



KHS ECOLOGY & BUSHFIRE

Flora and Fauna Assessment:

*for a proposed new private residential development at
361 Old Grattai Road, Erudgere, Lot 102 DP 756897*

Mid-Western Local Government Area



October 2021

Prepared by:

KHS Ecology & Bushfire Pty Ltd

Document Title:

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1 Introduction

1.1 Background

This Flora and Fauna assessment documents the biodiversity values at the site proposed for a new private residential development at 361 Old Grattai Road, Erudgere. The Architectural design and site plans for the development have been prepared by Anderson Architecture.

Part of the property is mapped on the Terrestrial Biodiversity map under the Mid-Western Regional Local Environment Plan 2012. This report has been prepared to support the Development Application submitted to Mid-Western Regional Council and to address both the LEP requirements for biodiversity considerations and the NSW legislation requirement for impact assessment.

1.2 The proposal

The proposal is for a new dwelling (house) on the property at the location shown in **Figure 1-1**. The site plans are shown in **Figure 1-2**.

The development comprises the following components:

- A new dwelling building (house), shed and secondary dwelling (private cabin).
- Use of an existing track for the driveway from Old Grattai Road of approximately 800 m in length, which requires widening by 2m (to 4m width) and construction of a new gravel driveway of approximately 60 m in length and 4 m width to the main Dwelling site.
- Establishment of an Asset Protection Zone (APZ) around the house and cabin for bushfire protection due to the development being on bushfire prone land.

The site photographs shown below depict the property entry at Old Grattai Road and the setting for the house and shed (**Photograph 1-1**, **Photograph 1-2**).

1.3 Information sources

The following information and data sources were used to inform this assessment.

- NSW Government Planning Portal (<https://www.planningportal.nsw.gov.au/>) and spatial data including cadastre layers obtained from SIXMaps (www.maps.six.nsw.gov.au).
- Bionet databases including the Wildlife Atlas and Vegetation Information Systems (VIS) database (www.bionet.nsw.gov.au accessed July 2021).
- Site assessments undertaken on July-October 2021, at the proposed development site and surrounding land.
- Architectural plans prepared by Anderson Architecture, dated October (refer to plans attached to the Development Application).
- Bushfire Assessment Report, prepared by KHS Ecology & Bushfire, October 2021.
- Geotechnical soil and effluent reports, prepared by Barnson, dated 30 July 2021.
- Flora of NSW (Harden 1991-2002) and Flora NSW Online (www.plantnet.rbgsyd.nsw.gov.au).

Figure 1-1. Property location.

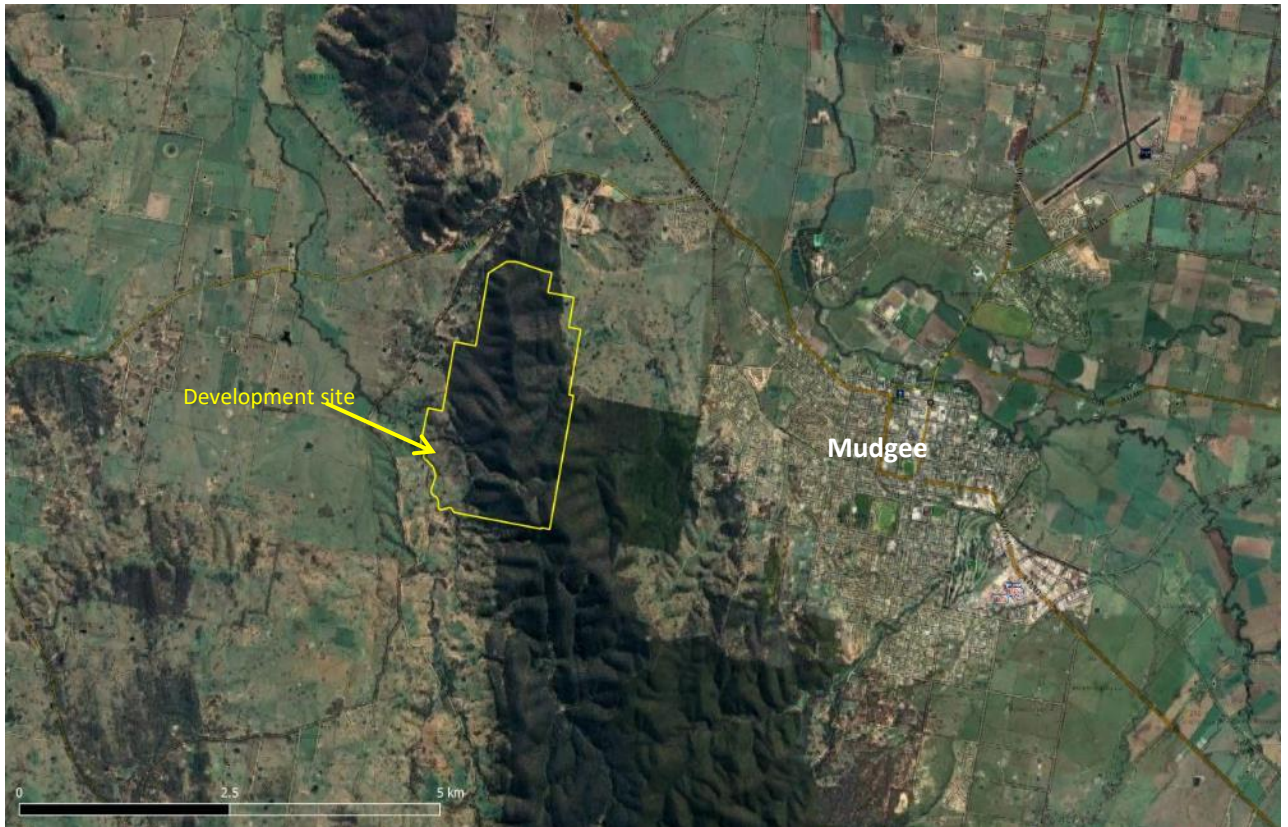


Figure 1-2. Site layout – driveway from Old Grattai Road, proposed house, shed and private cabin.



Photograph 1-1. Driveway into the property from at Old Grattai Road, with the Right of Carriageway over Track on the far hill on the neighbour's property, and the internal driveway in the foreground.



Photograph 1-2. Setting and location of the proposed shed (centre) and house (right).



Photograph 1-3. Proposed site for the private cabin.



1.4 Property description

The property is situated in a mixed rural and bushland setting on Old Grattai Road, just west of Mudgee. The property has been used for sheep grazing by the previous owners, mainly on the lower slopes on the western side. The majority of the property is intact native woodland and forest which cover the steeper hills and the main part of the range within the property boundary. The development is proposed on open grassland areas on the western side of the property, near the access driveway from Old Grattai Road.

The property is identified under the Mid-Western Regional Local Environmental Plan (LEP) 2012 (pub. 10-8-2012) as follows (also refer to the planning maps in **Appendix A**).

- Local Government Area: Mid Western Regional Council
- Address: 361 OLD GRATTAI ROAD ERUDGERE 2850
- Lot/Section/Plan no: 102/-/DP756897
- Land zoning: E3 - Environmental Management
- Bushfire Prone Land
- Minimum lot size (LEP zoning): 400 ha
- The actual lot size is 409.1 ha (Sixmaps cadastre)

1.5 Regulatory context

The proposal is a local development and will be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) Local developments are required to identify biodiversity values including any threatened species, populations or communities likely to occur on site or be impacted. This includes entities that are listed under the *NSW Biodiversity Conservation Act 2016* (BC Act) and *Fisheries Management Act 1994* (FM Act).

Mid-Western Regional Local Environment Plan (LEP) also has specific environmental considerations and required to be addressed including in relation to biodiversity.

As the proposal is on bushfire prone land, an Asset Protection Zone (APZ) is required to be identified for the development. The impact assessment in this report addresses the proposed APZ as part of the development. The APZ has been identified by the NSW Rural Fire Service as

Certain additional requirements apply to some developments that exceed thresholds for entry into the Biodiversity Offset Scheme

(<http://www.environment.nsw.gov.au/biodiversity/offsetscheme.htm>) (BOS), established by the BC Act. For local developments (e.g. private dwellings, subdivisions etc) assessment under the Scheme is required if the proposal exceeds one of the thresholds for entry¹. This report provides an

¹ Thresholds for entry into the NSW Biodiversity Offset Scheme:

- If the area of clearing exceeds the minimal area permitted for the lot size, and if the native vegetation condition is above a certain quality (vegetation integrity score) as specified in the BC Act; AND/OR
- If the development is likely to significantly impact a threatened species or ecological community, or their habitats, according to section 7.3 of the BC Act (five-part-test), AND/OR
- If the development is located on land identified in the Biodiversity Values map (<https://www.lmbc.nsw.gov.au/Maps/>).

assessment in relation to the thresholds for entry into the Scheme (refer to **section 5.4** of this report).

1.6 Aim

This assessment seeks to address the requirements of NSW *Biodiversity Conservation Act 2016* in relation to impacts to native vegetation, threatened species and ecological communities.

The aim of this flora and fauna assessment includes the following.

- Identify native flora species and vegetation communities present on the site, including any threatened species or their habitat and any threatened ecological communities (TECs).
- Assess the proposed development footprint in relation to potential impacts to threatened species, including undertake the Test of Significance for species likely to occur on the site.
- Outline measures to avoid and minimise potential impacts to biodiversity, in the context of site features and design requirements for the proposed development.
- Assess the proposed development in relation to the thresholds for entry into the NSW Biodiversity Offset Scheme.

1.7 Defining terms

This assessment uses the following terms to define the study area.

The property – refers to the subject property.

Subject site – refers to the areas proposed to be disturbed for the development including the building footprint, asset protection zone (APZ), other infrastructure including access roads, tanks and waste water system (including effluent area).

Study area – refers to an area within the following distances of the development site: (i) a 1500 m buffer (for vegetation/habitat assessment) or (ii) 10 km buffer (for locally-recorded threatened species), if relevant.

2 Methods

2.1 Site assessment

Multiple site assessments were undertaken between July -October 2021 to gather data and information on the following.

- Identification of flora species and native vegetation communities present at the property.
- Presence/absence of potential threatened flora, focusing on searches for the *Swainsona recta* (Small Purple Pea), *Swainsona sericea* and *Diuris tricolor* and *Eucalyptus cannonii*.
- Identification of habitat features including rock outcrops, trees that provide potential habitat for threatened fauna.
- The targeted searches for potential threatened flora were undertaken in August, September and October 2021 on and near the development site. This timing was suitable for detecting the local threatened species *Swainsona recta*, *Swainsona sericea* and *Acacia ausfeldii*. None of these species were found on or near the development site.

The data from the field assessment was used to inform the assessment of the proposed development in relation to the thresholds for the NSW Biodiversity Offset Scheme and to identify measures to minimise and avoid environmental impacts, as far as practical, to address objectives of the land zoning being E3 Environmental Management to the site.

The GPS survey track (green dashed line) recorded during the targeted threatened flora searches is shown below, in relation to the proposed development layout.



2.2 Desktop analysis

A desktop review of available information including vegetation mapping, regulatory maps (Biodiversity Values Map) and BioNet databases was completed to identify the likely and predicted vegetation types and flora and fauna values at the site. Review of BioNet data (including Wildlife Atlas threatened species records) was used to identify the most likely threatened species at the site or nearby. These species and their habitat were searched for during the site assessment and confirmed as either present or absent.

