutus White-throated Needletail	Yes	--	High Sensitivity to Gain	Not Listed	Vulnerable	PCT 3373_ Mod
Lathamus discolor Swift Parrot (Foraging)	Yes	--	Moderate Sensitivity to Gain	Endangered	Critically Endangered	PCT 3373_ Mod
Melanodryas cucullata cucullata Hooded Robin (south-eastern form)	Yes	--	Moderate Sensitivity to Gain	Vulnerable	Not Listed	PCT 3373_ Mod
Melithreptus gularis gularis Black-chinned Honeyeater (eastern subspecies)	Yes	--	Moderate Sensitivity to Gain	Vulnerable	Not Listed	PCT 3373_ Mod
Ninox connivens Barking Owl (Foraging)	Yes	--	High Sensitivity to Gain	Vulnerable	Not Listed	PCT 3373_ Mod PCT 3373_ Mod
Ninox strenua Powerful Owl (Foraging)	Yes	--	High Sensitivity to Gain	Vulnerable	Not Listed	PCT 3373_ Mod
Pachycephala olivacea Olive Whistler	Yes	--	Moderate Sensitivity to Gain	Vulnerable	Not Listed	PCT 3373_ Mod

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Species	Retained for further Assessment?	Reason for exclusion	Sensitivity to gain class	BC Act listing status	EPBC Act listing status.	Vegetation Zones
Petroica boodang	Yes	--	Moderate Sensitivity to Gain	Vulnerable	Not Listed	PCT 3373_ Mod
Scarlet Robin						
Petroica phoenicea	Yes	--	Moderate Sensitivity to Gain	Vulnerable	Not Listed	PCT 3373_ Mod
Flame Robin						
Pteropus poliocephalus	Yes	--	High Sensitivity to Gain	Vulnerable	Vulnerable	PCT 3373_ Mod
Grey-headed Flying-fox (Foraging)						
Stagonopleura guttata	Yes	--	Moderate Sensitivity to Gain	Vulnerable	Not Listed	PCT 3373_ Mod
Diamond Firetail						
Suta flagellum	Yes	--	High Sensitivity to Gain	Vulnerable	Not Listed	PCT 3373_ Mod
Little Whip Snake						
Tyto novaehollandiae	Yes	--	High Sensitivity to Gain	Vulnerable	Not Listed	PCT 3373_ Mod
Masked Owl (Foraging)						
Varanus rosenbergi	Yes	--	High Sensitivity to Gain	Vulnerable	Not Listed	PCT 3373_ Mod
Rosenberg's Goanna						

Ecosystem Credit Species excluded from further assessment;

Three species have been excluded from further assessment;

- Glossy Black-Cockatoo
- Painted Honeyeater
- White-bellied Sea-Eagle

Glossy Black-Cockatoo occurs reasonably commonly in the district in open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foraging resources for this bird. Native forests with sheoaks are common in the Marulan, Bungonia & Tallong areas. Potential nest trees (Species Credit habitat) contain hollows that are at least 8 m above the ground; and in stems with a diameter of at least 30 cm, hollow diameter is at least 15 cm & stem angle is at least 45 degrees, and may be near-vertical or vertical.

No foraging or breeding habitat is present for this species.

The Painted Honeyeater inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests and is a specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias preferring mistletoes of the genus *Amyema*. The TBDC recommends that suitable habitat is present for this species if mistletoes are present at a density of greater than five mistletoes per hectare. No mistletoes were recorded on the subject land.

No foraging or breeding habitat is present for this species

The White-bellied Sea-Eagle habitat is characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the ocean. It occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forests. Breeding habitat (Species Credit habitat) consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass.

None of these habitat components are present in the subject land.

No foraging or breeding habitat is present for this species.

Ecosystem Credit Species excluded from further assessment in one vegetation zone only;

No Ecosystem Credit Species have been excluded from further assessment in one vegetation zone only

5.1.2 Species credit species

All predicted species credit species generated by the BAM-C are detailed in Table 10 for flora and Table 11 for fauna below.

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Table 10 Predicted flora species credit species

Species	Retained for further Assessment ?	Reason for exclusion	Sensitivity to gain class	BC Act listing status	EPBC Act listing status.	Veg Zones
No Flora species credit species generated by the BAM-C or considered likely to occur	--	--	--	--	--	

Table 11 Predicted fauna species credit species

Species	Retained for further Assessment ?	Reason for exclusion	Sensitivity to gain class	BC Act listing status	EPBC Act listing status.	Veg Zones
<u>Anthochaera phrygia</u>	No	Geographic limitations Important Habitat Mapping not present for this species	High Sensitivity to Gain	Critically Endangered	Critically Endangered	PCT 3373_Mod
Regent Honeyeater						
(Breeding)						
<u>Chalinolobus dwyeri</u>	No	Habitat limitations Cliffs not present Subject land not within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels	Very High Sensitivity to Gain	Vulnerable	Vulnerable	PCT 3373_Mod
Large-eared Pied Bat						
<u>Keyacris scurra</u>	Yes	--	High Sensitivity to Gain	Endangered	Not Listed	PCT 3373_Mod

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Species	Retained for further Assessment ?	Reason for exclusion	Sensitivity to gain class	BC Act listing status	EPBC Act listing status.	Veg Zones
Key's Matchstick Grasshopper						PCT 3373_Mo d
<u>Lathamus discolor</u>	No	Habitat limitations Geographic limitations Important Habitat Mapping not present for this species	Moderate Sensitivity to Gain	Endangere d	Critically Endangere d	PCT 3373_Mo d
Swift Parrot						
(Breeding)						
<u>Mixophyes balbus</u>	No	Habitat limitations No suitable habitat present – see notes below	Very High Sensitivity to Gain	Endangere d	Vulnerable	PCT 3373_Mo d
Stuttering Frog						
<u>Petrogale penicillata</u>	No	Habitat limitations No land within 1 km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or cliffines	Very High Sensitivity to Gain	Endangere d	Vulnerable	PCT 3373_Mo d
Brush-tailed Rock-wallaby						

The BAM-C did not suggest Key's Matchstick Grasshopper for assessment as a predicted fauna species credit species, this species was added as it was noted there was potential habitat. All species suggested by the BAM-C have been excluded due to habitat limitations as detailed in Table 11, in line with TBDC advice.

The other species excluding the Stuttering Frog have specific exclusion criteria in the TBDC, as detailed in Table 11. The Stuttering Frog, a SAIL species, is found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor. None of these habitat components or environments occur in the assessment area, the subject site is a derived native grassland with no forest. It occurs on the tablelands and not on foothills. The nearest records of the Stuttering Frog occur 30 to 70 kilometres north and east of the subject site in environments that do support suitable habitat.

5.2 Presence of candidate species credit species

Each candidate species credit species requiring further assessment were targeted in surveys as detailed in Table 12 & 13 below.

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	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		BC Act	EPBC Act		
--	--	--	--	--	--

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	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		BC Act	EPBC Act		
Key's Matchstick Grasshopper	Keyacris scurra	E	-	Targeted Threatened Species Survey	Yes

5.3 Threatened species surveys

Threatened species surveys undertaken and their outcome are detailed in tables 14 & 15 below.

Table 14 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 Subsections 5.2.5 and 5.2.6)
		Survey method (transects or grids)	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort (hours & no. people)		
--	--	--	--	--	--	--

No flora surveys were undertaken for candidate fauna species credit species as none were found likely to occur.

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)
		Survey method (e.g. harp trap, Elliott trap, bioacoustics, etc.)	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort (hours & no. people)		
Key's Matchstick Grasshopper	<i>Keyacris scurra</i>	Grasshopper walking transect	<input checked="" type="checkbox"/> Yes 26 Nov. 23	100m transect over 40mins planned Species presence confirmed in 45m of transect and 11minutes of survey. Survey discontinued	Yes	Yes

5.4 Expert reports

No expert reports were applied to this assessment.

5.5 More appropriate local data

No more appropriate local data has not been used to assess habitat suitability for this assessment.

Table 16 Use of more appropriate local data for habitat suitability

Species	Amendments to species data	Local data source/s
-	-	-

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

One species of threatened fauna, Key's Matchstick Grasshopper, was found to be present on the subject land a species polygon has been mapped for this species that includes the whole of the 1.6ha of the 1.7ha PCT 3373_Mod vegetation zone, Figure 8. Table 17 summarises each species recorded or assumed present.

Table 17 Results for present species (recorded within the subject land)

Common name	Scientific name	Biodiversity risk weighting (BAM-C & TBDC*)	SAIL 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	<i>Keyacris scurra</i>	High (2)	No	Reliant on understorey of tussock grasses, typically Themeda triandra or other disturbance-sensitive species for shelter and possibly food but may use similar grasses	--	1.6ha	None provided in relation to species polygons	VI Score 38.1

6 Identifying prescribed impacts

Prescribed impacts are the impacts identified in clause 6.1 of the BC Regulation. These can be direct or indirect impacts and are additional to the impacts of native vegetation clearing. Prescribed impacts are considered in Table 19 below.

Table 19 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 EEC, that are at risk of vehicle strike
Karst, caves, crevices, cliffs, rocks or other geological features of significance	<input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No	Site inspections considered the presence of and confirmed no karst, caves, crevices, cliffs, rocks or other geological features of significance occur on or nearby the subject site.	N/A
Human-made structures	<input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	No significant human made structures occur, boundary fences have been constructed around the whole site and minor earthworks have created an access way to Southdown Road.	These human made structures are basic steel post and wire construction are not likely to be in use by or a habitat feature for any threatened entity due to their simple design and lack of habitat values.
Non-native vegetation	<input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	Non-native vegetation occurs across the site	These areas of non-native vegetation are not likely to be in use by or a habitat feature for any threatened entity beyond those identified and addressed for Key's Matchstick Grasshopper
Habitat connectivity	<input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	The subject land has good continuity to the west with areas of native vegetation including similar modified grasslands and woodland however, the subject land does not support features or habitat that is likely to be an important part of a movement corridor	The proposal will not impede habitat connectivity in a significant way. The proposal will impact grassland habitat between residential back yards and native vegetation habitat
Waterbodies, water quality and hydrological processes	<input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No	Waterbodies are not present on the development area	N/A
Wind turbine strikes (wind farm development only)	<input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No	Windfarm development not proposed	N/A

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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 EEC, that are at risk of vehicle strike
Vehicle strikes	<input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No	The proposal does not include through roads and will not create islands of habitat that require terrestrial fauna to cross roads.	N/A

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 proposal has been located in an area of land zoned as R5 Large Lot Residential and is adjoined in all directions of land of this zoning. Given the planning environment and the strategic planning policy for the site taken by local government to utilise this area for housing as proposed in the LEP, it is considered an appropriate scale of development for the land and avoids impacting areas that have been considered to have the most important biodiversity conservation values such as lands of a Conservation Zoning.