Plant species identification and nomenclature follows the keys and descriptions on NSW Flora Online (<http://plantnet.rbgsyd.nsw.gov.au/>). Vegetation classification has been undertaken in accordance with the NSW *Master Plant Community Type Classification* (OEH, 2018). The NSW Plant Community Types (PCTs) were determined on the basis of dominant species in each stratum, vegetation structure, and landscape position and soil type.

Mapping was undertaken in geographic information systems software, QGIS, to enable the site to be characterised as to the extent vegetation types, existing disturbed areas and the development footprint, including to produce the area calculations.

2.3 Limitations and assumptions

Limitations and assumptions of this study are outlined below.

- For flora species generally, an indicative list has been compiled based on the two site assessments, however some additional ephemeral or cryptic flora species may have been dormant and not detected at the time of the survey.
- The study did not involve targeted threatened fauna survey, such as spotlighting, trapping, microbat detection or bird surveys. General observations of the presence of suitable habitat for predicted threatened fauna species was assessed only.

2.4 Author qualifications

The author's qualifications and experience are summarised in **Table 2-1**. It is declared that the author is also the joint owner of the property and proponent for the development (private residential development). The assessment has been undertaken in the same manner as would be done for any other similar development of this type.

Table 2-1: Summary of qualifications

Name / Position	Qualifications / experience
Dr Kate Hammill, Principal Ecologist, KHS Ecology & Bushfire	18 years ecological research and consulting experience, in the Greater Blue Mountain, Central Tablelands, Central West, Far West, North West Slopes and Sydney regions NSW. Biodiversity Assessment Methodology (BAM) accredited assessor (Certification No.: BAAS18022; Valid From: 9/02/2018 to 8/02/2022). Bushfire Planning and Design (BPAD) NSW level 2 Accredited Practitioner Practising member of the NSW Ecological Consultants Association. Bachelor of Science Hons 1 1996, majoring in Botany / Zoology / Microbiology (University of Sydney); PhD native vegetation restoration 2001 (University of Sydney), Graduate Diploma in Bushfire Protection 2015 (University of Western Sydney).

3 Site assessment

3.1 Landscape and bioegion

The subject property encompasses a section of the northern end of the Avisford Range on the western side of Mudgee. The subject property is constrained for development being mostly native bushland and steep sloping land. The development site is located on a relatively flat bench on the lower hillslopes that have been cleared in the past, above the Macdonalds Creek. The subject site has a westerly aspect at an elevation of 550-560 m above sea level (refer to **Figure 1-1**).

The property is located at the eastern edge of the Inland Slopes subregion of the NSW South Western Slopes Bioregion (Thackway and Cresswell 1995). The bioregion and subregion are used to predict threatened species that may be present on the development site, which are the species that need to be considered in relation to potential impacts of the development.

The Inland Slopes subregion is a large area of foothills and ranges comprising the western fall of the Great Dividing Range to the edge of the Riverina Bioregion. The upper slopes part of the subregion is characterised by steep, hilly and undulating ranges and granite basins. Occasional basalt caps, confined river valleys with terrace remnants. Vegetation of the upper slopes part of the Inland Slopes subregion is described broadly as follows:

Open forests and woodlands. Red stringybark on upper slopes with black cypress pine, kurrajong, red ironbark, white gum, white box, yellow box and Blakely's red gum on lower slopes. Merging west to yellow box, grey box and white cypress pine. Rough-barked apple on flats with river oak on upper tributaries and river red gum on lower and larger streams (NSW NPWS 2003).

3.2 Rivers and streams

The subject site is situated near Macdonalds Creek and tributaries flowing off the hills at the northern end of the Avisford Range. Macdonalds Creek is a non-perennial third order stream in the catchment of the Cudgegong River. The driveway access to the property crosses Macdonalds Creek at an existing in-stream crossing, which has a firm gravel bed providing access in all times other than when the creek is in very occasionally in flood. The development is located so that it will not impact Macdonalds Creek or mapped tributaries, and will be located more than 100m and 40 m from these streams, respectively.

3.3 Site history and disturbance

The property has a history of sheep grazing on the lower, cleared slopes where the development is proposed. These areas retain good mixed native and non-native groundcover with scattered large trees, but there is evidence of old topsoil erosion apparently from heavy stock trampling and grazing in the past. The intention of the current owners is to reduce or exclude stock and encourage natural regeneration of the native grassland and stands of trees. The scattered larger trees include *Eucalyptus macrorhyncha* (Red Stringybark), *Eucalyptus sideroxylon* (Mugga Ironbark) and *Eucalyptus dealbata* (Hill Red Gum). There are abundant old dead tree stems and fallen logs across the lower slopes of the property, which is where the development will be located, from clearing many decades ago (likely > 50 years).

The current proposed residential development has been intentionally located on existing cleared grassland areas to minimise impacts and avoid the need to clear any trees.

3.4 Plant species

Flora species observed at the subject site are listed in **Appendix B**. A total of 65 species was recorded, comprising 55 native and 10 non-native (weed) species.

The most common species observed on and around the development site include the following.

- Trees: *Allocasuarina leuhmanniana* (Drooping Sheoak), *Brachychiton populneus* (Kurrajong), *Eucalyptus dealbata* (Hill Red Gum), *Eucalyptus macrorhyncha* (Red Stringybark), *Eucalyptus sideroxylon* (Mugga Ironbark) and (**Photograph 3-1, Photograph 3-2**).
- Shrubs: *Acacia paradoxa* (Kangaroo Thorn), *Acacia vestita* (Weeping Boree), *Dodonaea viscosa* (Hopbush), *Hibbertia obtusifolia* (Hoary Guinea Flower), *Lissanthe strigosa* (Peach Heath) (**Photograph 3-5**).
- Grasses, forbs and ferns: *Aristida vagans* (Red Grass), *Arthropodium fimbriatum*, *Austrostipa scabra* (Speargrass), *Bothriochloa macra* (Red Grass), *Burchardia umbellata*, *Calotis cuneifolia* (Purple Burr-Daisy), *Cheilanthes sieberi*, *Cymbonotus lawsonianus*, *Dichelachne crinita*, *Dichondra repens*, *Drosera peltata*, *Echinopogon caespitosus* (Hedgehog Grass), *Eragrostis brownii*, *Gonocarpus spp.*, *Hydrocotyle laxiflora* (Pennywort), *Hypericum gramineum*, *Microlaena stipoides*, *Wahlenbergia stricta* (**Photograph 3-6**).

Photograph 3-1. The development site and surrounding areas are mainly cleared, with dead tree stems from old clearing, some live trees and native grassy groundcover.



Photograph 3-2. *Eucalyptus macrorhyncha* (Red Stringybark) occurs as the main large tree (top left), with smaller trees *Eucalyptus sideroxylon* (Mugga Ironbark) and *Brachychiton populneus* (Kurrajong) (top right) of *Eucalyptus dealbata* (lower left) and *Allocasuarina verticillata* (lower right) in patches.



Photograph 3-3. Sparse shrubs include *Acacia paradoxa* (Kangaroo Thorn).



Photograph 3-4. The groundcover comprises native grasses such as *Aristida* spp. *Austrostipa scabra* and *Microlaena stipioides*, diverse forbs and low shrubs such as *Gonocarpus* spp., *Cheilanthes sieberi*, *Hydrocotyle laxiflora* (Pennywort), *Hypericum gramineum*, *Wahlenbergia stricta* and *Hibbertia obtusifolia*, mixed with non-native species.



3.5 Vegetation type

Vegetation at the subject site has been identified to a Plant Community Types (PCT) on the basis of the remnant trees and grassy groundcover present. The following PCT is present at the site as a semi-cleared woodland and derived grassland.

PCT: 461 Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion.

Site Identification: PCT 461 was identified at the subject site from a shortlist of candidate PCTs known to occur in the Inland Slopes subregion, on the basis of scattered trees of *Eucalyptus dealbata*, *Eucalyptus macrorhyncha* and *Eucalyptus sideroxylon*, native shrubs of *Acacia spp.* and *Allocasuarina verticillata* with a grassy herbaceous native groundcover. The PCT is present as a semi-cleared woodland and derived grassland, as a result of historical clearing many decades ago. Scattered mature old trees are present with some sapling regeneration around trees. The development is been located in the derived grassland areas (refer to photographs above).

NSW Formation and Class: The community is within the Grassy Woodlands NSW vegetation formation and Western Slopes Grassy Woodlands (Keith 2004).

Associated TEC: Where White Box is present, the PCT can be part of the *White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland* TEC, as defined in the NSW Scientific Committee Determination.

PCT general description: Mid-high to low open woodland to woodland dominated by Tumbledown Gum (*Eucalyptus dealbata*) often with no other tree species. Other trees that may be present include Kurrajong (*Brachychiton populneus* subsp. *populneus*), White Box (*Eucalyptus albens*), *Callitris endlicheri*, *Eucalyptus macrorhyncha* and *Eucalyptus sideroxylon*. The shrub layer is very sparse or absent. Tall shrubs include *Acacia implexa* and *Allocasuarina verticillata*. Low shrubs include *Acacia decora*, *Xanthorrhoea glauca* subsp. *angustifolia*, *Hibbertia obtusifolia*, *Calytrix tetragona*, *Brachyloma daphnoides*, *Pultenaea spinosa* and *Harmogia densifolia*. The ground cover is mainly composed of bare earth or stones with the vegetation cover very sparse to sparse depending on rainfall. Grass species include *Austrostipa scabra* subsp. *scabra*, *Austrodanthonia racemosa* var. *racemosa*, *Aristida personata*, *Aristida vagans*, *Poa sieberiana*, *Bothriochloa macra*, *Elymus scaber* var. *scaber* and *Panicum effusum*. Forb species include *Daucus glochidiatus*, *Stypandra glauca*, *Dichondra* sp. A, *Einadia nutans* subsp. *nutans*, *Oxalis radicata*, *Chamaesyce drummondii* and *Cymbonotus lawsonianus*. The rock ferns *Cheilanthes sieberi* and *Cheilanthes distans* are common as is the scrambler *Desmodium varians*. Occurs on shallow to stony brown to red sandy loam to light clay soils derived from metasediments or granite on hillslopes, hillcrests and gullies in rises, low hills and hills landform patterns mainly in the Gulgong - Dunedoo - Goolma - Tanner Springs region in the NSW South-western Slopes Bioregion with minor outliers to the north at the southern edge of the Brigalow Belt South Bioregion. Probably also in Capertee Valley south of Mudgee. Mostly cleared and overgrazed with some pasture weed infestation. A poorly protected and threatened community. (DPIE 2021b)

3.6 Weeds

A number of herbaceous and woody weeds were observed at the property including the following significant weeds (**Photograph 3-5**).

- *Opuntia stricta* (Common Prickly Pear). This is a 'High Threat Exotic' and also a significant agricultural weed. Plants are very occasional and present in low numbers only.
- *Hypericum perforatum* (St John's Wort). This is a 'High Threat Exotic' and also a significant agricultural weed. Plants are very occasional and present in low numbers only.

- *Carthamus lanatus* (Saffron Thistle). This is a 'High Threat Exotic' in relation to biodiversity conservation and also a significant agricultural weed. Plants are very occasional and present in low numbers only.
- Other non-native herbs and grasses including *Hypochaeris radicata* (Catsear), *Briza minor* (Shivery Grass), *Aira caryophyllea* (Silvery Hairgrass), *Linaria pelisseriana* (Pelisser's Toadflax) and *Parentucellia latifolia* (Red Bartsia) – these are environmental weeds only.

Photograph 3-5. *Opuntia stricta* (Common Prickly Pear) is occasionally present.



3.7 Threatened species

A search of the BioNet Wildlife Atlas database has returned a total of 909 records for 21 threatened species within 10 km of the subject site (**Table 3-1**). The review of these species is provided in **Appendix D**. A brief discussion based on the site assessment and likely presence and/impact on each species is provided below.

By far the majority of the Wildlife Atlas records are for *Swainsona recta* and *Swainsona sericea*, recorded in significant numbers on the eastern side of the range in Mudgee Common and nearby lands.

The following habitat features on and near the development site have been considered in relation to the potential presence of, and potential impact on, the locally recorded threatened species.

- Scattered trees, at a low density, native grassy groundcover vegetation, litter and abundant fallen logs.
- Abundant dead tree stems which have various sizes of hollows, and a high abundance of fallen logs in the grassland including large logs with hollows.
- Connectivity to larger areas of native woodland and forest on the Avisford hills and proximity to the non-perennial watercourse, Macdonalds Creek.
- Rock outcropping in the surrounding gullies and along Macdonalds Creek, although none within or directly adjoining the development footprint.

Table 3-1: Threatened species previously recorded within 10 km of the development site.

Class	Scientific Name	Common Name	NSW status	Comm. status	No. Records
Aves	<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	CE	2
Aves	<i>Apus pacificus</i>	Fork-tailed Swift	P	C,J,K	1
Aves	<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V		1
Aves	<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	V		5
Aves	<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V		5
Aves	<i>Daphoenositta chrysoptera</i>	Varied Sittella	V		1
Aves	<i>Glossopsitta pusilla</i>	Little Lorikeet	V		2
Aves	<i>Hieraetus morphnoides</i>	Little Eagle	V		1
Aves	<i>Hirundapus caudacutus</i>	White-throated Needletail		V,C,J,K	2
Aves	<i>Ninox strenua</i>	Powerful Owl	V		2
Aves	<i>Petroica boodang</i>	Scarlet Robin	V		3
Aves	<i>Polytelis swainsonii</i>	Superb Parrot	V	V	1
Mammalia	<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V		1
Mammalia	<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E	V	1
Mammalia	<i>Phascolarctos cinereus</i>	Koala	V	V	5
Mammalia	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	12
Flora	<i>Acacia ausfeldii</i>	Ausfeld's Wattle	V		19
Flora	<i>Dichanthium setosum</i>	Bluegrass	V	V	1
Flora	<i>Eucalyptus cannonii</i>	Capertee Stringybark	V		3
Flora	<i>Swainsona recta</i>	Small Purple-pea	E	E	692
Flora	<i>Swainsona sericea</i>	Silky Swainson-pea	V		149

* Listed as Vulnerable (V), Endangered (E) or Critically Endangered (CE) under the NSW Biodiversity Conservation Act 2016 or Commonwealth EPBC Act 1999 (* International Migratory Bird Agreements)

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Regent Honeyeater – The Capertee Valley is a known breeding area for the Regent Honeyeater. It is a generalist frager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. The site is not a breeding region, however birds could be seasonally present in woodland on the property, feeding on flowering eucalypts from time to time. No trees will be cleared for the development. The development therefore will not affect this species or its habitat.

Fork-tailed Swift – Almost exclusively aerial, occurring over a variety of habitats. The species could be present flying or foraging over the site from time to time. The development is of relatively small scale and would not affect this species or its habitat.

Woodland birds: Brown Treecreeper (eastern subspecies), Dusky Woodswallow, Varied Sittella, Hooded Robin, Scarlet Robin, Speckled Warbler, Flame Robin – These species inhabit a wide range of eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. The Scarlet and Flame robin also utilise open areas for foraging. The woodland on the property provides suitable habitat for these birds, and hence they may be present from time to time on or near the development site, such as foraging in the grassland areas and scattered trees. A small amount of open grassland foraging habitat will be loss as a result of the development. No trees will be cleared. Overall, the development is not of a scale or type that would impact any locally-occurring birds or populations of these species. The impact of the development on this species is considered to be negligible.

Glossy Black-cockatoo – This species could be seasonally present in the area, feeding on *Allocasuarina verticillata* (Drooping Sheoak) on the property. The species is highly mobile and may visit the site to forage from time to time. No trees of *Allocasuarina verticillata* are proposed to be cleared. The removal of sheep from the property after the land was recently purchased has allowed the natural regeneration of the *Allocasuarina verticillata* stands to increase, with many seedlings now surviving and growing under the mature trees. The development will improve habitat for Glossy Black-cockatoo by protecting the *Allocasuarina verticillata* stands from stock grazing.

Little Lorikeet – Forages primarily in the canopy of open *Eucalyptus* forest and woodland, favouring eucalypts that produce high volumes of nectar. The species could be present at the site from time to time, especially feeding on box trees in the woodland areas. No trees will be cleared for the development. The development will not affect this species or its habitat.

Little Eagle – Found throughout the Australian mainland in eucalypt forest, woodland or open woodland. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. No large trees with nests were observed on the site. No trees will be cleared for the development. The development therefore will not affect this species or its habitat.

White-throated Needle-tail – Almost exclusively aerial, above woodland, open forest and rainforest, and may also fly between trees or in clearings, below the canopy. The species could be present flying nearby or foraging over the site from time to time. The development is of relatively small scale and will not affect this species or its habitat.

Powerful Owl – The Powerful Owl is found in open forests and woodlands, as well as along sheltered gullies in wet forests with dense understorey, especially along watercourses. Needs old growth trees with hollows of 20cm more diameter to nest. The species could be present in the area. Was recorded in 2002 in Avisford NR. No large hollow-bearing trees occur on or near the development site. No trees will be cleared for the development. The development therefore will not affect this species or its habitat.

Superb Parrot – The Superb Parrot is found throughout eastern inland NSW with core breeding areas on the core breeding area bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum Forest or Woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. Could be seasonally present in woodland on the property, feeding on flowering eucalypts from time to time. However no trees will be cleared for the development. The development therefore will not affect this species or its habitat.

Eastern Pigmy Possum – Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum dreys or thickets of vegetation, (e.g. grass-tree skirts). The site does have logs and stumps that could be inhabited by this species. Precautionary measures are required during preparation of the building sites in case any animals are present in logs or stumps. No trees will be cleared for the development. Overall, the impacts to this species would be negligible even if present at the property due to the small size of the development footprint.

Koala – The forests and woodland in the area represent suitable habitat and Koalas may occasionally be present at the site. There are two old records for Koala, from 1991 and 1995, near the northern end of the property. No trees will be cleared for the development. Even if present on the property

from time to time, the impacts of the development on this species and its habitat is considered to be negligible.

Grey headed Flying Fox – Generally found within 200km of the coast. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. No roosts or colonies of this species are known along Macdonalds Creek. The development will not affect riparian habitat for any trees that could provide food resources for this species, i.e. no trees will be cleared. This species is highly unlikely to be present and it is concluded that it will not be impacted.

FLORA

Acacia ausfeldii – Grows in eucalypt woodland in sandy soil; often in remnant roadside patches of woodland, in Mudgee - Ulan - Gulgong area. This species occurs locally on the northern end of Old Grattai Road. The targeted searches on the site by the botanist were within the flowering season for the species, and did not locate any plants. It is concluded that *Acacia ausfeldii* is not present on the development site or immediate surrounds. It is concluded that this species will not be impacted.

Dichanthium setosum – Associated with heavy basaltic black soils and red-brown loams with clay subsoil on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW. No *Dichanthium* grasses were observed on the development site. The site does not have the heavy basalt plains soil preferred by this species. It is concluded that this species will not be impacted.

Eucalyptus cannonii – The nearest record is in Avisford NR on the eastern side of the range, south of Mudgee, which is at the limit of the species' distribution. The stringybarks near the development site are identified as *Eucalyptus macrorhyncha* on the basis of the fruit size being <10mm and lacking the deep flange / rim on the fruit; these are distinguishing features between the two similar species, *E. macrorhyncha* and *E. cannonii*. No trees will be removed for the development and the Stringybarks near the site will be retained and protected *in situ* as a priority. It is concluded that this species is not present on the site and will not be impacted. *Eucalyptus cannonii* may be present elsewhere on the property.

Swainsona recta – Known from the Queanbeyan and Wellington-Mudgee areas. Grows in association with understorey of Kangaroo Grass *Themeda australis*, Poa tussocks *Poa* spp. and spear-grasses *Austrostipa* spp. A large population is present in the Mudgee Common and a small population occurs locally along the southern section of Old Grattai Road, on the road side. The targeted searches on the site by the botanist were undertaken within the flowering season of the species, and did not locate any plants on or near the development site. It is concluded that *Swainsona recta* is not present on the development site or immediate surrounds and will not be impacted. It may be present elsewhere on the property.

Swainsona sericea – Silky Swainson-pea has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. It is concluded that this species will not be impacted. This species occurs locally at the Mudgee Common. The targeted searches on the site by the botanist were undertaken within the flowering season of the species, and did not locate any plants on or near the site. It is concluded that *Swainsona sericea* is not present on the development site or immediate surrounds and will not be impacted. It may be present elsewhere on the property.

3.8 Threatened ecological communities

There are four threatened ecological communities (TECs) in the Inland Slopes IBRA subregion. These are listed in **Table 3-2** and have each been considered as to whether the vegetation at the development site is consistent with the TEC.

The vegetation community identified on the site, which is present as a semi-cleared and derived grassland form, is PCT 461 *Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion*. This PCT is not associated with any TECs, as per the published description (DPIE 2021b).

Table 3-2: Threatened ecological communities occurring in the Inland Slopes IBRA subregion.

Threatened Ecological Community	NSW status	Comm status	Site assessment
<i>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</i>	CE	CE	Not present. Occurs from the QLD border into Victoria. Characterised by the presence of <i>Eucalyptus blakelyi</i> (Blakely's Red Gum) with <i>E. melliodora</i> (Yellow Box), <i>E. gonicalyx</i> and <i>E. bridgesiana</i> , and a generally grassy understorey. The site is within the know range for this TEC, and vegetation has the characteristic grassy understorey, however the trees (<i>Eucalyptus dealbata</i> , <i>Eucalyptus macrorhyncha</i> and <i>Eucalyptus sideroxylon</i>) are not consistent with the TEC. The PCT 461 identified at the site is not associated with the TEC. It is concluded that this TEC is not present.
<i>Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions</i>	E		Not present. Occurs on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South bioregions occurs on brown loam or clay, alluvial or colluvial soils on prior streams and abandoned channels or slight depressions. Occurs upslope from River Red Gum communities, just above frequently inundated areas on the floodplain. It also occurs on colluvial soils on lower slopes and on valley flats. The site does not have <i>Eucalyptus conica</i> , which is the main identifying tree for this TEC. It is concluded that this TEC is not present.
<i>Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Penepplain, Nandewar and Brigalow Belt South Bioregions</i>	E		Not present. Inland Grey Box Woodland includes those woodlands in which the most characteristic tree species, <i>Eucalyptus microcarpa</i> (Inland Grey Box), is often found in association with <i>E. populnea subsp. bimbil</i> (Bimble or Poplar Box), <i>Callitris glaucophylla</i> (White Cypress Pine), <i>Brachychiton populneus</i> (Kurrajong), <i>Allocasuarina luehmannii</i> (Bulloak) or <i>E. melliodora</i> (Yellow Box), and sometimes with <i>E. albens</i> (White Box). Occurs predominately within the Riverina and South West Slopes regions of NSW. The site does not have <i>Eucalyptus microcarpa</i> , which is the main identifying tree for this TEC. It is concluded that this TEC is not present.