The whole of the subject site has suffered habitat degrading land management practices in the past, particularly clearing of the woody vegetation. Given these impacts and the need for housing in this area, the chosen site is well suited to the proposed development.

7.1.2 Project design

The proposal has been designed to minimise impacts to biodiversity, along with meeting other environmental planning criteria, the subject land was chosen for the proposal as it is currently in a moderate ecological state offering minimal value for native vegetation, threatened species, threatened ecological communities and their habitats. It also occurs in an environment that is being developed for similar residential uses in all directions, and adjoins existing residential development.

The design of the subdivision minimises impact areas by reducing the length of road construction required and siting future building envelopes close to this road. The clustered design also minimises the length of service installation impacts. The existing trees would occur in proposed lot 7, these trees may be retained and incorporated into landscaping on the site, however, as their condition and visual appeal are poor it is likely future land uses would involve their removal and this has been considered in this report.

The design has also considered the potential habitat continuity to habitats surrounding the subject land, the design ensures minimal interruption to potential continuity by limiting the extent of the road and retaining the continuity across the landscape, the short no through road also reduces the opportunities for vehicle strikes to fauna.

7.1.3 Indirect impacts

During construction indirect impacts of dust, noise, erosion and sedimentation and weed spread are impacts that works may impose on adjoining and downstream lands, these will be avoided and minimised through the implementation of best management practices prescribed through management plans to be implemented during works.

7.2 Avoid and minimise prescribed impacts

7.2.1 Project location

The proposal has been located in an area that avoids prescribed (clause 6.1 of the BC Regulation) impacts, see Section 6.

7.2.2 Project design

In the design phase it was identified that prescribed impacts are unlikely, due to the nature of the development and the limited biodiversity values it offers in terms of habitat connectivity.

7.2.3 Summary of measures to avoid and minimise impacts

Measures implemented to avoid and minimise direct, indirect and prescribed impacts are documented in Table 21.

Table 21 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
Knowledge of biodiversity values has informed decisions about the location of the proposal	The location of the proposal is on land zoned for residential uses in an area of land of similar land uses, areas of higher biodiversity value have been avoided.	Design phase	Developer
Biodiversity values of the local area and likely to occur onsite informed design of the proposal	Biodiversity impacts have been minimised by locating the most intense parts of the proposal in the areas of least biodiversity value, where practical, with consideration of both direct impacts to vegetation and habitat as well as indirect impacts of biological continuity.	Design phase	Developer

8 Impact assessment

8.1 Direct impacts

8.1.1 Residual direct impacts

Residual direct impacts are summarised in Table 22, as illustrated in Figure 9. Impacts are clearing works required to accommodate the development.

Table 22 Summary of residual direct impacts

Direct impact	BC Act status	EPBC Act status	SAIL entity	Project phase/timing of impact	Extent (ha/ no.)
Clearing of habitat for (See Figure 9);			No	Construction – permanent	1.7ha
Regent Honeyeater	CE	CE	No	Construction – permanent	1.7ha
Dusky Woodswallow	V	-	No	Construction – permanent	1.7ha
Gang-gang Cockatoo	V	E	No	Construction – permanent	1.7ha
Speckled Warbler	V	-	No	Construction – permanent	1.7ha
Brown Treecreeper (eastern subspecies)	V	-	No	Construction – permanent	1.7ha
Varied Sittella	V	-	No	Construction – permanent	1.7ha
Spotted-tailed Quoll	V	E	No	Construction – permanent	1.7ha
Black Falcon	V	-	No	Construction – permanent	1.7ha
Little Eagle	V	-	No	Construction – permanent	1.7ha
Little Lorikeet	V	-	No	Construction – permanent	1.7ha
White-throated Needletail	-	V	No	Construction – permanent	1.7ha
Swift Parrot	E	CE	No	Construction – permanent	1.7ha
Hooded Robin (south-eastern form)	V	-	No	Construction – permanent	1.7ha
Black-chinned Honeyeater (eastern subspecies)	V	-	No	Construction – permanent	1.7ha

Direct impact	BC Act status	EPBC Act status	SAIL entity	Project phase/timing of impact	Extent (ha/ no.)
Barking Owl	V	-	No	Construction – permanent	1.7ha
Powerful Owl	V	-	No	Construction – permanent	1.7ha
Olive Whistler	V	-	No	Construction – permanent	1.7ha
Scarlet Robin	V	-	No	Construction – permanent	1.7ha
Flame Robin	V	-	No	Construction – permanent	1.7ha
Grey-headed Flying-fox	V	V	No	Construction – permanent	1.7ha
Diamond Firetail	V	-	No	Construction – permanent	1.7ha
Little Whip Snake	V	-	No	Construction – permanent	1.7ha
Masked Owl	V	-	No	Construction – permanent	1.7ha
Rosenberg's Goanna	V	-	No	Construction – permanent	1.7ha
Key's Matchstick Grasshopper	V	-	No	Construction – permanent	1.6ha

8.1.2 Change in vegetation integrity score

The vegetation integrity score derived through the BAM calculator following surveys are documented in Table 23 below for the current state of each vegetation zone and the likely future scores. While it is possible post development vegetation integrity scores would be higher for some time, as the land will be occupied for residential uses it is unlikely that they will remain above zero in perpetuity.

Table 23 Impacts to vegetation integrity

Vegetation zone	PCT ID	Management zone	Area (ha)	Pre development				Post development				
				Composition	Structure	Function	VI score	Composition	Structure	Function	VI score	Change in VI score
3373_ Mod	3373	Development	1.7	63.9	57.9	15	38.1	0	0	0	0	-38.1

8.1.3 Indirect impacts

Impacts that may occur extending beyond the project area or subject site are documented in Table 24 below considering both construction and operational phases of the proposal.

Table 24 Summary of residual indirect impacts

Indirect impact	Impacted entities	Extent	Duration	Project phase/ timing of impact	Likelihood/ consequences of failure & mitigation measures
<p>Inadvertent construction impacts on adjacent habitat and vegetation;</p> <ul style="list-style-type: none"> • Weed spread • Accidental mechanical damage 	Adjoining 3373 Goulburn Tableland Box-Gum Grassy Forest to west of subject land	Lands adjoining project's western boundary	short term	Construction	<p>Unlikely.</p> <p>Consequences include damage to vegetation and weed species introduction.</p> <p>Prior to clearing & grubbing, clearing limits will be clearly demarcated with a visible barrier</p> <p>Plant and vehicles working on the site are only to access the site from a formed access off Southdown Road</p> <p>During operation phase there is a very low risk of future tenants of the developed land impacting adjoining vegetation.</p>
Reduced viability of adjacent habitat due to edge effects	Adjoining 3373 Goulburn Tableland Box-Gum Grassy Forest to west of subject land	Lands adjoining project's western boundary	Long term	Construction & Operation	<p>Existing impact, unlikely to be exacerbated.</p> <p>Edge effects are currently impacting adjoining vegetation, potential increase in impact are minor</p>

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Indirect impact	Impacted entities	Extent	Duration	Project phase/ timing of impact	Likelihood/ consequences of failure & mitigation measures
Reduced viability of adjacent habitat due to noise, dust or light spill	Adjoining 3373 Goulburn Tableland Box-Gum Grassy Forest to west of subject land	Lands adjoining project's western boundary	Long term	Construction & Operation	<p>Existing impact. Low likelihood of increasing during construction.</p> <p>Construction works will increase dust noise and vibration temporarily. These impacts will be managed through best management practices for civil works.</p> <p>During the construction phase these impacts may scare fauna from habitat temporarily reducing its value</p> <p>During operation ongoing noise and light impacts of residential development will reduce the value of habitat however this impact already exists and is unlikely to be increased to any significant extent.</p>
Transport of weeds and pathogens from the site to adjacent vegetation	Adjoining 3373 Goulburn Tableland Box-Gum Grassy Forest to west of subject land	Lands adjoining project's western boundary	Long term	Operation	<p>Existing impact.</p> <p>During construction plant and machinery may import weed material to the site, hygiene protocols and best practice will manage this risk.</p> <p>During the operation phase residential uses may result in plant material escaping landscaping or garden works. This is an existing potential impact on adjoining</p>

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Indirect impact	Impacted entities	Extent	Duration	Project phase/ timing of impact	Likelihood/ consequences of failure & mitigation measures
					vegetation. The proposed development will include boundary fencing for lots created that will minimise this impact Consequences are minor, adjoining lands already suffer weed impacts
Increased risk of starvation or exposure, and loss of shade or shelter	N/A, works will not incorporate this risk	-	-	N/A	N/A
Loss of breeding habitat	N/A, works will not impact potential nearby breeding habitat	-	-	N/A	N/A
Trampling of threatened flora species	N/A, works will not incorporate this risk	-	-	N/A	N/A
Inhibition of nitrogen fixation and increased soil salinity	N/A, works will not incorporate this risk	-	-	N/A	N/A
Fertilizer drift	N/A, works will not incorporate this risk	-	-	N/A	N/A
Rubbish dumping	Adjoining 3373 Goulburn Tableland Box-Gum Grassy Forest to west of subject land	Lands adjoining project's western boundary	Long term	Construction & Operation	Unlikely, 4 proposed lots adjoin these lands. During construction works crews will manage waste according to best practice and regulation. There is a small risk that during the operation phase residential uses may result in rubbish dumping, this is an existing risk for this land. It is

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Indirect impact	Impacted entities	Extent	Duration	Project phase/ timing of impact	Likelihood/ consequences of failure & mitigation measures
					unlikely to occur however as these lands are in private ownership with dwellings that obtain views of the areas at risk. The clear visibility of the land at risk is a deterrent which is likely to be very effective.
Wood collection	Adjoining reserve to south at risk	Potentially adjoining land to west	Long term	Operation	Existing impact. There is a small risk that during the operation phase residential uses may result in collection of firewood from the adjoining lands, this is an existing risk for this land and unlikely as it is in private ownership and visible from occupier's dwelling.
Bush rock removal and disturbance	Bush rock is not common on adjoining lands	-	-	N/A	N/A
Increase in predatory/ pest species populations	Any surrounding native habitats at risk	Potentially lands to west	Long term	Operation	Existing impact – likely to increase It is likely that during the operation phase residential uses may result the keeping of domestic animals including cats and dogs that may at times contribute to predation of fauna in adjoining lands. This is an existing risk for this land and the proposal will

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Indirect impact	Impacted entities	Extent	Duration	Project phase/ timing of impact	Likelihood/ consequences of failure & mitigation measures
					increase the population of pest/ and exotic predators
Increased risk of fire	Adjoining woody vegetation at risk	Potentially lands to west	Long term	Operation	Existing impact. There is a small risk that during the operation phase residential uses may result in increased fire due to the presence of people, this is an existing risk for this land
Disturbance to specialist breeding and foraging habitat	N/A – specialist habitats do not occur nearby	-	-	N/A	N/A
Indirect impacts on receiving waters during construction	Receiving waters	Downstream waterways	Short term	Construction	Unlikely, potential consequences moderate, An Erosion and Sediment Control Plan (ESCP) for the construction of the development is to be prepared and implemented in accordance with “The Blue Book” (Landcom, 2004) and issuance of any subsequent construction certificate for the works is to consider the adequacy of this ESCP

8.2 Prescribed impacts

Prescribed impacts as identified in Section 6 are discussed below.

8.2.1 Non native vegetation

Nature

Several species of non-native vegetation occur that are known to or may be used by Key's Matchstick Grasshopper for foraging.

Extent

Vegetation of non-native origin that may be of use to Key's Matchstick Grasshopper occurs across the whole 1.7 ha site, this species is only likely to use the area of 1.6ha (see species polygon, Figure 8) where adequate native grasses occur.

Duration

Impacts to this vegetation is permanent.

These impacts to potential foraging habitat for Key's Matchstick Grasshopper have been considered and proposed to be offset through the retirement of biodiversity credits as a species credit species.

8.3 Mitigating residual impacts – management measures and implementation

Table 27 Summary of proposed mitigation and management measures for residual impacts (direct, indirect and prescribed)

Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy	MNES
Displacement of resident fauna						
Timing works to avoid critical life cycle events such as breeding/ nesting	Works will avoid noise, dust and vibration generating activities during spring	Construction	throughout construction	Construction contractor	low risk of failure	N/A
Instigating clearing protocols including pre-clearing construction surveys	pre works surveys will ensure unexpected occurrences of resident fauna are adequately managed by an ecologist	Pre-construction	throughout construction	Construction contractor	low risk of failure	N/A
Induct all staff prior to construction to identify vegetation to be retained, prevent inadvertent impacts to offsite habitats	Works limits to be clearly delineated by barrier visible to plant operators Site inductions to emphasis the importance of avoiding breaching clearing limits	Construction	throughout construction	Construction contractor	low risk of failure	N/A
Indirect impacts on native vegetation and habitat						
Install temporary tree protection and clearing limit barriers	Works limits to be clearly delineated by barrier visible to plant operators	Construction	throughout construction	Construction contractor	low risk of failure	N/A
Hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas	works methodology to include mechanisms for ensuring plant and equipment are weed free prior to entering and leaving the site	Construction	throughout construction	Construction contractor	low risk of failure	N/A
Preparation and implementation of a Vegetation Management Plan (VMP) for the works by a suitably experienced ecologist	VMP to adequately address; Implementation of above measures as well as unexpected finds procedure for immobile, breeding or	Construction	throughout construction	Construction contractor	low risk of failure	N/A

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Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy	MNES
	threatened fauna procedures for managing weeds encountered during works procedures for protecting retained trees					
Net loss of biodiversity						
Native Landscaping	Native species will be used in street landscaping as part of the project. Including at a minimum the following <ul style="list-style-type: none"> • 2 <i>Eucalyptus cinerea</i> is to be planted per new lot created, in the road verge of the newly created street • The plantings referred to above will be maintained until well established, being for at least 5 years 	Construction & post Construction	Ongoing	Developer	Highly effective	
Prescribed biodiversity impacts						
N/A						N/A

9 Serious and irreversible impacts

9.1 Assessment for serious and irreversible impacts on biodiversity values

No species listed as at risk of a Serious and Irreversible Impact have been found likely to use the subject and or be impacted by the proposal.

10 Impact summary

10.1 Determine an offset requirement for impacts

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

Ecosystem credit offsets required are calculated through the BAM – C, offsets are required for impacts of proposals on PCTs that are associated with a vegetation zone that has a vegetation integrity score of:

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

For this proposal all vegetation zones are required to be offset, see Table 34 below, BAM – C outputs are provided in Appendix C Credit reports.

Table 34 Impacts that require 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 3373_Mod	3373 Goulburn Tableland Box-Gum Grassy Forest	Yes, CEEC	1.7	38.1	0	-38.1	1.50	42
Total ecosystem credits								42

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

Impacts on threatened species (species credits) that require an offset are identified in Table 36 below along with their BAM – C calculated credits required, BAM – C outputs are provided in Appendix C Credit reports.

Table 35 Impacts that require an offset – species credits

Species & Vegetation zone	Area (ha)/Count (no. individuals)	BC Act Listing status	EPBC Act listing status	Potential SAI	Species credits
<i>Keyacris scurra</i> , Key's Matchstick Grasshopper					
3373_Mod	1.6ha	Endangered	Not listed	No	31
				Subtotal	31

10.1.3 Indirect and prescribed impacts

Indirect and prescribed impacts are adequately avoided and minimised no further offsetting beyond credit retirement detailed above is required.

10.1.4 Impacts that do not need further assessment

No parts of the subject land are eligible for exclusion from assessment, all parts of the site with native vegetation are included within the vegetation zones documented in Table 34 above.

11 Biodiversity credit report

Clause 6.2 of the BC Regulation establishes the offset rules ('like-for-like' and variation). To satisfy the like-for-like rule, the BAM allows for impacts to PCTs and threatened species to be offset by other different PCTs and threatened species (respectively) that share the same attributes from a class of credits, which form an offset trading group. The credit class and corresponding offset trading group can be found in the biodiversity credit report (like-for-like) produced by the BAM-C. The BAM also puts restrictions on where (IBRA region) credits can be sourced and whether hollow-bearing trees must be present at the offset site. Where like-for-like credits cannot be sourced, the BAM also allows for other credit types to be sourced subject to the variation rules contained in the BC Regulations. Credit reports are included at Appendix C and Ecosystem credit class/ Species credit class and matching credit profile are provided in Tables below.

11.1 Ecosystem credits

Table 36 Ecosystem credit class and matching credit profile

Ecosystem 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
3373_Mod 42 Credits	Goulburn Tableland Box-Gum Grassy Forest	Southern Tableland Grassy Woodlands	Grassy Woodlands	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	No	Bungonia

11.2 Species credits

Table 38 Species credit class and matching credit profile

Species credit	Name of threatened species	Kingdom	BC Act status	IBRA region
<i>Keyacris scurra</i> Key's Matchstick Grasshopper	Any species with same or higher category of listing under Part 4 of the BC Act	Fauna	Endangered	Bungonia, Bateman, Burragorang, Crookwell, Ettrema, Kanangra, Kybeyan-Gourock, Monaro and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

12 References

- Cropper, S. (1993). Management of Endangered Plants. CSIRO Publications, East Melbourne, Victoria
- DEC (2004). Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities. Working Draft November 2004.
- DEWHA (2013). Matters of National Environmental Significance Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999. Commonwealth of Australia.
- Threatened Species Scientific Committee, Advice to the Minister for the Environment and Heritage from the Threatened Species Scientific Committee (TSSC) on Amendments to the List of Ecological Communities under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