Threatened Ecological Community	NSW status	Comm status	Site assessment
<i>Coolac-Tumut Serpentine Shrubby Woodland in the NSW South Western Slopes and South Eastern Highlands Bioregions</i>	E		<p>Not present. The TEC occurs on soils derived from serpentinite in the Coolac-Tumut area. There is an overstorey of drooping sheoak (<i>Allocasuarina verticillata</i>) with the shrubs hickory wattle (<i>Acacia implexa</i>), grasstrees (<i>Xanthorrhoea glauca</i>) and <i>Ricinocarpus bowmanii</i>. The groundlayer is consists of a range of native grasses and herbs, often including kangaroo grass (<i>Themeda australis</i>), wiregrasses (<i>Aristida</i> spp.), wallaby grasses (<i>Rytidosperma</i> spp.). Scattered trees of white box (<i>Eucalyptus albens</i>) and bundy (<i>Eucalyptus nortonii</i>) can occur. Many sites are degraded and have a poor level of regeneration, no longer supporting the full complement of species.</p>

* Listed as Endangered (E) or Critically Endangered (CE) under the NSW Biodiversity Conservation Act 2016 or Commonwealth EPBC Act 1999.

4 Measures to avoid and minimise impacts

The proposed site layout with development area for buildings, bushfire asset protection zones (APZs, as per the Bushfire Assessment Report attached), driveway, waste water systems and fill area is shown in **Figure 4-1**. The development footprint is further detailed and discussed below in terms of impact minimisation/avoidance, vegetation affected, and area of impact.

4.1 Existing design measures

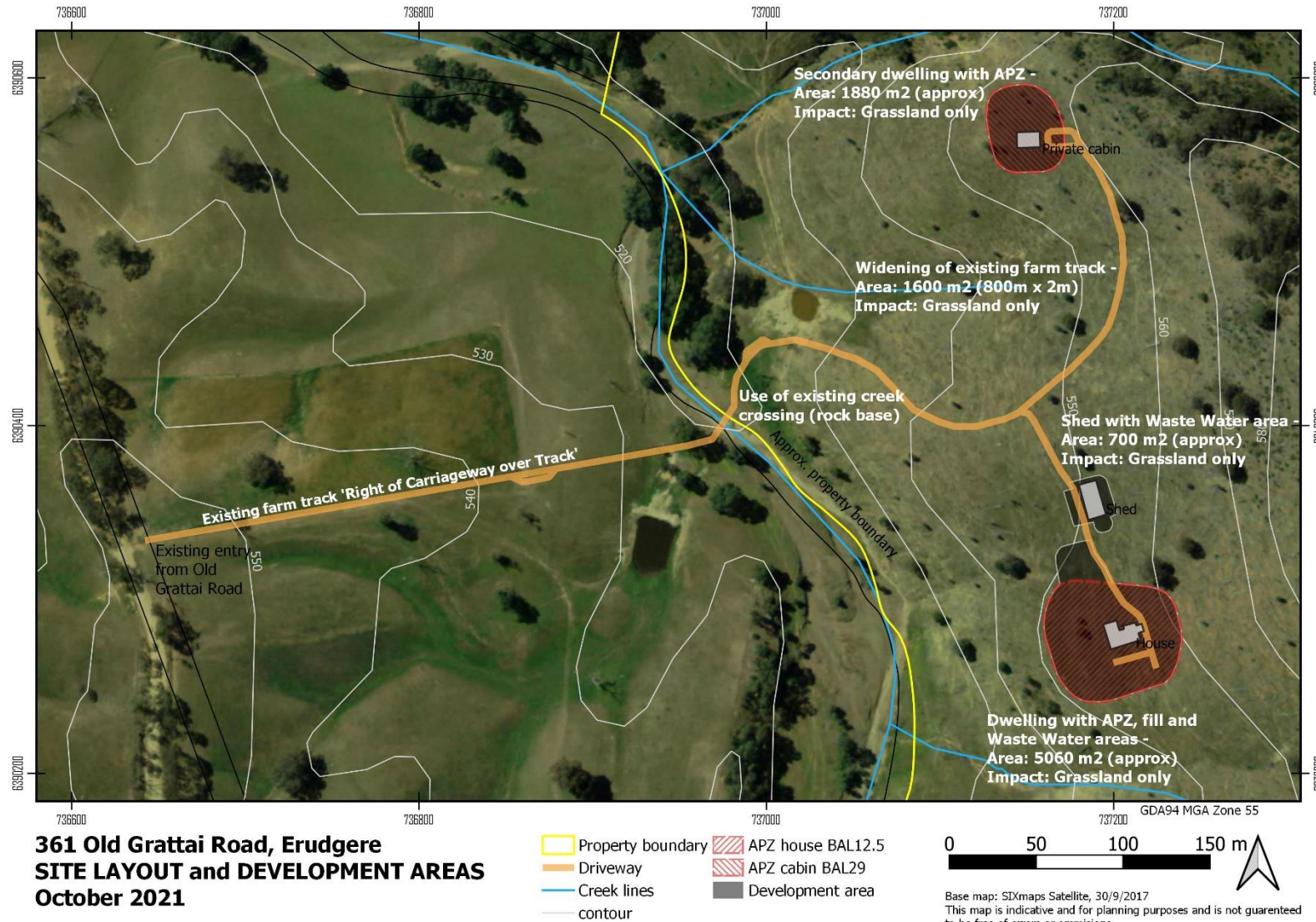
The development incorporates the following measures to avoid and minimise impacts to native vegetation and threatened species habitat.

1. The development has been located within existing cleared areas (**Figure 4-1**). Impacts will be to native groundcover vegetation only.
2. The proposed bushfire asset protection zone has been considered in relation to the vegetation management required and the size. A balance between bushfire protection and minimising environmental impact is proposed, whereby no trees will need to be cleared for the building or to establish the asset protection zone. The proposed site layout and APZs have been analysed and mapped in the attached Bushfire Assessment Report. The APZ are indicated in **Figure 4-1**.
3. The geotechnical and effluent reports have assessed the site and defined the acceptable effluent disposal management areas for the main dwelling, shed and secondary dwelling. Their report has defined the required effluent filtration trenches suitable for the site, providing a 100m buffer to Macdonalds Creek and 40 m buffer to other side creek lines. The showing the location of the relevant site maps from the effluent report are included in **Appendix D**.

4.2 Additional recommended measures

4. Native groundcover should be retained, where possible, within the APZ, especially in the outer part of the APZ to maintain the natural soil profile, reduce erosion risk and minimise disturbance and weed proliferation.
5. All areas not within the approved development footprint are to be demarcated as environmental protection areas prior to and during construction, to avoid vehicle access and inadvertent damage.
6. Sediment control measures are to be in place prior to and during the construction phase to contain soil and sediment within the approved construction footprint.
7. All logs and fallen timber and dead tree stems in the development footprint that need to be removed, will be first checked for any wildlife, and then moved nearby and retained on site as habitat.

Figure 4-1. Proposed site layout with development areas.



5 Summary of impacts

5.1 Native vegetation clearing

The impact of the development on native vegetation is summarised in **Table 5-1**. The impact assessment is based on the site layout and development areas shown in **Figure 4-1**.

Table 5-1: Summary of the proposed development footprint and impact to vegetation and habitat.

Development component	Vegetation /habitat type to be impacted	Type of impact	Area of impact (approx.)
DWELLING			
Dwelling building footprint, and immediate construction buffer of 10m around the building.	Native grassland	Complete removal of vegetation dead tree stems and fallen logs	1200 m ²
APZ, landscaping and gardens, Worm Farm Waste system, water tank and fill area	Native grassland	Management of vegetation to low fuel loads. No tree clearing. Established native trees will be retained to <15% cover.	3860 m ²
SHED			
Shed footprint, and immediate construction buffer of 10m around the building including water tank and septic system.	Native grassland	Complete removal of vegetation dead tree stems and fallen logs	700 m ²
SECONDARY DWELLING			
Dwelling building footprint, and immediate construction buffer of 10m around the building.	Native grassland	Complete removal of vegetation dead tree stems and fallen logs	500 m ²
APZ and landscaping	Native grassland	Management of vegetation to low fuel loads. No tree clearing. Established native trees will be retained to <15% cover.	1380 m ²
SECONDARY DWELLING			
New driveway to main dwelling site (where not within other development areas) (Photograph	Native grassland	Complete removal of vegetation dead tree stems and fallen logs	1380 m ²
Widening of existing farm track (2m additional width for 800 m length)	Native grassland	Complete removal of vegetation	1600 m ²
TOTAL			9480 m²

Photograph 5-1. Main dwelling site and bushfire APZ is located in open grassland. The APZ vegetation management will require relocation of logs, slashing of grassland and maintaining tree cover less than 15%. No trees will be cleared.



Photograph 5-2. The new driveway alignment will be along an existing informal track. No trees need to be removed for this work and the alignment is in native grassland only.



Photograph 5-3. Shed site is located in open grassland. Grassland and logs will be cleared for construction.



Photograph 5-4. Proposed secondary dwelling site on an open grassland site. No trees will be removed.



5.2 Aquatic habitat

The Geotechnical investigations by Barnson, dated 30 July 2021, has provided the approved effluent disposal area for each site, to allow for the required 100 m buffer to Macdonalds Creek and 40m buffer to mapped tributaries. Based on the site plan prepared by the property owner, in July 2021, these buffers have been retained and there will be no development or effluent disposal within the buffer areas (refer to **Figure 5-1**).

The driveway crosses the Macdonalds Creek but does not require any upgrade for the current development. The creek crossing is at the location of an existing farm track, which has been provided as the 'Right of Carriageway over Track' on the land title, and this is currently the only vehicle access onto the property. The creek bed has a firm rock base and is adequate access for a private driveway.

Figure 5-1. Proposed site layout and location of sewage systems in relation to the 100m buffer to Macdonalds Creek and 40 buffer from side tributaries.



5.3 Test of significance

The Test of Significance (five-part-test) under section 7.7 of the BC Act is used to determine whether a proposed development or activity is likely to significantly affect threatened species, ecological

communities, populations or their habitats. In this case, the Test of Significance has been applied to the following species.

- **Flora:** Not applied to any threatened flora species, since none of the potential species were detected during the survey, which was undertaken in the suitable flowering period (September-October 2021), as described in **section 3**.
- **Fauna:** Applied to the Eastern Pigmy-possum, based on the presence of abundant logs and stumps, all other potential threatened fauna species are unlikely to be impacted since there will be no clearing of trees or woodland vegetation, as described in **section 3**.
- **Threatened ecological community:** Not applied to any TEC, since none of the potential TECs were identified on the development, as described in **section 3**. The Test of Significance below is intended to be interpreted in combination with the avoid and minimise measures described in **section 4**.

Test of Significance

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

Eastern Pigmy-possum:

The proposal will affect a very small area of disturbed and cleared habitat that may be utilised from time to time by the Eastern Pygmy-possum due to the presence of fallen hollow logs and stumps. Surveys for threatened fauna have not been undertaken, hence the test considers impacts to habitat that could be important for maintaining the life cycle of this species.