13 Figures

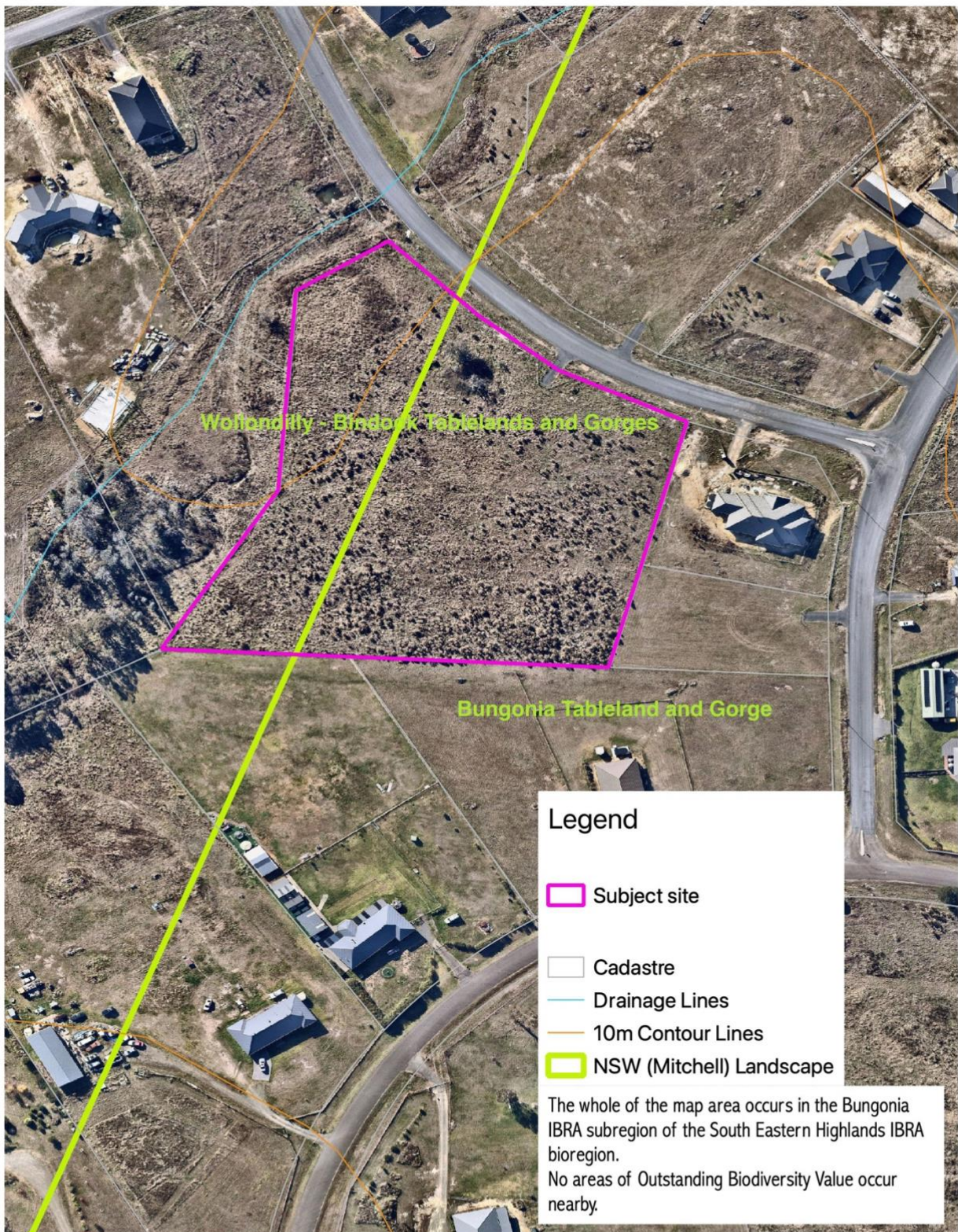


Figure 1
Site Map



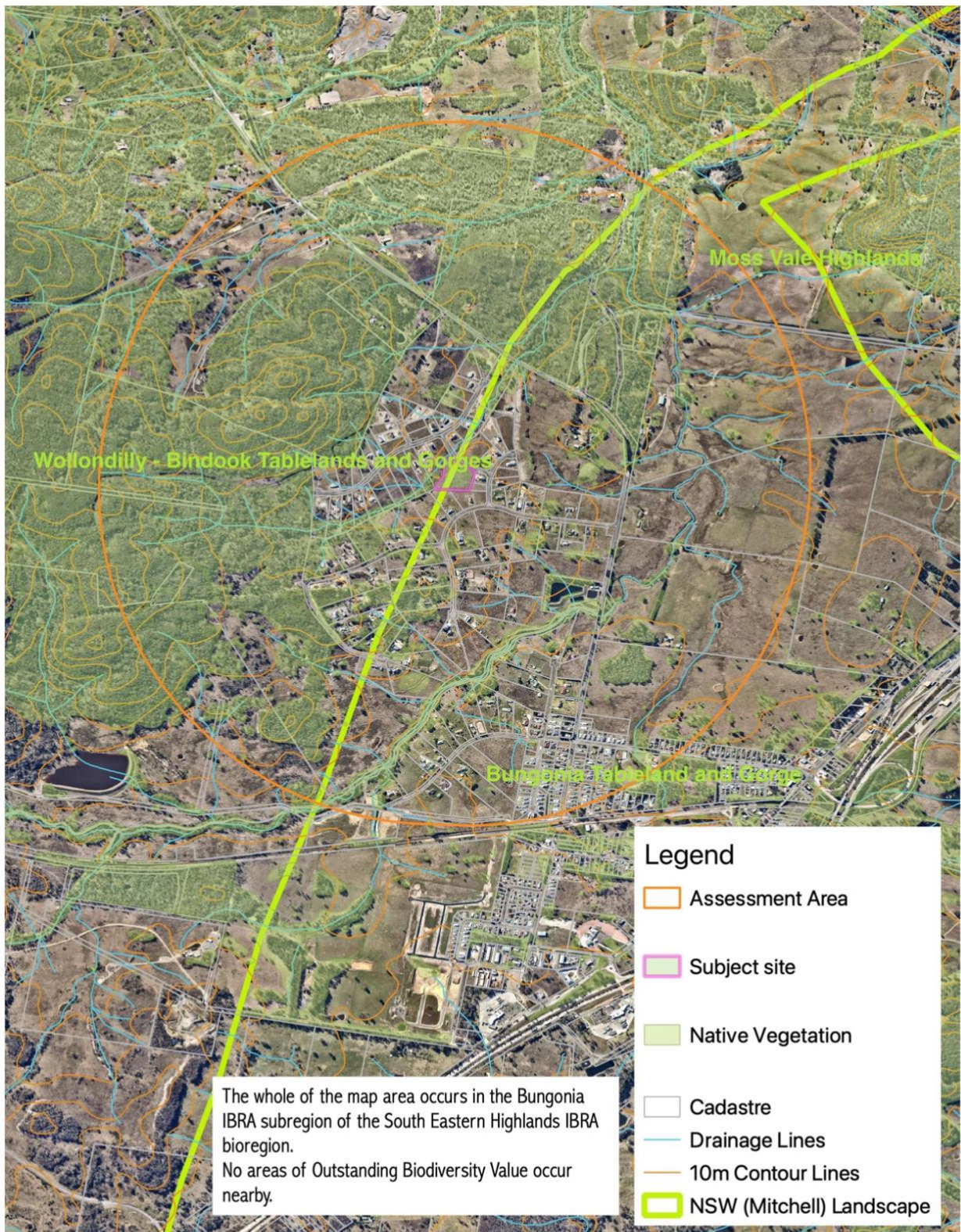


Figure 2
 Location Map

0 0.25 0.5 km



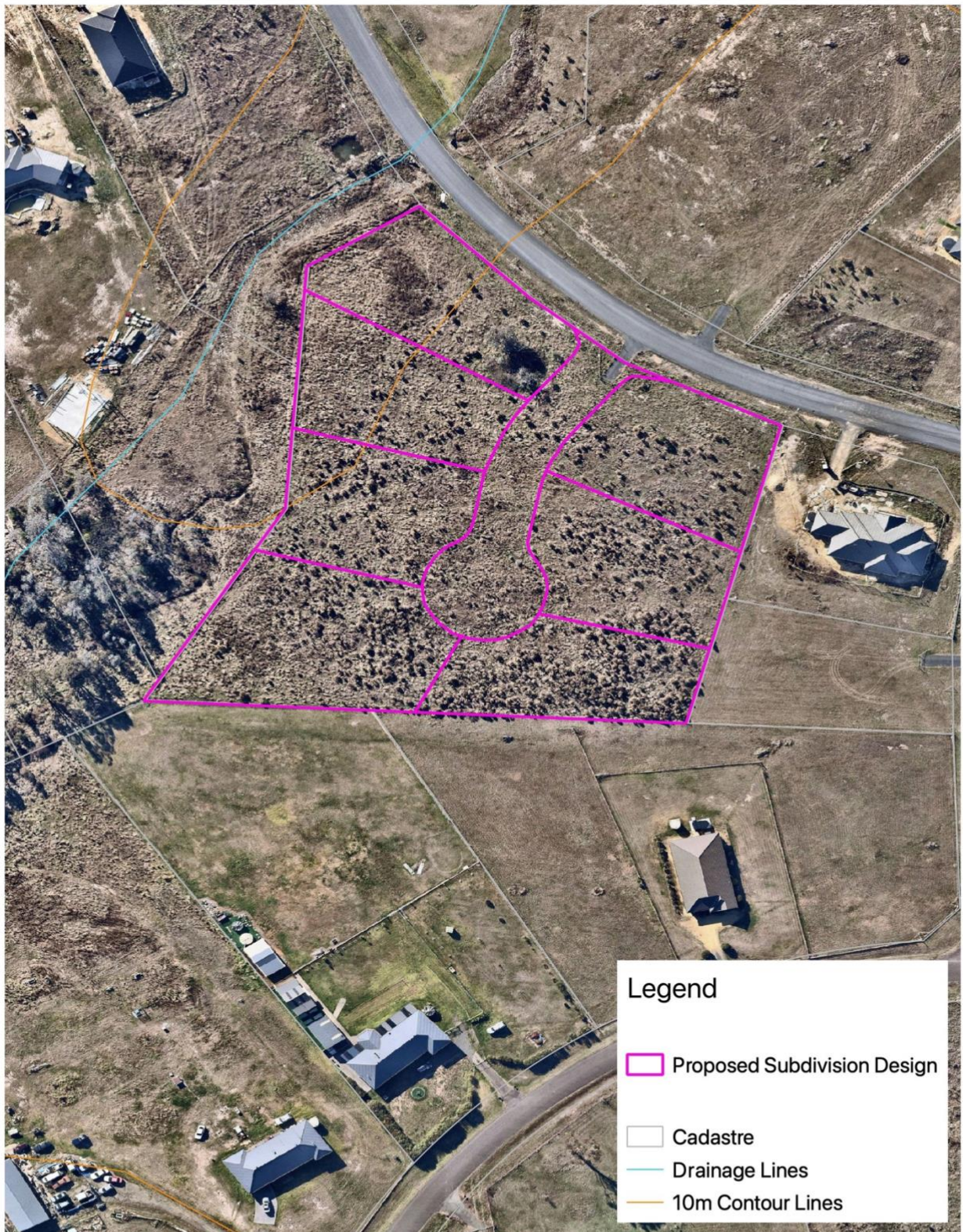


Figure 3
Development
Layout

0 25 50 m



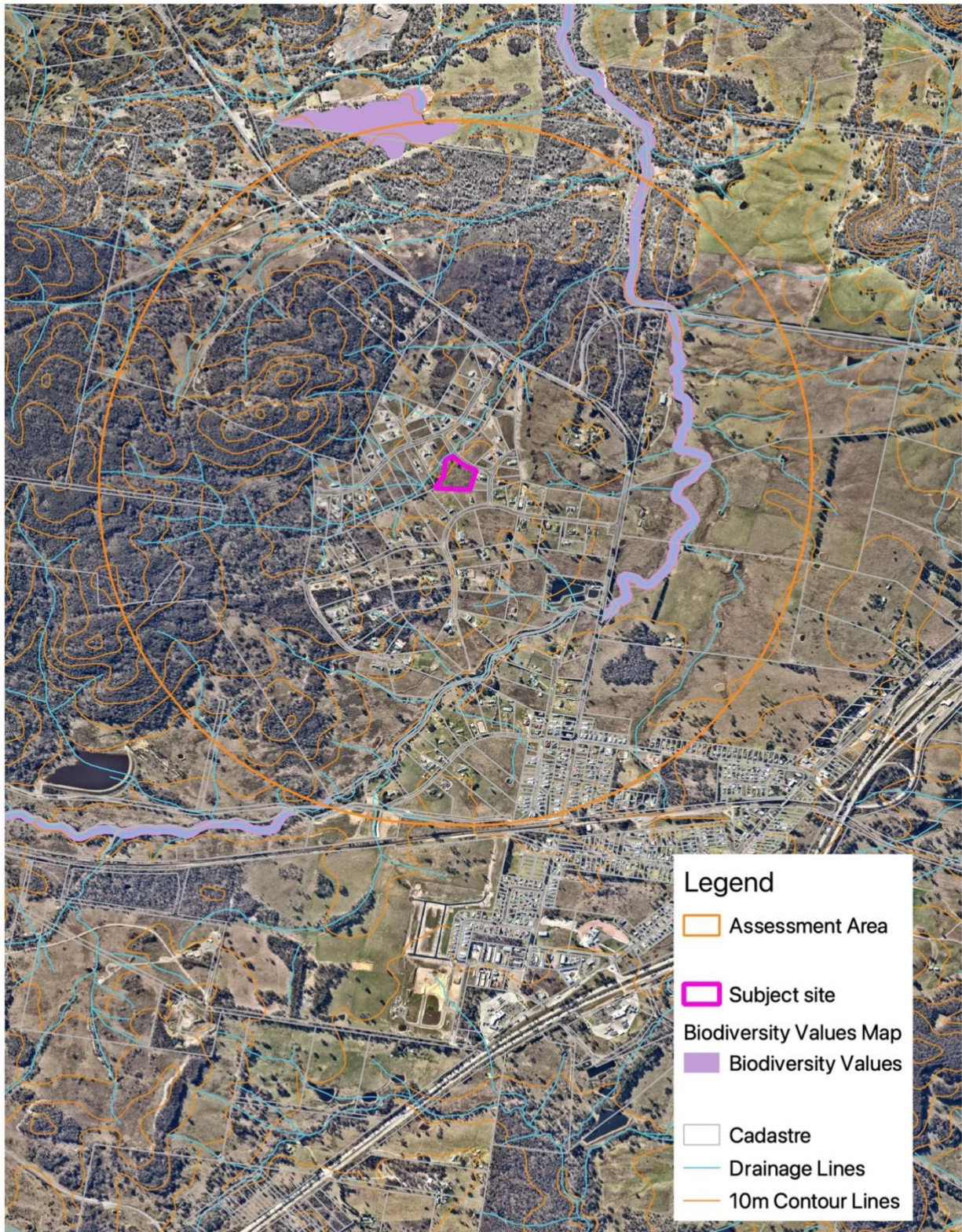


Figure 4
Biodiversity Values
Map

0 0.5 1 km





Figure 5
Field Survey
Locations





Figure 6
Native Vegetation
Extent

0 25 50 m





Figure 7
Plant Community Types &
Vegetation Zones

0 25 50 m





Figure 8
Species Polygons

0 25 50 m





Figure 9
Direct Impacts of Proposal

0 25 50 m



14 Appendix A: BDAR requirements compliance

Assessment of compliance with BDAR minimum information requirements

BDAR section	BAM ref.	BAM requirement	Section in this BDAR
Introduction	Chapters 2 and 3	Information	
		Introduction to the biodiversity assessment including:	–
		<input type="checkbox"/> brief description of the proposal	1.1.1
		<input type="checkbox"/> identification of subject land boundary, including:	1.1.3
		<input type="checkbox"/> operational footprint	
		<input type="checkbox"/> construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure	
		<input type="checkbox"/> general description of the subject land	1.1.3
		<input type="checkbox"/> sources of information used in the assessment, including reports and spatial data	1.5
		<input type="checkbox"/> identification and justification for entering the BOS	1.2
			Maps and tables
	<input type="checkbox"/> 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	
Landscape	Sections 3.1 and 3.2, Appendix E	Information	
		Identification of site context components and landscape features, including:	–
		<input type="checkbox"/> general description of subject land topographic and hydrological setting, geology and soils	1.1.3
		<input type="checkbox"/> per cent native vegetation cover in the assessment area (as described in BAM Section 3.2)	1.1.1
		<input type="checkbox"/> IBRA bioregions and subregions (as described in BAM Subsection 3.1.3(2.))	3.2.1

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BDAR section	BAM ref.	BAM requirement	Section in this BDAR
		<input type="checkbox"/> rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3(3.) and Appendix E)	3.2.2
		<input type="checkbox"/> wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3(3.))	3.2.2
		<input type="checkbox"/> connectivity of different areas of habitat (as described in BAM Subsection 3.1.3(5–6.))	3.2.3
		<input type="checkbox"/> 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.))	3.2.4
		<input type="checkbox"/> areas of outstanding biodiversity value occurring on the subject land and assessment area (as described in BAM Subsection 3.1.3(8–9.))	3.2.5
		<input type="checkbox"/> any additional landscape features identified in any SEARs for the proposal	NA, SEARS not relevant to this proposal
		<input type="checkbox"/> NSW (Mitchell) landscape on which the subject land occurs	3.2.6
		<input type="checkbox"/> 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)	2.1
Maps and tables			
		<input type="checkbox"/> Site Map	Figure 1
		<input type="checkbox"/> Property boundary	
		<input type="checkbox"/> Boundary of subject land	
		<input type="checkbox"/> Cadastre of subject land (including labelling of Lot and DP or section plan if relevant)	
		<input type="checkbox"/> Landscape features identified in BAM Subsection 3.1.3	
		<input type="checkbox"/> Location Map	Figure 2
		<input type="checkbox"/> Digital aerial photography at 1:1,000 scale or finer	
		<input type="checkbox"/> Boundary of subject land	

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BDAR section	BAM ref.	BAM requirement	Section in this BDAR
		<input type="checkbox"/> Assessment area (i.e. the subject land and either 1500 m buffer area or 500 m buffer for linear development)	
		<input type="checkbox"/> Landscape features identified in BAM Subsection 3.1.3	
		<input type="checkbox"/> 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:	–
		<input type="checkbox"/> IBRA bioregions and subregions	Figure 1 & Figure 2
		<input type="checkbox"/> rivers, streams and estuaries	
		<input type="checkbox"/> wetlands and important wetlands	
		<input type="checkbox"/> connectivity of different areas of habitat	
		<input type="checkbox"/> karst, caves, crevices, cliffs, rocks and other geological features of significance and if required, soil hazard features	
		<input type="checkbox"/> areas of outstanding biodiversity value occurring on the subject land and assessment area	
		<input type="checkbox"/> any additional landscape features identified in any SEARs for the proposal	
		<input type="checkbox"/> NSW (Mitchell) landscape on which the subject land occurs	
		Data	
		<input type="checkbox"/> All report maps as separate jpeg files	Uploaded to BOAMS
		Individual digital shape files of:	Uploaded to BOAMS
		<input type="checkbox"/> subject land boundary	Uploaded to BOAMS
		<input type="checkbox"/> assessment area (i.e. subject land and 1500 m buffer area) boundary	Uploaded to BOAMS
		<input type="checkbox"/> cadastral boundary of subject land	Uploaded to BOAMS

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BDAR section	BAM ref.	BAM requirement	Section in this BDAR
		<input type="checkbox"/> areas of native vegetation cover	Uploaded to BOAMS
		<input type="checkbox"/> landscape features	Uploaded to BOAMS
Native vegetation	Chapter 4, Appendix A and Appendix H	Information	
		<input type="checkbox"/> 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)	4.1 & Figure 6
		<input type="checkbox"/> Provide justification for all parts of the subject land that do not contain native vegetation (as described in BAM Subsection 4.1.2)	4.1.2
		<input type="checkbox"/> 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)	2.2.2
		<input type="checkbox"/> Describe the systematic field-based floristic vegetation survey undertaken in accordance with BAM Section 4.2	2.2.3
		<input type="checkbox"/> 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)	NA More appropriate local data not available or used
		For each PCT within the subject land, describe:	–
		<input type="checkbox"/> PCT name and ID	4.1 & Figure 6
		<input type="checkbox"/> vegetation class	4.1.2
		<input type="checkbox"/> extent (ha) within subject land	2.2.2
		<input type="checkbox"/> evidence used to identify a PCT including any analyses undertaken, references/sources, existing vegetation maps (BAM Section 4.2(1–3.))	2.2.3

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BDAR section	BAM ref.	BAM requirement	Section in this BDAR
		<input type="checkbox"/> plant species relied upon for identification of the PCT and relative abundance of each species	4.1
		<input type="checkbox"/> if relevant, TEC status including evidence used to determine vegetation is the TEC (BAM Subsection 4.2.2(1–2.))	4.1 & Figure 6
		<input type="checkbox"/> estimate of per cent cleared value of PCT (BAM Subsection 4.2.1(5.))	4.1.2
		Describe the vegetation integrity assessment of the subject land, including:	–
		<input type="checkbox"/> identification and mapping of vegetation zones (as described in BAM Subsection 4.3.1)	4.4 & Figure 10
		<input type="checkbox"/> description of vegetation zones within the subject land (as described in Operational Manual Stage 1 Table 2 and Subsection 3.3.2)	4.4 & Figure 10
		<input type="checkbox"/> area (ha) of each vegetation zone	4.4
		<input type="checkbox"/> assessment of patch size (as described in BAM Subsection 4.3.2)	4.4
		<input type="checkbox"/> survey effort (i.e. number of vegetation integrity survey plots) as described in BAM Subsection 4.3.4(1–2.)	4.5.1
		<input type="checkbox"/> use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsection 4.3.3(5.))	4.5.3
		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):	–
		<input type="checkbox"/> identify the PCT or vegetation class for which local benchmark data will be applied	4.5.3
		<input type="checkbox"/> identify published sources of local benchmark data (if benchmarks obtained from published sources)	
		<input type="checkbox"/> describe methods of local benchmark data collection (if reference plots used to determine local benchmark data)	
		<input type="checkbox"/> provide justification for use of local data rather than BioNet Vegetation Classification benchmark values	NA
		<input type="checkbox"/> provide written confirmation from the decision-maker that they support the use of local benchmark data	NA

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BDAR section	BAM ref.	BAM requirement	Section in this BDAR
			Local benchmark data not used
		Maps and tables	
		<input type="checkbox"/> 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 6
		<input type="checkbox"/> Map of PCTs within the subject land (as described in BAM Section 4.2(1.))	Figure 7
		<input type="checkbox"/> Map of vegetation zones within the subject land (as described in BAM Subsection 4.3.1)	Figure 7
		<input type="checkbox"/> Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCT boundaries	Figure 5
		<input type="checkbox"/> Map of TEC distribution on the subject land and table of TEC listing, status and area (ha)	Figure 7
		<input type="checkbox"/> 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 7 & Table 6
		Table of current vegetation integrity scores for each vegetation zone within the site and including:	–
		<input type="checkbox"/> composition condition score	Table 7
		<input type="checkbox"/> structure condition score	
		<input type="checkbox"/> function condition score	
		<input type="checkbox"/> presence of hollow bearing trees	
		Data	
		<input type="checkbox"/> All report maps as separate jpeg files	Uploaded to BOAMS
		<input type="checkbox"/> Plot field data (MS Excel format)	Uploaded to BOAMS
		<input type="checkbox"/> Plot field datasheets	Appendix B

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BDAR section	BAM ref.	BAM requirement	Section in this BDAR
		Digital shape files of:	–
		<input type="checkbox"/> PCT boundaries within subject land	Uploaded to BOAMS
		<input type="checkbox"/> TEC boundaries within subject land	Uploaded to BOAMS
		<input type="checkbox"/> vegetation zone boundaries within subject land	Uploaded to BOAMS
		<input type="checkbox"/> floristic vegetation survey and vegetation integrity plot locations	Uploaded to BOAMS
Threatened species	Chapter 5	Information	
		Identify ecosystem credit species likely to occur on the subject land, including:	–
		<input type="checkbox"/> list of ecosystem credit species derived from the BAM-C (as described in BAM Subsection 5.1.1 and Section 5.2(1.))	5.1.1
		<input type="checkbox"/> 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)	5.1.1
		<input type="checkbox"/> justification for addition of any ecosystem credit species to the list	5.1.1
		Identify species credit species likely to occur on the subject land, including:	–
		<input type="checkbox"/> list of species credit species derived from the BAM-C (as described in BAM Subsection 5.1.1)	Table 10 & Table 11
		<input type="checkbox"/> 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)	5.1.2
		<input type="checkbox"/> 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)	5.1.2
		<input type="checkbox"/> justification for addition of any species credit species to the list	5.1.2
		From the list of candidate species credit species, identify:	–