Overall, the habitat to be cleared or impacted covers a relatively small area in the landscape context, and would not be the only habitat in the local area relied on for foraging and breeding, if any animals are present. There are extensive adjoining areas of woodland and grassland with logs that provide equivalent and better food and shelter resources for the Eastern Pygmy-possum. It is concluded that the proposed development will not affect the lifecycle of the Eastern Pygmy-possum, if animals are present in the area, such that a viable local population would be put at risk of extinction. The plan for the property is to protect and regenerate the remainder of the grassland and woodland areas across the property which will maintain extensive areas of habitat for the Eastern Pygmy-possum and other native species over the long term.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

The proposal will not impact any endangered ecological community or critical endangered ecological community.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

Eastern Pigmy-possum:

In relation to the extent of habitat, the proposed area of impact to native vegetation is very small in the landscape context, and is also focused on existing cleared areas. No mature woodland or large trees will be cleared. The impact minimisation and avoidance measures

Overall, the habitat to be cleared or impacted covers a relatively small area in the landscape context, and would not be the only habitat in the local area relied on for foraging and breeding, if any animals are present. There are extensive adjoining areas of woodland and grassland with logs that provide equivalent and better food and shelter resources for the Eastern Pigmy-possum. It is concluded that the proposed development will not affect the lifecycle of the Eastern Pigmy-possum, if animals are present in the area, such that a viable local population would be put at risk of extinction. The plan for the property is to protect and regenerate the remainder of the grassland and woodland areas across the property which will maintain extensive areas of habitat for the Eastern Pigmy-possum and other native species over the long term. The site is connected to larger areas of similar vegetation where animals could readily move, if needed. The small size and location of the development within a large connected area of grassland and woodland means that the development will not isolate any habitat from other similar areas.

The impact minimisation measures in **section 4**, include a recommendation that 'All logs and fallen timber and dead tree stems in the development footprint that need to be removed, will be first checked for any wildlife, and then moved nearby and retained on site as habitat.' This measure means the habitat being removed for the development will essentially be retained on site.

Given these considerations and the small size of the development footprint in the local landscape context, this assessment concludes that the effects of the proposal on the extent, connectivity and important habitat is minimal and non-significant for all species. The development will not adversely affect any locally-occurring threatened species or ecological communities due to habitat loss.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

There are currently no declared areas of outstanding biodiversity value (AOBV) within the Mid-Western Regional LGA. The proposal will not affect any declared areas of outstanding biodiversity value.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The proposal represents a very small contribution to the recognised threatening process 'vegetation clearing' within the immediate development footprint, in this case the clearing is only of native grassland, since no trees will be cleared. The small size of the development footprint in the local landscape context will have a negligible contribution to this threat.

5.4 Offset scheme thresholds

The residual impacts of the development have been assessed against the thresholds for entry into the NSW Biodiversity Offset Scheme (BOS). In this case, the lot size for the zoning is **400 ha** and the relevant native vegetation clearing threshold applicable to the development is 1 ha (10,000 m²)

(Table 5-2) (see also <https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/biodiversity-offsets-scheme/entry-requirements>).

Table 5-2: Native vegetation clearing thresholds by lot size for entry into the BOS.

Minimum lot size for the zoning	Native vegetation clearing threshold
Less than 1 ha	0.25 ha or more
1 ha to less than 40 ha	0.5 ha or more
40 ha to less than 1000 ha	1 ha or more
1000 ha or more	2 ha or more

The proposed development footprint detailed in **section 5.1** of this report has calculated a total impact footprint of approximately 9480 m² (0.948 ha) entirely within native grassland vegetation. This is below the threshold for entry into the BOS or the lot size. The development is not located on land identified in the Biodiversity Values Map (refer to **Appendix A**). The test of significance does not find any likelihood of a significant impact to any threatened species or ecological community, or their habitats. The proposed development does not trigger the BOS.

6 Summary and conclusion

The following PCT is present at the site as a derived grassland: **PCT: 461 Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion**. PCT 461 was identified at the subject site from a shortlist of candidate PCTs known to occur in the Inland Slopes subregion, on the basis of scattered trees of *Eucalyptus dealbata*, *Eucalyptus macrorhyncha* and *Eucalyptus sideroxylon*, native shrubs of *Acacia spp.* and *Allocasuarina verticillata* with a grassy herbaceous native groundcover. The PCT is present as a semi-cleared woodland and derived grassland, as a result of historical clearing many decades ago. Scattered mature old trees are present with some sapling regeneration around trees. The development is been located in the derived grassland areas (refer to photographs above).

The vegetation at the site is not part of any TEC, due to the absence of diagnostic trees, as described in **section 3.8**.

The site assessment did not find any threatened plants within the development area or nearby. The targeted searches were done in the Spring flowering season (August -October) for the most likely species, *Swainson recta* and *Swainsona sericea* and *Acacia ausfeldii*, and none were found.

Threatened fauna have been assessed on the basis of the type of habitat present and proposed to be cleared for the development. Potential impacts to threatened fauna are discussed in **section 3.7** and the Test of Significance has been applied in **section 5.3**. It is concluded that the proposed development is unlikely to cause significant harm to any threatened fauna or their habitat, due to the relatively small size of the development and that it will not occur within existing cleared grassland areas only.

The development footprint has been calculated as covering an area of 9480 m², including building footprints, APZ and new driveways. This area is within native grassland, which has been cleared in the past. No trees are proposed to be cleared, or need to be cleared, for the development.

The assessment of the proposal against the thresholds for the NSW Biodiversity Offset Scheme finds that none of the thresholds are exceeded and the development is not required to enter the BOS.

7 References

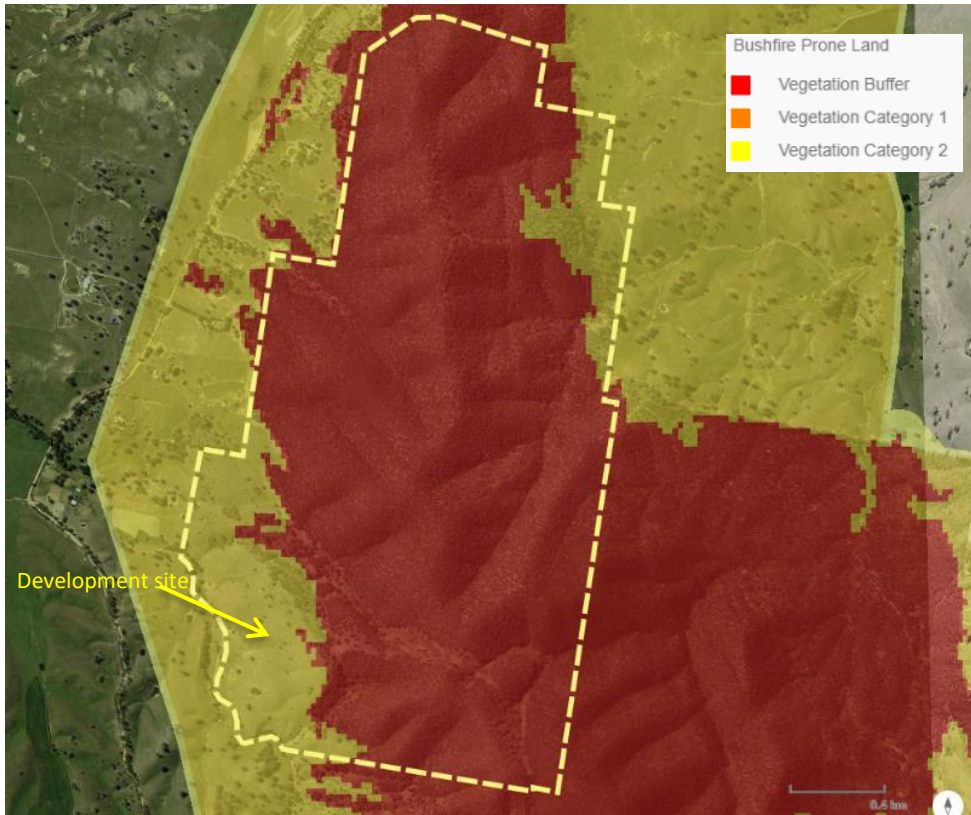
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8 Declaration of interest

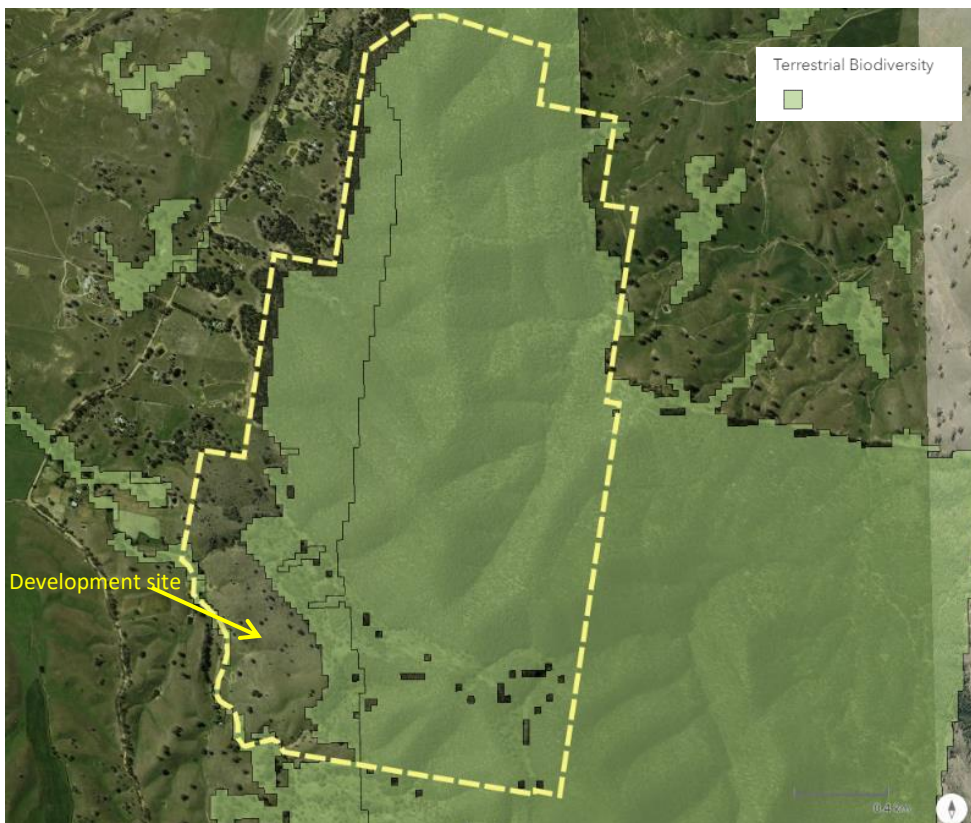
This report has been prepared by Dr Kate Hammill Stone who is a BAM Accredited Assessor and also the Joint land owner of the subject property and proponent for the development. The assessment has been undertaken in the same manner and with due diligence as would be done by the author for any other similar development proposal.

Appendix A. LEP and database maps

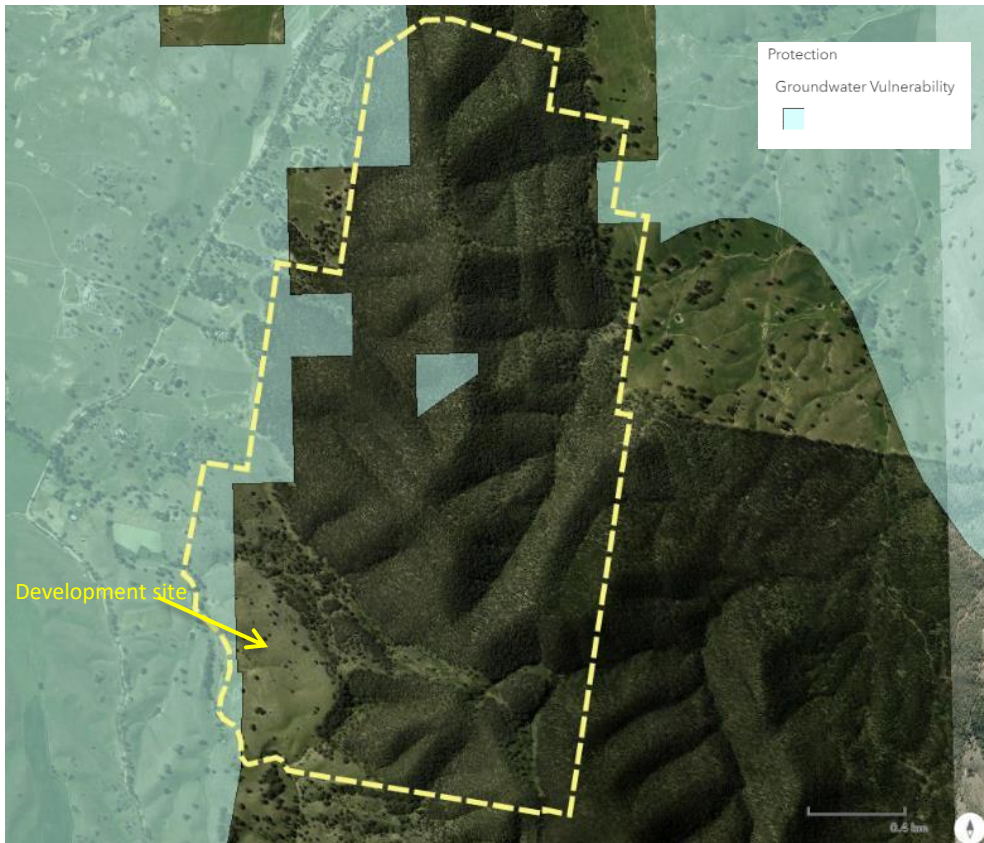
LEP Bush Fire Prone Land mapping



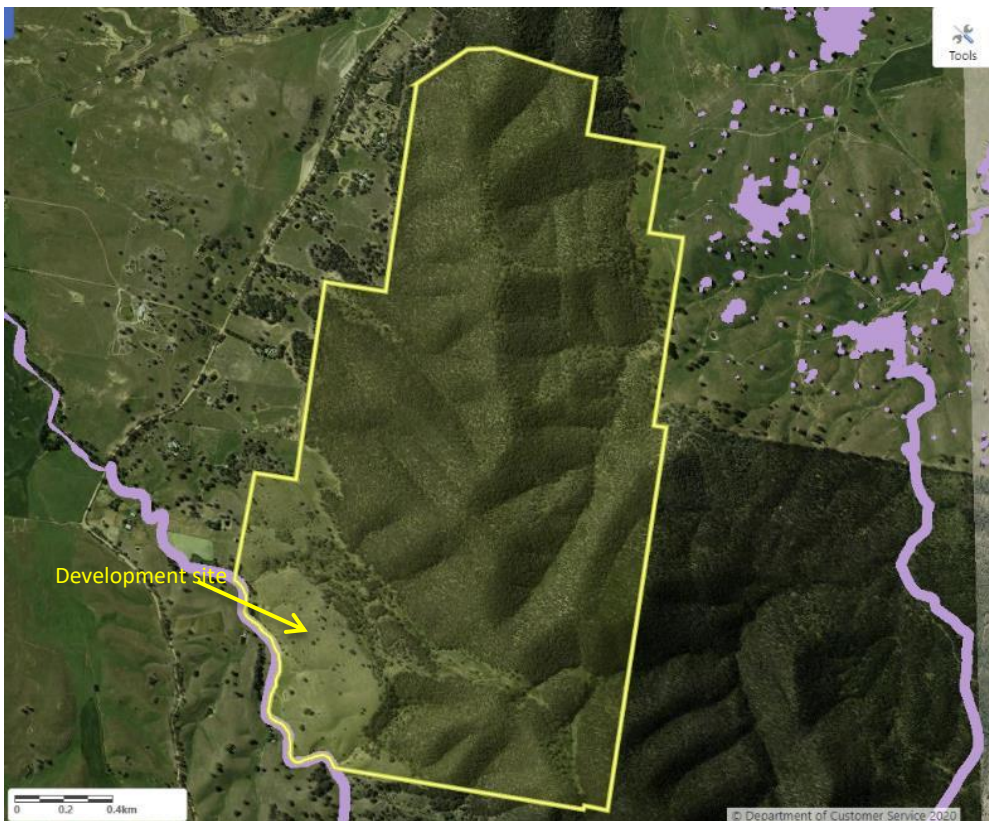
LEP Terrestrial Biodiversity mapping



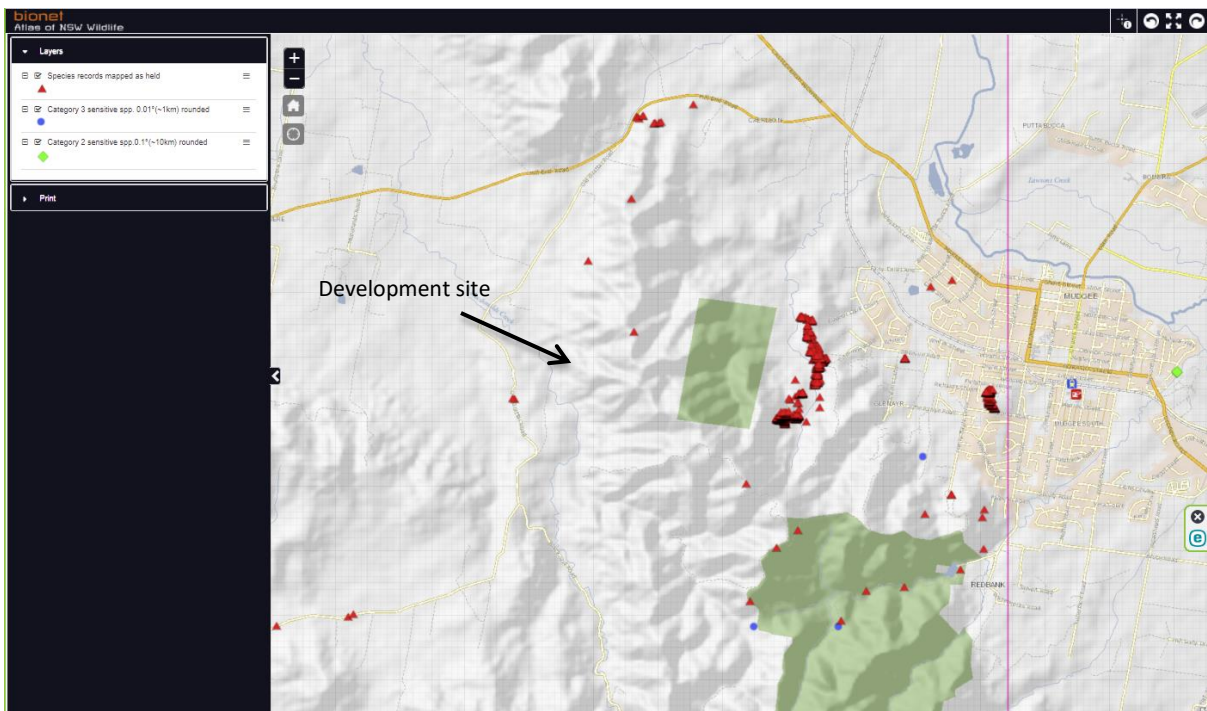
LEP Groundwater vulnerability



Biodiversity Values Map



Bionet Wildlife Atlas threatened species records search 27/10/2021.



Appendix B. Site flora species list

Native plant species observed on the development site, July-October 2021.

Growth form	Family	Scientific Name	Common Name	Status*
Tree	Casuarinaceae	<i>Allocasuarina verticillata</i>	Drooping Sheoak	
Tree	Myrtaceae	<i>Angophora floribunda</i>	Rough-barked Apple	
Tree	Malvaceae	<i>Brachychiton populneus</i>	Kurrajong	
Tree	Myrtaceae	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	
Tree	Myrtaceae	<i>Eucalyptus macrorhyncha</i>	Red Stringybark	
Tree	Myrtaceae	<i>Eucalyptus sideroxylon</i>	Mugga Ironbark	
Shrub	Fabaceae	<i>Acacia decora</i>	Western Silver Wattle	
Shrub	Fabaceae	<i>Acacia implexa</i>	Hickory Wattle	
Shrub	Fabaceae	<i>Acacia paradoxa</i>	Kangaroo Thorn	
Shrub	Fabaceae	<i>Acacia vestita</i>	Weeping Boree	
Shrub	Pittosporaceae	<i>Bursaria spinosa</i>	Native Blackthorn	
Shrub	Dilleniaceae	<i>Hibbertia obtusifolia</i>	Hoary Guinea Flower	
Shrub	Ericaceae	<i>Lissanthe strigosa</i>	Peach Heath	
Shrub	Asteraceae	<i>Olearia viscosa</i>	Daisy bush	
Shrub	Phyllanthaceae	<i>Phyllanthus hirtellus</i>	Thyme Spurge	
Shrub	Fabaceae	<i>Pultenaea foliolosa</i>	A Bush Pea	
Grass & grasslike	Poaceae	<i>Aristida vagans</i>	Threeawn Speargrass	
Grass & grasslike	Poaceae	<i>Austrostipa scabra</i>	Speargrass	
Grass & grasslike	Poaceae	<i>Bothriochloa macra</i>	Red Grass	
Grass & grasslike	Cyperaceae	<i>Carex inversa</i>	Knob Sedge	
Grass & grasslike	Poaceae	<i>Echinopogon caespitosus</i>	Bushy Hedgehog-grass	
Grass & grasslike	Poaceae	<i>Eragrostis brownii</i>	Brown's Lovegrass	
Grass & grasslike	Lomandraceae	<i>Lomandra spp.</i>	Mat-rush	
Grass & grasslike	Poaceae	<i>Microlaena stipoides</i>	Weeping Grass	
Grass & grasslike	Poaceae	<i>Panicum effusum</i>	Hairy Panic	
Grass & grasslike	Poaceae	<i>Rhynchospora (short)</i>	Wallaby Grass	
Grass & grasslike	Poaceae	<i>Rhynchospora (tall)</i>	Wallaby Grass	
Grass & grasslike	Cyperaceae	<i>Schoenus apogon</i>	Fluke Bogrush	
Grass & grasslike	Poaceae	<i>Sporobolus creber</i>	Slender Rat's Tail Grass	
Forb	Rosaceae	<i>Acaena ovina</i>	Acaena	
Forb	Anthericaceae	<i>Arthropodium fimbriatum</i>	Chocolate Lily	
Forb	Colchicaceae	<i>Burchardia umbellata</i>	Milkmaids	
Forb	Orchidaceae	<i>Caladenia carnea</i>	Pink Fingers	P
Forb	Asteraceae	<i>Calotis cuneifolia</i>	Purple Burr-Daisy	
Forb	Asteraceae	<i>Chrysocephalum apiculatum</i>	Common Everlasting	
Forb	Asteraceae	<i>Cymbonotus lawsonianus</i>	Bear's Ear	
Forb	Convolvulaceae	<i>Dichondra repens</i>	Kidney Weed	
Forb	Orchidaceae	<i>Diuris sulphurea</i>	Tiger Orchid	P
Forb	Droseraceae	<i>Drosera peltata</i>	A Sundew	
Forb	Asteraceae	<i>Euchiton sphaericus</i>	Star Cudweed	
Forb	Geraniaceae	<i>Geranium homeanum</i>	Native Geranium	
Forb	Haloragaceae	<i>Gonocarpus spp.</i>	Raspwort	
Forb	Goodeniaceae	<i>Goodenia hederacea</i>	Ivy Goodenia	