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BDAR section	BAM ref.	BAM requirement	Section in this BDAR
		<input type="checkbox"/> species assumed present within the subject land (if relevant) (as described in BAM Subsection 5.2.4(2.a.))	Table 12 & Table 13
		<input type="checkbox"/> 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.))	
		<input type="checkbox"/> species for which targeted surveys are to be completed to determine species presence (BAM Subsection 5.2.4(2.b.))	
		<input type="checkbox"/> species for which an expert report is to be used to determine species presence (BAM Subsection 5.2.4(2.c.))	
		Present the outcomes of species credit species assessments from:	–
		<input type="checkbox"/> threatened species survey (as described in BAM Section 5.2.4)	Table 14 & Table 15
		<input type="checkbox"/> 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)	5.4
		Where survey has been undertaken include detailed information on:	–
		<input type="checkbox"/> survey method and effort (as described in BAM Section 5.3)	Table 14 & Table 15
		<input type="checkbox"/> 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	5.3
		<input type="checkbox"/> 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	Table 14 & Table 15 & 5.3
		<input type="checkbox"/> survey personnel and relevant experience	Declarations ii
		<input type="checkbox"/> describe any limitations to surveys and how these were addressed/overcome	5.3
		Where an expert report has been used in place of survey (as described in BAM Section 5.3, Box 3), include:	–
		<input type="checkbox"/> justification of the use of an expert report	N/A expert report not required

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BDAR section	BAM ref.	BAM requirement	Section in this BDAR
		<input type="checkbox"/> identify the expert, provide evidence of their expert credentials and departmental approval of expert status <input type="checkbox"/> all requirements of Box 3 have been addressed in the expert report	
		Where use of local data is proposed (BAM Subsection 1.4.2):	–
		<input type="checkbox"/> identify relevant species	NA Local data not used
		<input type="checkbox"/> identify data to be amended	
		<input type="checkbox"/> identify source of information for local data, e.g. published literature, additional survey data, etc.	
		<input type="checkbox"/> justify use of local data in preference to VIS Classification or TBDC data	
		<input type="checkbox"/> provide written confirmation from the decision-maker that they support the use of local data	NA Local data not used
		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:	–
		<input type="checkbox"/> the unit of measure for each species is documented	Table 17 & Table 18
		for species assessed by area:	–
		<input type="checkbox"/> 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 8
		<input type="checkbox"/> 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	5.6
		for species assessed by counts of individuals:	–
		<input type="checkbox"/> the number of individual plants present on the subject land (as described in BAM Subsection 5.2.5(3.))	5.6
		<input type="checkbox"/> the method used to derive this number (i.e. threatened species survey or expert report) and evidence-based justification for the approach taken	5.6

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BDAR section	BAM ref.	BAM requirement	Section in this BDAR
		<input type="checkbox"/> the polygon includes all individuals located on the subject land with a buffer of 30 m around the individuals or groups of individuals on the subject land	Figure 8
		<input type="checkbox"/> 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 17 & Table 18
		Maps and tables	
		<input type="checkbox"/> Table showing ecosystem credit species in accordance with BAM Subsection 5.1.1, and identifying:	
		<input type="checkbox"/> the ecosystem credit species removed from the list	Table 9
		<input type="checkbox"/> the sensitivity to gain class of each species	Table 9
		<input type="checkbox"/> Table detailing species credit species in accordance with BAM Section 5.2 and identifying:	Table 10 & Table 11
		<input type="checkbox"/> 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	Table 10 & Table 11
		<input type="checkbox"/> the candidate species credit species not recorded on the subject land as determined by targeted survey, expert report or important habitat map	Table 12 & Table 13
		<input type="checkbox"/> 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)	5.6 & Table 17 & Table 18
		<input type="checkbox"/> 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)	Figure 8
		Data	
		<input type="checkbox"/> Digital shape files of suitable habitat identified for survey for each candidate species credit species	Uploaded to BOAMS
		<input type="checkbox"/> Survey locations including GPS coordinates of any plots, transects, grids	Uploaded to BOAMS

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BDAR section	BAM ref.	BAM requirement	Section in this BDAR
		<input type="checkbox"/> Digital shape files of each species polygon including GPS coordinates of located individuals	Uploaded to BOAMS
		<input type="checkbox"/> Species polygon map in jpeg format	Uploaded to BOAMS
		<input type="checkbox"/> Expert reports and any supporting data used to support conclusions of the expert report	Uploaded to BOAMS
		<input type="checkbox"/> Field datasheets detailing survey information including prevailing conditions, date, time, equipment used, etc.	Uploaded to BOAMS
Prescribed impacts	Chapter 6	Information	
		Identify potential prescribed biodiversity impacts on threatened entities, including:	–
		<input type="checkbox"/> karst, caves, crevices, cliffs, rocks and other geological features of significance (as described in BAM Subsection 6.1.1)	Table 19
		<input type="checkbox"/> occurrences of human-made structures and non-native vegetation (as described in BAM Subsection 6.1.2)	
		<input type="checkbox"/> corridors or other areas of connectivity linking habitat for threatened entities (as described in BAM Subsection 6.1.3)	
		<input type="checkbox"/> waterbodies or any hydrological processes that sustain threatened entities (as described in BAM Subsection 6.1.4)	
		<input type="checkbox"/> 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)	Table 20
		<input type="checkbox"/> 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 19
		<input type="checkbox"/> Identify a list of threatened entities that may be dependent upon or may use habitat features associated with any of the prescribed impacts	N/A
		<input type="checkbox"/> 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)	N/A

BDAR section	BAM ref.	BAM requirement	Section in this BDAR
		Where the proposed development is for a wind farm:	–
		<input type="checkbox"/> 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)	N/A
		<input type="checkbox"/> provide details of targeted survey for candidate species of wind farm developments undertaken in accordance with BAM Subsection 6.1.5(2–3.)	N/A
		<input type="checkbox"/> 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.))	N/A
		Where the proposal may result in vehicle strike:	N/A
		<input type="checkbox"/> 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	N/A
		Maps and tables	
		<input type="checkbox"/> Map showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.)	Figure 1 & Figure 2
		<input type="checkbox"/> Map showing location of potential vehicle strike locations	Figure 1
		<input type="checkbox"/> 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)	Figure 1 & Figure 2
		Data	
		<input type="checkbox"/> Digital shape files of prescribed impact feature locations	Uploaded to BOAMS
		<input type="checkbox"/> Prescribed impact features map in jpeg format	Uploaded to BOAMS
Avoid and minimise impacts	Chapter 7	Information	

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BDAR section	BAM ref.	BAM requirement	Section in this BDAR
		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:	
		<input type="checkbox"/> modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology	7.1.2 & 7.2.2
		<input type="checkbox"/> routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route	7.1.1 & 7.2.1
		<input type="checkbox"/> alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location	7.1.1 & 7.2.1
		<input type="checkbox"/> 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	7.1.1 & 7.2.1
		<input type="checkbox"/> 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)	7.1.2 & 7.2.2
		<input type="checkbox"/> 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.))	7
		<input type="checkbox"/> Detail measures or options considered but not implemented because they are not feasible and/or practical (e.g. due to site constraints)	7.3
		Maps and tables	
		<input type="checkbox"/> Table of measures to be implemented to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility	Table 21
		<input type="checkbox"/> Map of alternative footprints considered to avoid or minimise impacts on biodiversity values; and of the final proposal footprint, including construction and operation	Figure 3
		<input type="checkbox"/> Maps demonstrating indirect impact zones where applicable	Figure 9
		Data	
		Digital shape files of:	Uploaded to BOAMS

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BDAR section	BAM ref.	BAM requirement	Section in this BDAR
		<input type="checkbox"/> alternative and final proposal footprint	Uploaded to BOAMS
		<input type="checkbox"/> direct and indirect impact zones	Uploaded to BOAMS
		<input type="checkbox"/> Maps in jpeg format	Uploaded to BOAMS
Assessment of impacts	Chapter 8, Sections 8.1 and 8.2	Information	
		<input type="checkbox"/> 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)	Table 22
		Assessment of indirect impacts on vegetation and threatened species and their habitat including (as described in BAM Section 8.2):	–
		<input type="checkbox"/> description of the nature, extent, frequency, duration and timing of indirect impacts of the proposal	Table 24
		<input type="checkbox"/> documenting the consequences to vegetation and threatened species and their habitat including evidence-based justifications	8.2
		<input type="checkbox"/> reporting any limitations or assumptions, etc. made during the assessment	8.2
		<input type="checkbox"/> identification of the threatened entities and their habitat likely to be affected	Table 24
		Assessment of prescribed biodiversity impacts (as described in BAM Section 8.3) including:	–
		assessment of the nature, extent frequency, duration and timing of impacts on the habitat of threatened species or ecological communities associated with:	–
		<input type="checkbox"/> karst, caves, crevices, cliffs, rocks and other features of geological significance	8.3.1
		<input type="checkbox"/> human-made structures	8.3.2
		<input type="checkbox"/> non-native vegetation	8.3.3

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BDAR section	BAM ref.	BAM requirement	Section in this BDAR
		<input type="checkbox"/> connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	8.3.4
		<input type="checkbox"/> movement of threatened species that maintains their life cycle	8.3.4
		<input type="checkbox"/> water quality, waterbodies and hydrological processes that sustain threatened species and threatened ecological communities	8.3.5
		<input type="checkbox"/> assessment of the impacts of wind turbine strikes on protected animals	1.1.1
		<input type="checkbox"/> assessment of the impacts of vehicle strikes on threatened species of animals or on animals that are part of a TEC	8.3.7
		<input type="checkbox"/> evaluate the consequences of prescribed impacts	1.1
		<input type="checkbox"/> describe impacts that are uncertain	8.2 & 1.1
		<input type="checkbox"/> document limitations to data, assumptions and predictions	8.2 & 1.1
		Maps and tables	
		<input type="checkbox"/> Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts	Table 23
		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:	–
		<input type="checkbox"/> techniques, timing, frequency and responsibility	Table 27
		<input type="checkbox"/> identify measures for which there is risk of failure	
		<input type="checkbox"/> evaluate the risk and consequence of any residual impacts	

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BDAR section	BAM ref.	BAM requirement	Section in this BDAR
		<input type="checkbox"/> document any adaptive management strategy proposed	1.1
		Identification of measures for mitigating impacts related to:	–
		<input type="checkbox"/> displacement of resident fauna (as described in BAM Subsection 8.4.1(2.))	8.4
		<input type="checkbox"/> indirect impacts on native vegetation and habitat (as described in BAM Subsection 8.4.1(3.))	
		<input type="checkbox"/> mitigating prescribed biodiversity impacts (as described in BAM Subsection 8.4.2)	
		<input type="checkbox"/> Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM Section 8.5)	1.1
		Maps and tables	
		<input type="checkbox"/> 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	Table 27
		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:	–
		<input type="checkbox"/> addressing all criteria in Subsection 9.1.1 for each TEC listed as at risk of an SAII present on the subject land	Section 9.1
		<input type="checkbox"/> for each TEC, report the extent of the TEC in NSW	
		<input type="checkbox"/> addressing all criteria in Subsection 9.1.2 for each threatened species at risk of an SAII present on the subject land	Section 9.1
		<input type="checkbox"/> for each threatened species, report the population size in NSW	Section 9.1
		<input type="checkbox"/> documenting assumptions made and/or limitations to information	Section 9.1

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BDAR section	BAM ref.	BAM requirement	Section in this BDAR
		<input type="checkbox"/> documenting all sources of data, information, references used or consulted <input type="checkbox"/> clearly justifying why any criteria could not be addressed	
		<input type="checkbox"/> Identification of impacts requiring offset in accordance with BAM Section 9.2	Table 34 & 35
		<input type="checkbox"/> Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1(3.)	Figure 10
		<input type="checkbox"/> Identification of areas not requiring assessment in accordance with BAM Section 9.3	Figure 10
		Maps and tables	
		<input type="checkbox"/> Map showing the extent of TECs at risk of an SAll within the subject land	Figure 10
		<input type="checkbox"/> Map showing location of threatened species at risk of an SAll within the subject land	Figure 10
		Map showing location of:	–
		<input type="checkbox"/> impacts requiring offset	Figure 10
		<input type="checkbox"/> impacts not requiring offset	Figure 10
		<input type="checkbox"/> areas not requiring assessment	Figure 10
		Data	
		Digital shape files of:	Uploaded in BOAMS
		<input type="checkbox"/> extent of TECs at risk of an SAll within the subject land	Uploaded in BOAMS
		<input type="checkbox"/> location of threatened species at risk of an SAll within the subject land	Uploaded in BOAMS
		<input type="checkbox"/> boundary of impacts requiring offset	Uploaded in BOAMS
		<input type="checkbox"/> boundary of impacts not requiring offset	Uploaded in BOAMS

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BDAR section	BAM ref.	BAM requirement	Section in this BDAR
		<input type="checkbox"/> boundary of areas not requiring assessment	Uploaded in BOAMS
		<input type="checkbox"/> Maps in jpeg format	Uploaded in BOAMS
Impact summary	Chapter 10	Information	
		Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including:	–
		<input type="checkbox"/> future vegetation integrity score for each vegetation zone within the subject land (Equation 25 and Equation 26 in BAM Appendix H)	Table 34
		<input type="checkbox"/> change in vegetation integrity score (BAM Subsection 8.1.1)	
		<input type="checkbox"/> 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)	
		<input type="checkbox"/> biodiversity risk weighting for each	Table 36
		<input type="checkbox"/> number of required species credits for each candidate threatened species that is directly impacted on by the proposal (BAM Subsection 10.1.3)	Table 36
		Maps and tables	
		<input type="checkbox"/> Table of PCTs requiring offset and the number of ecosystem credits required	Table 35
		<input type="checkbox"/> Table of threatened species requiring offset and the number of species credits required	Table 36
		Data	
		<input type="checkbox"/> Submitted proposal in the BAM Calculator	Completed in BOAMS
Biodiversity credit report	Chapter 10	Information	
		<input type="checkbox"/> 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)	Table 36 & 38

BDAR section	BAM ref.	BAM requirement	Section in this BDAR
		<input type="checkbox"/> BAM credit report in pdf format	Appendix C
		Maps and tables	
		<input type="checkbox"/> Table of credit class and matching credit profile	Table 36
		Data	
		<input type="checkbox"/> BAM credit report in pdf format	Appendix C

15 Appendix B: Vegetation survey data

- Plot-based vegetation and vegetation integrity survey locations,
- Vegetation integrity survey plot data
- Field datasheets.

Vegetation survey data and locations Table;

plot	pct	area	patchsize	condition class	zone	easting	northing	bearing	compTree	compShrub	compGrass	compForbs	compFerns	compOther	strucTree	strucShrub	strucGrass	strucForbs	strucFerns	strucOther	funLargeTrees	funHollowtrees	funLitterCover	funLenFallenLogs	funTreeStem5to9	funTreeStem10to19	funTreeStem20to29	funTreeStem30to49	funTreeStem50to79	funTreeRegen	funHighThreatExotic	Plot-based vegetation survey?	Vegetation integrity survey?
1_3373	3373	1.76	100	Low	55	77421 1	615670 1.0	0	0	1	9	14	0	0	0.0	15. 0	146 .0	3.5	0.0	0.0	0	0	99. 0	0.0	0	0	0	0	0	0	0.0	Yes	Yes

Numbers ¹⁻⁸ on this page correlate with the numbers and explanatory notes on page 3

Site sheet #	1 of	Date	/ /	Survey name		Plot identifier	/	
Recorders					IBRA region			Veg zone ID
¹ Datum		Coordinate system	<input type="checkbox"/> Projected <input type="checkbox"/> Geographic	MGA zone		¹ X coordinate		¹ Y coordinate
Location description		descriptive notes to locate site without grid reference						
¹ Plot dimensions	For composition & structure (400m ²): 20 m x 20 m ✓ For function (1000m ²): 20 m x 50 m ✓				¹ Orientation of midline from 0 m point	Magnetic °	Photo #	1443

Datum: AGD66, WGS84, GDA94, GDA2020 or Other (specify). MGA Zone (for Projected coordinate. system only): 56 (Coastal NSW), 55 (Central NSW or 54 (Western NSW). X/Y coordinate: Long/Lat (for Projected coordinate. system), Easting/Northing (for geographic coordinate. system)

Vegetation integrity								
Composition and structure sum values may be completed after entering data into available tools. It is not required while in the field								
Composition (400 m ² plot)		Structure (400 m ² plot)		Function (1000 m ² plot)				
Total count of native plant species (richness) in each growth form group (not individual plants within each growth form)	Trees (TG)	Sum values	Sum of ² foliage cover of native plant species by growth form group	Trees (TG)	Sum values (%) (may sum to >100%)	³ Tree stem size class (DBH)	If data are to be used as more appropriate local data i.e. to generate local benchmarks, stems must be counted	
	Shrubs (SG)	0		Shrubs (SG)	0	80 + cm		Count
	Grasses etc. (GG)	1		Grasses etc. (GG)	15	50 – 79 cm		Count (best practice)/tick. If ⁸ large tree benchmark size ≥ 50 cm, count
	Forbs (FG)	9		Forbs (FG)	146	30 – 49 cm		Count (best practice)/tick. If ⁸ large tree benchmark size ≥ 30 cm, count
	Ferns (EG)	14		Ferns (EG)	3.5	20 – 29 cm		Count (best practice)/tick. If ⁸ large tree benchmark size ≥ 20 cm, count
	Other (OG)	0		Other (OG)	0	10 – 19 cm		Count (best practice)/tick
		0			0	5 – 9 cm		Count (best practice)/tick
Total high threat weed cover				21 %	⁴ Tree regeneration < 5 cm	Tick		
					⁵ Length of fallen logs	Tally space	Total 0 m	
					⁶ Hollow bearing trees	Tick		

Vegetation integrity - function cont. (five 1 m ² plots)	⁷ Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	100 100 98 100 98	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0
Average of the 5 subplots	99	0	0	0

These attributes require consideration of site observations and may be completed after field work:

Vegetation class	⁸ Large tree benchmark size	20/ 30/ 50/ 80 DBH	Confidence	H/ M/ L
Plant community type (PCT)	EEC	Tick	Confidence	H/ M/ L

Physiography and site features that may help in determining PCT and management zone (optional) or for BioNet systematic flora survey purposes:

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

Disturbance	Severity code	Age code	Brief site description or other notes											
Clearing (inc. logging)														
Cultivation (inc. pasture)														
Soil erosion														
Firewood / CWD removal														
Grazing (id. native/stock)														
Fire damage														
Storm damage														
Weediness			Emergents heights			Upper stratum heights			Middle stratum heights			Lower stratum heights		
Other			Top	Mid	Bottom	Top	Mid	Bottom	Top	Mid	Bottom	Top	Mid	Bottom
			m	m	m	m	m	m	m	m	m	m	m	m

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

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

400 m ² floristics plot:		Survey name	Plot identifier	Recorders
Date	26 Nov 23	-244	1	JK

GF code	Species name Full species name, or a unique means of identifying separate taxa within a survey is mandatory. Data from here will be used to assign growth form richness and cover.	N, HTW or non-HTW	Foliage cover ²	Abundance	Voucher
	1				
	2				
8	3 C. Diffusa	Cassinia Diffusa	15	54	515
8	4 Cin-nat.	Einadia natans	0.1	6	0.
11	5 Le-bottoms	Leptorhynchus Sycandrus	0.01	1	32
	6 Chrysoc-a-pic	Chrysolephatum apiculatum	0.1	46	(3.5)
	7 White-bog	W. gracilis	0.1	20	
	8 Vitadhad	Vitadinia Muelleri	1	90	
	9 " long	" Cuneata	0.5	40	
	10 Tric-yell	Tricoryne elatior			
	11 Euc-h-	Euchiton involucratus	0.2	150	
	12 Bid-ref	Bidens repens	0.1	30	
	13 E-rocker Crinitum?		0.1	4	
	14 Grass	Geranium Solanderi	1	20	
	15 Datura x 2?	Lytidosperma sacrosanctum	10	150	70
GT	16 micro-lum Stig-floer		20	200	
	17 Dig	Digitalis sp. diffusa?	20	40	50
G/B	18 E-brown + 2	E. brownii x leptostachya	15/5	20	150/50
	19 Good-leaf	Goodenia hederacea	0.1	12	
F3	20 Plantago varia		0.1	11	
	21 Rumex	Rumex brownii	0.1	8	
GL	22 Juncus - 1	J. Continuus	2.5	300	46
	23 + 2nd	J. vitatus	1	40	
GR	24 Pan-c-hairy	Panicum effusum	30	200	(145)
	25 whetgrass	Anthosachne scabra	20	80	
	26 Med-c-	Medicago polymorpha	~ 0.1	8	
	27 H-lan	Holcus lanatus	~	2	60
	28 Sh. sam	Rumex/Leucoside vulgaris	~	2	250 HTW
	29 N-rad	Hypochaeris radicum	~	0.1	30
	30 Plantago (hairs)		~	0.2	60
	31 V. sed	Cyperus eragrostis	~	0.1	7 HTW
	32 Conyza sp.	Conyza	~	0.1	9
	33 daisy	Taraxacum officinale	~	0.1	4
	34 Job Corn	Trifolium subterraneum	~	0.1	9
	35 Centay	Centaurium erythraeum	~	0.1	10
	Brown-ant		~	0.1	10
	Malaria aquatna		~	0.3	20

Print more copies of this page to allow for higher species counts at a plot. All vascular plant species in a plot need to be recorded.

GF Code: see growth form definitions in BAM 2020 Appendix F. **N:** native, **HTW:** high threat weed.

Foliage cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, 4, 5, 10, 15, 20, 25, ...100%; 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. Note the top 3 dominant native species within each GF group.