Growth form	Family	Scientific Name	Common Name	Status*
Forb	Clusiaceae	<i>Hypericum gramineum</i>	Small St John's Wort	
Forb	Asteraceae	<i>Microseris lanceolata</i>	Yam Daisy	
Forb	Orchidaceae	<i>Pterostylis spp.</i>	Greenhood	P
Forb	Polygonaceae	<i>Rumex brownii</i>	Swamp Dock	
Forb	Caryophyllaceae	<i>Stellaria pungens</i>	Prickly Starwort	
Forb	Phormiaceae	<i>Stypandra glauca</i>	Nodding Blue Lily	
Forb	Asteraceae	<i>Triptilodiscus pygmaeus</i>	Common Sunray	
Forb	Asteraceae	<i>Vittadinia cuneata</i>	A Fuzzweed	
Forb	Campanulaceae	<i>Wahlenbergia spp.</i>	Bluebell	
Forb	Campanulaceae	<i>Wahlenbergia stricta</i>	Tall Bluebell	
Fern	Pteridaceae	<i>Cheilanthes sieberi</i>	Rock Fern	
Non-native	Poaceae	<i>Aira caryophyllea</i>	Silvery Hairgrass	
Non-native	Poaceae	<i>Briza maxima</i>	Quaking Grass	
Non-native	Poaceae	<i>Briza minor</i>	Shivery Grass	
Non-native	Asteraceae	<i>Carthamus lanatus</i>	Saffron Thistle	HTE
Non-native	Clusiaceae	<i>Hypericum perforatum</i>	St. Johns Wort	HTE
Non-native	Asteraceae	<i>Hypochaeris radicata</i>	Catsear	
Non-native	Scrophulariaceae	<i>Linaria pelisseriana</i>	Pelisser's Toadflax	
Non-native	Cactaceae	<i>Opuntia stricta</i>	Common Prickly Pear	
Non-native	Scrophulariaceae	<i>Parentucellia latifolia</i>	Red Bartsia	
Non-native	Poaceae	<i>Vulpia myuros</i>	Rat's Tail Fescue	

* For native species - Protected (P), Vulnerable (V), Endangered (E) or Critically Endangered (CE) as listed under the Schedules of the *Biodiversity Conservation Act 2016*.

* For non-native species – High Threat Exotic (HTE), as defined in the Biodiversity Assessment Method; Priority Weed (Pr) with a biosecurity duty under the *NSW Biosecurity Act 2015*.

Appendix C. Review of threatened species, communities and threats

The following table includes a review of the BioNet Wildlife Atlas search of all valid records of NSW threatened entities (listed on BC Act 2016) or Commonwealth listed Entities (threatened species and communities listed on EPBC Act 1999) in NSW Inland Slopes subregion. The table below includes consideration of each of these entities in relation to potential habitat present and impacted by the proposal. Species or communities that will be impacted, or could be impacted because suitable habitat is present, have been further considered in section 3 and section 5 (Test of Significance) in this report.

Predicted species review.

Class	Scientific Name	Common Name	NSW status	Comm status	No. Records	Site assessment	Potential presence & impact	Description
Aves	<i>Anthochaera phrygia</i>	Regent Honeyeater	E4A,P	CE	2	The site is not a breeding region for Regent Honeyeater, however birds could be seasonally present in woodland on the property, feeding on flowering eucalypts from time to time. However no trees will be cleared for the development.	No	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar.
Aves	<i>Apus pacificus</i>	Fork-tailed Swift	P	C,J,K	1	The species could be present flying or or foraging over the site from time to time. The development is of relatively small scale and would not affect this species or its habitat.	No	In NSW, the Fork-tailed Swift is recorded in all regions mostly east of the Great Divide, sometimes west of the Great Divide. Almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh, also grassland and sandplains, open farmland and sometimes above rainforests, wet sclerophyll forest or open forest or plantations of pines.
Aves	<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V,P		1	The species could be present at the site from time to time. The development is of relatively small scale and would not affect this species or its habitat.	No	The Dusky Woodswallow is found in woodlands and dry open sclerophyll forests, in farm land, road sides and golf courses, usually at the edges of forest or woodland or wind breaks with dead timber. Nests colonially in 'neighbourhoods'. The nest is a loose bowl of twigs, grass and roots, lined with fine grass, and is placed in a tree fork, behind bark, in a stump hollow or in a fence post, about 1 m - 10 m above the ground. Feeds on insects and nectar.

Class	Scientific Name	Common Name	NSW status	Comm status	No. Records	Site assessment	Potential presence & impact	Description
Aves	<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	V,P,2		5	The property has <i>Allocasuarina verticillata</i> (Drooping Sheoak) near the development site and elsewhere on the property. This is potential habitat for Glossy Black Cockatoo. However no trees of <i>Allocasuarina verticillata</i> will be cleared for the development.	No	The Glossy Black-Cockatoo is uncommon although widespread in eastern Australia, inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Feeds almost exclusively on the seeds of several species of she-oak (<i>Casuarina</i> and <i>Allocasuarina</i> species), shredding the cones with the massive bill. Black Sheoak (<i>Allocasuarina littoralis</i>) and Forest Sheoak (<i>A. torulosa</i>) are important foods. Inland populations feed on a wide range of sheoaks, including <i>Allocasuarina verticillata</i> , <i>Allocasuarina diminuta</i> , and <i>A. gymnathera</i> and Belah (<i>Casuarina cristata</i>). Dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.
Aves	<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V,P		5	The species could be present at the site from time to time. It has previously been recorded on the eastern side of the range near Mudgee Common. The development is of relatively small scale and would not affect this species or its habitat.	No	The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. It is less commonly found on coastal plains and ranges. The western boundary of the range of the species runs approximately through Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell. The eastern subspecies lives in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands. Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey; also found in mallee and River Red Gum (<i>Eucalyptus camaldulensis</i>) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging.
Aves	<i>Daphoenositta chrysoptera</i>	Varied Sittella	V,P		1	The species could be present at the site from time to time. The development is of relatively small scale and would not affect this species or its habitat.	No	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.

Class	Scientific Name	Common Name	NSW status	Comm status	No. Records	Site assessment	Potential presence & impact	Description
Aves	<i>Glossopsitta pusilla</i>	Little Lorikeet	V,P		2	The species could be present at the site from time to time, especially feeding on box trees in the woodland areas on the hills. No trees will be cleared for the development. The development will not affect this species or its habitat.	No	The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species.
Aves	<i>Hieraetus morphnoides</i>	Little Eagle	V,P		1	The species could be present and nest in large trees in the surrounding woodland areas. No potential nest trees are on the site. No trees will be cleared for the development. The development will not affect this species or its habitat.	No	The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW. Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.
Aves	<i>Hirundapus caudacutus</i>	White-throated Needletail	P	V,C,J,K	2	The species could be present flying or or foraging over the site from time to time. The development is of relatively small scale and would not affect this species or its habitat.	No	The White-throated Needletail is widespread in across the coast of eastern and south-eastern Australia, and Tasmania. Almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, conventional habitat descriptions are inapplicable. They are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland.
Aves	<i>Ninox strenua</i>	Powerful Owl	V,P,3		2	The species could be present in the area and nest in large trees in the surrounding woodland areas. Was recorded in 2002 in Avisford NR. No large hollow-bearing trees or hollow stags are on the development site. No trees will be cleared for the development. The development therefore will not affect this species or its habitat.	No	The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the eastern side of the Great Dividing Range, from south-eastern Queensland to Victoria. The Powerful Owl is found in open forests and woodlands, as well as along sheltered gullies in wet forests with dense understoreys, especially along watercourses. Will sometimes be found in open areas near forests such as farmland, parks and suburban areas, as well as in remnant bushland patches. Needs old growth trees to nest.

Class	Scientific Name	Common Name	NSW status	Comm status	No. Records	Site assessment	Potential presence & impact	Description
Aves	<i>Petroica boodang</i>	Scarlet Robin	V,P		3	The species could be present at the site from time to time. The development is of relatively small scale and would not affect this species or its habitat.	No	The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude. The Scarlet Robin is primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees.
Aves	<i>Polytelis swainsonii</i>	Superb Parrot	V,P,3	V	1	Could be seasonally present in woodland on the property, feeding on flowering eucalypts from time to time. However no trees will be cleared for the development.	No	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. Nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum Forest or Woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box.

Class	Scientific Name	Common Name	NSW status	Comm status	No. Records	Site assessment	Potential presence & impact	Description
Mammalia	<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V,P		1	The site does have logs and stumps that could be inhabited by this species. Precautionary measures are required during preparation of the building sites in case any animals are present in logs or stumps. No trees will be cleared for the development. Overall, the impacts to this species would be negligible even if present at the property due to the small size of the development footprint.	Possible, precautionary measures required when removing logs	The Eastern Pygmy-possum is found in south-eastern Australia, from southern Queensland to eastern South Australia and in Tasmania. In NSW it extends from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes. Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum (<i>Pseudocheirus peregrinus</i>) dreys or thickets of vegetation, (e.g. grass-tree skirts).
Mammalia	<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E1,P	V	1	The site is in open grassland and does not contain the sheltered rocky habitat inhabited by this species. The records for this species are historical records only. This species is highly unlikely to be present and will not be impacted.	No	The range of the Brush-tailed Rock-wallaby extends from south-east Queensland to the Grampians in western Victoria, roughly following the line of the Great Dividing Range. However the distribution of the species across its original range has declined significantly in the west and south and has become more fragmented. In NSW they occur from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. Browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees.
Mammalia	<i>Phascolarctos cinereus</i>	Koala	V,P	V	5	There are two old records for Koala, from 1991 and 1995, near the northern end of the property. No trees will be cleared for the development. Even if present on the property from time to time, the impacts of the development on this species and its habitat is considered to be negligible.	No	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. Inhabit eucalypt woodlands and forests.

Class	Scientific Name	Common Name	NSW status	Comm status	No. Records	Site assessment	Potential presence & impact	Description
Mammalia	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V,P	V	12	No roost of this species are known along Macdonalds Creek. The development will not affect riparian habitat for any trees that could provide food resources for this species, i.e. no trees will be cleared. This species is highly unlikely to be present and will not be impacted.	No	Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of natural resource shortages, they may be found in unusual locations. Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.
Flora	<i>Acacia ausfeldii</i>	Ausfeld's Wattle	V		19	This species occurs locally including along Old Grattai Road. The targeted searches on the site by the botanist, which occurred during the flower season for the species, did not located any plants of this species. It is concluded that <i>Acacia ausfeldii</i> is not present on the development site or immediate surrounds.	No	Erect or spreading shrub 1–4 m high; branchlets terete becoming angled (quadrangular) to flattened towards apex, resinous, glabrous. Grows in eucalypt woodland in sandy soil; often in remnant roadside patches of woodland. Occurs north from Mudgee, in Mudgee - Ulan - Gulgong area, predominantly in the northern part of the Central Western Slopes. Populations are recorded from Yarrobil National Park, Goodiman State Conservation Area and there is a 1963 record from Munghorn Gap Nature Reserve. A large population is also known from Tuckland State Forest to the northwest of Gulgong.
Flora	<i>Dichanthium setosum</i>	Bluegrass	V	V	1	No <i>Dichanthium</i> grasses were observed on the development site. The site does not have the heavy basalt plains soil preferred by this species.	No	Bluegrass occurs on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW, extending to northern Queensland. Associated with heavy basaltic black soils and red-brown loams with clay subsoil. Flowering time is mostly in summer. Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. Associated trees include <i>Eucalyptus albens</i> , <i>Eucalyptus melanophloia</i> , <i>Eucalyptus melliodora</i> , <i>Eucalyptus viminalis</i> .

Class	Scientific Name	Common Name	NSW status	Comm status	No. Records	Site assessment	Potential presence & impact	Description
Flora	<i>Eucalyptus cannonii</i>	Capertee Stringybark	V		3	The nearest record is in Avisford NR on the eastern side of the range. The species could be present on the property. The stringybarks near the development site are identified as <i>Eucalyptus macrorhyncha</i> on the basis of the fruit size being <10mm and lacking the deep flange on the fruit, which are distinguishing features between the two species (<i>E. macrorhyncha</i> and <i>E. cannonii</i>). Some of the Stringybarks could be hybrids. No trees will be removed for the development and the Stringybarks near the site will be retained and protected in situ as a priority.	No	Predominantly restricted to the central tablelands and slopes of NSW between the Golden Highway in the north, and the Mitchell Highway in the south. The species' distribution is bounded from east of Bathurst, to Wallerawang near Lithgow, north along the western edge of Wollemi National Park and north-west to Mudgee. Capertee Stringybark has a broad altitudinal range, from around 450m to 1,050m. Within this range, the species appears to tolerate most situations except the valley floors. Hybridises with other stringybarks, in particular <i>Eucalyptus macrorhyncha</i> . At some locations where <i>E. cannonii</i> and <i>E. macrorhyncha</i> occur together no intermediates are found while at others hybrids are prevalent. Buds and bud stems are angular, and fruits are generally greater than 10 mm diameter, often with a distinct rim around the middle.
Flora	<i>Swainsona recta</i>	Small Purple-pea	E1	E	692	This species occurs locally along Old Grattai Road, on the road side. The targeted searches on the site by the botanist, which were undertaken within the flowering season for the species, did not locate any plants on or near the site. It is concluded that <i>Swainsona recta</i> is not present on the development site or immediate surrounds. It may be present elsewhere on the property.	No	Small Purple-pea populations still exist in the Queanbeyan and Wellington-Mudgee areas. Over 80% of the southern population grows on a railway easement. Before European settlement Small Purple-pea occurred in the grassy understorey of woodlands and open-forests dominated by Blakely's Red Gum <i>Eucalyptus blakelyi</i> , Yellow Box <i>E. melliodora</i> , Candlebark Gum <i>E. rubida</i> and Long-leaf Box <i>E. goniocalyx</i> . Grows in association with understorey dominants that include Kangaroo Grass <i>Themeda australis</i> , poa tussocks <i>Poa</i> spp. and spear-grasses <i>Austrostipa</i> spp.
Flora	<i>Swainsona sericea</i>	Silky Swainson-pea	V		149	This species occurs locally in the Mudgee Common. The targeted searches on the site by the botanist were undertaken within the flowering season of the species, and did not locate any plants on or near the site. It is concluded that <i>Swainsona sericea</i> is not present on the development site or immediate surrounds. It may be present elsewhere on the property.	No	Silky Swainson-pea has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. There is one isolated record from the far north-west of NSW. Its stronghold is on the Monaro. Also found in South Australia, Victoria and Queensland. Found in Natural Temperate Grassland and Snow Gum <i>Eucalyptus pauciflora</i> Woodland on the Monaro. Found in Box-Gum Woodland in the Southern Tablelands and South West Slopes.

Appendix D. Effluent application areas

Proposed effluent disposal for the shed and house (red outline) within the approved application area – refer also to Architect site plans.

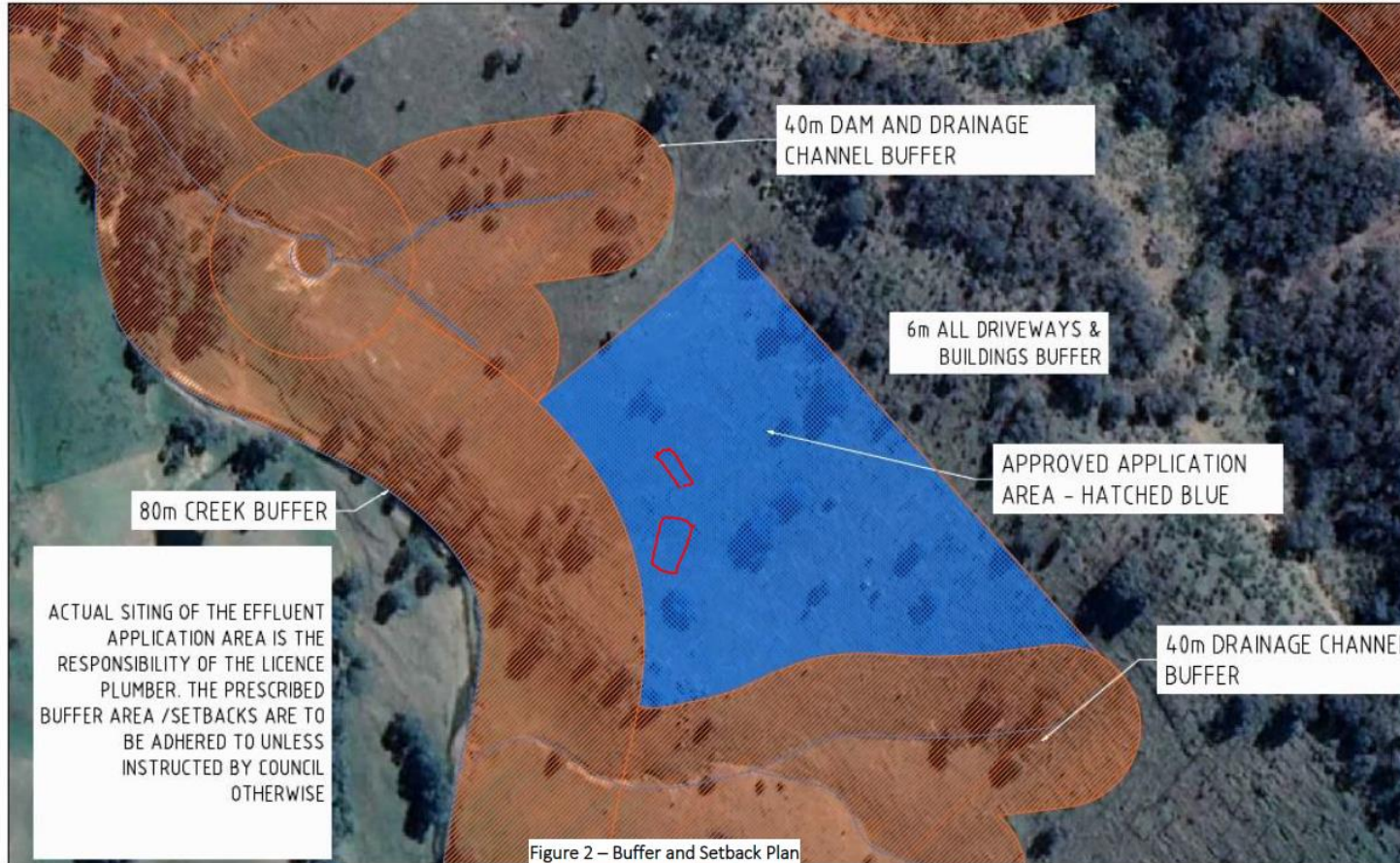


Figure 2 – Buffer and Setback Plan



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Drawn: JW	
Check: LM	Drawing Number:
Original Sheet Size: A4	36162-GD02
	Revision: A

Proposed effluent disposal for the secondary dwelling (red outline) within the approved application area – refer also to Architect site plans.

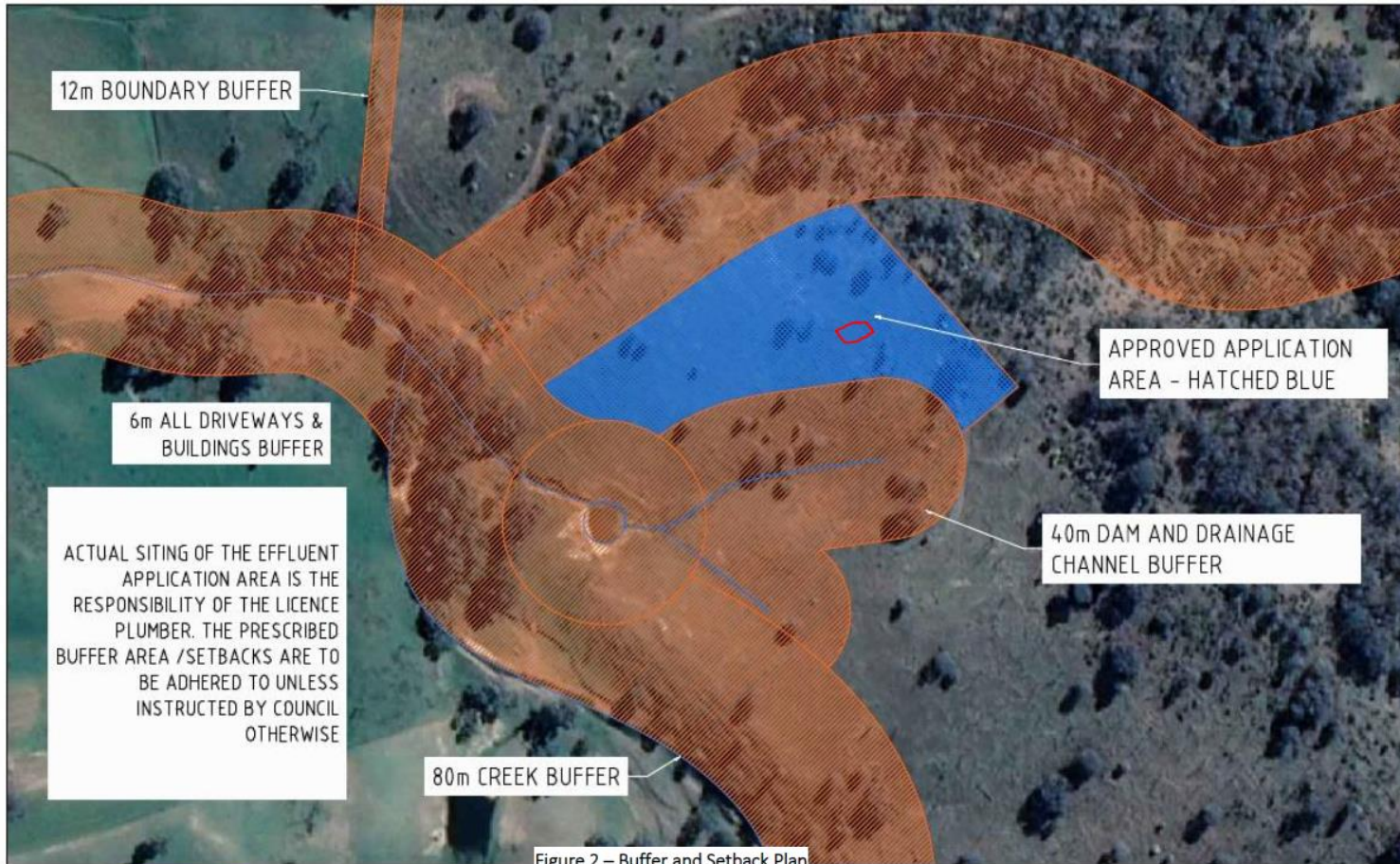


Figure 2 – Buffer and Setback Plan



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