Abundance: Count 1, 2, 3 ..., when ≤10, estimate when >10, 20, 30 ... 100, 200, 300 ..., 1000, 2000, 3000 ... (as integer values).

16 Appendix C: Credit reports



BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00045057/BAAS19018/23/00045058	Proposed 7 Lot Residential Subdivison Southdown Rd Marulan	22/06/2023
Assessor Name	Assessor Number	BAM Data version *
Pat Guinane	BAAS19018	61
Proponent Names	Report Created	BAM Case Status
Abdullah Ismail	24/12/2023	Finalised
Assessment Revision	Assessment Type	Date Finalised
3	Part 4 Developments (Small Area)	24/12/2023
BOS entry trigger	* 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.	
BOS Threshold: Area clearing threshold		

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		
Species		
Nil		

Additional Information for Approval

BAM Biodiversity Credit Report (Like for like)

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)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
3373-Goulburn Tableland Box-Gum Grassy Forest	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	1.8	0	42	42

3373-Goulburn Tableland Box-Gum Grassy Forest	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	-	3373_Mod	No	42	Bungonia, Bateman, Burragarang, Crookwell, Ettrema, Kanangra,

BAM Biodiversity Credit Report (Like for like)

	<p>Grassy Woodland and Derived Native Grassland This includes PCT's: 74, 75, 83, 101, 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, 516, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415,</p>				<p>Kybeyan-Gourock, Monaro and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.</p>
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BAM Biodiversity Credit Report (Like for like)

	3533, 4147, 4149, 4150					

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Keyacris scurra / Key's Matchstick Grasshopper	3373_Mod	1.6	31.00

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

Proposal Details

Assessment Id

00045057/BAAS19018/23/00045058

Assessor Name

Pat Guinane

Proponent Name(s)

Abdullah Ismail

Assessment Revision

3

BOS entry trigger

BOS Threshold: Area clearing threshold

Proposal Name

Proposed 7 Lot Residential Subdivison Southdown Rd Marulan

Assessor Number

BAAS19018

Report Created

24/12/2023

Assessment Type

Part 4 Developments (Small Area)

BAM data last updated *

22/06/2023

BAM Data version *

61

BAM Case Status

Finalised

Date Finalised

24/12/2023

* 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
Nil		
Species		
Nil		

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks



BAM Biodiversity Credit Report (Variations)

PCT

No Changes

Predicted Threatened Species Not On Site

Name

No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
3373-Goulburn Tableland Box-Gum Grassy Forest	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	1.8	0	42	42.00

3373-Goulburn Tableland Box-Gum Grassy Forest

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region

BAM Biodiversity Credit Report (Variations)

<p>White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland</p> <p>This includes PCT's: 74, 75, 83, 101, 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, 516, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150</p>	-	3373_Mod	No	42	<p>Bungonia, Bateman, Burragorang, Crookwell, Ettrema, Kanangra, Kybeyan-Gourock, Monaro and South East Coastal Ranges.</p> <p style="text-align: center;">or</p> <p>Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.</p>
Variation options					
Formation	Trading group	Zone	HBT	Credits	IBRA region

BAM Biodiversity Credit Report (Variations)

	Grassy Woodlands	Tier 1	3373_Mod	No	42	IBRA Region: South Eastern Highlands, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
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Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Keyacris scurra / Key's Matchstick Grasshopper	3373_Mod	1.6	31.00

Credit Retirement Options Like-for-like options

Keyacris scurra / Key's Matchstick Grasshopper	Spp		IBRA region
	Keyacris scurra /Key's Matchstick Grasshopper		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
Fauna	Endangered	Bungonia, Bateman, Burragorang, Crookwell, Ettrema, Kanangra, Kybeyan-Gourock, Monaro and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.	

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00045057/BAAS19018/23/00045058	Proposed 7 Lot Residential Subdivison Southdown Rd Marulan	22/06/2023
Assessor Name	Report Created	BAM Data version *
Pat Guinane	24/12/2023	61
Assessor Number	BAM Case Status	Date Finalised
BAAS19018	Finalised	24/12/2023
Assessment Revision	Assessment Type	BOS entry trigger
3	Part 4 Developments (Small Area)	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 SAI	Ecosystem credits
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Goulburn Tableland Box-Gum Grassy Forest												
1	3373_Mod	White Box- Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland	38.1	38.1	1.8	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Critically Endangered	2.50		42
										Subtotal	42	
										Total	42	

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 SAI	Species credits	
Keyacris scurra / Key's Matchstick Grasshopper (Fauna)										
3373_Mod		38.1	38.1	1.6	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Endangered	Not Listed	False	31
									Subtotal	31

17 Appendix D: BAM Plot photos

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Proposed 7 Lot Residential Subdivision, Southdown Road, Marulan



BAM Plot 1 from midline and right hand corner

18 Appendix E: Flora Recorded

Family	Species	Common Name	BC Status	EPBC Status	Exotic?
Anthericaceae	<i>Tricoryne elatior</i>	Yellow Autumn-lily			
Asteraceae	<i>Arctotheca calendula</i>	Capeweed			*
Asteraceae	<i>Cassinia sifton</i>	Sifton Bush			
Asteraceae	<i>Chrysocephalum apiculatum</i>	Common Everlasting			
Asteraceae	<i>Cichorium intybus</i>	Chicory			*
Asteraceae	<i>Cirsium vulgare</i>	Spear Thistle			*
Asteraceae	<i>Conyza spp.</i>				*
Asteraceae	<i>Euchiton involucreatus</i>	Star Cudweed			
Asteraceae	<i>Hypochaeris radicata</i>	Catsear			*
Asteraceae	<i>Leptorhynchus squamatus</i>	Scaly Buttons			
Asteraceae	<i>Sonchus asper</i>	Prickly Sowthistle			*
Asteraceae	<i>Taraxacum officinale</i>	Dandelion			*
Asteraceae	<i>Vittadinia cuneata</i>	Fuzzy Vittadinia			
Asteraceae	<i>Vittadinia muelleri</i>	Vittadinia			
Boraginaceae	<i>Echium plantagineum</i>	Patterson's Curse			*
Brassicaceae	<i>Hirschfeldia incana</i>	Buchan Weed			*

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Family	Species	Common Name	BC Status	EPBC Status	Exotic?
Campanulaceae	<i>Wahlenbergia gracilis</i>	Sprawling Bluebell			
Chenopodiaceae	<i>Einadia nutans subsp. nutans</i>	Climbing Saltbush			
Convolvulaceae	<i>Dichondra repens</i>	Kidney Weed			
Cyperaceae	<i>Cyperus eragrostis</i>	Umbrella Sedge			*
Fabaceae (Faboideae)	<i>Medicago polymorpha</i>	Burr Medic			*
Fabaceae (Faboideae)	<i>Trifolium subterraneum</i>	Subterranean Clover			*
Fabaceae (Mimosoideae)	<i>Acacia brownii</i>	Heath Wattle			
Fabaceae (Mimosoideae)	<i>Acacia deccurens</i>	Black Wattle			
Gentianaceae	<i>Centaurium erythraea</i>	Common Centaury			*
Geraniaceae	<i>Erodium cicutarium</i>	Common Crowfoot			*
Geraniaceae	<i>Erodium crinitum</i>	Blue Crowfoot			
Geraniaceae	<i>Geranium solanderi var. solanderi</i>	Geranium			
Goodeniaceae	<i>Goodenia hederacea</i>	Ivy Goodenia			
Goodeniaceae	<i>Velleia Paradoxa</i>	Spur Velleia			
Juncaceae	<i>Juncus continuus</i>	Juncus			

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Family	Species	Common Name	BC Status	EPBC Status	Exotic?
Juncaceae	<i>Juncus usitatus</i>	Juncus			
Lamiaceae	<i>Marrubium vulgare</i>	White Horehound			*
Malvaceae	<i>Modiola caroliniana</i>	Red-flowered Mallow			*
Myrtaceae	<i>Eucalyptus cinerea</i>	Argyle Apple			
Myrtaceae	<i>Kunzea parvifolia</i>	Violet Kunzea			
Myrtaceae	<i>Leptospermum trinervium</i>	Slender Tea-tree			
Onagraceae	<i>Oenothera sp.</i>	Common Evening Primrose			*
Plantaginaceae	<i>Plantago lanceolata</i>	Lamb's Tongues			*
Plantaginaceae	<i>Plantago varia</i>	Variable Plantain			
Poaceae	<i>Aira spp</i>	Airgrass			
Poaceae	<i>Anthosachne scabra</i>	Common wheatgrass			
Poaceae	<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass			*
Poaceae	<i>Aristida ramosa</i>	Purple Wiregrass			
Poaceae	<i>Austrostipa scabra</i>	Speargrass			
Poaceae	<i>Avena fatua</i>	Wild Oats			*
Poaceae	<i>Briza minor</i>	Shivery Grass			*
Poaceae	<i>Bromus catharticus</i>	Praire Grass			*

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Family	Species	Common Name	BC Status	EPBC Status	Exotic?
Poaceae	<i>Cynodon dactylon</i>	Common Couch			
Poaceae	<i>Digitaria diffusa</i>	Summer-grass			
Poaceae	<i>Eleusine tristachya</i>	Goose Grass			*
Poaceae	<i>Eragrostis brownii</i>	Brown's Lovegrass			
Poaceae	<i>Eragrostis leptostachya</i>	Paddock Lovegrass			
Poaceae	<i>Holcus lanatus</i>	Yorkshire Fog			*
Poaceae	<i>Hordeum sp.</i>	Barley Grass			*
Poaceae	<i>Lolium perenne</i>	Perennial Ryegrass			*
Poaceae	<i>Microlaena stipoides</i>	Weeping Grass			
Poaceae	<i>Nassella trichotoma</i>	Serrated Tussock			*
Poaceae	<i>Panicum effusum</i>	Hairy Panic			
Poaceae	<i>Paspalum dilatatum</i>	Paspalum			*
Poaceae	<i>Phalaris aquatica</i>	Phalaris			*
Poaceae	<i>Rytidosperma racemosum</i>	Wallaby Grass			
Poaceae	<i>Sorghum leiocladum</i>	Wild sorghum			
Poaceae	<i>Sporobolus creber</i>	Slender Rat's Tail Grass			
Polygonaceae	<i>Acetosella vulgaris</i>	Sheep Sorrel			*

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Family	Species	Common Name	BC Status	EPBC Status	Exotic?
Polygonaceae	<i>Rumex brownii</i>	Swamp Dock			
Portulacaceae	<i>Calandrinia eremaea</i>	Small Purslane			
Rosaceae	<i>Rosa rubiginosa</i>	Sweet Briar			*
Rosaceae	<i>Rubus anglocandicans</i>	Blackberry			*
Solanaceae	<i>Solanum sp.</i>	Nightshade			