Flora & Fauna Assessment
60 Bonner Rd, Agnes Banks

5 September 2018

SIA ECOLOGICAL & ENVIRONMENTAL PLANNING
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Signed: Date: 5th September 2018

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1 INTRODUCTION

1.1 Property Location and Setting

The property is situated at 60 Bonner Rd, Agnes Banks (Lot B DP38896) in the Penrith Local Government Area. It is 2.02 hectares in size. The topography across the property is flat with an elevation of approximately 20m AHD. The nearest watercourse is Yarramundi Lagoon located approximately 350m to the west. Figures 1-1 and 1-2 are aerial images of the property and surrounding land.

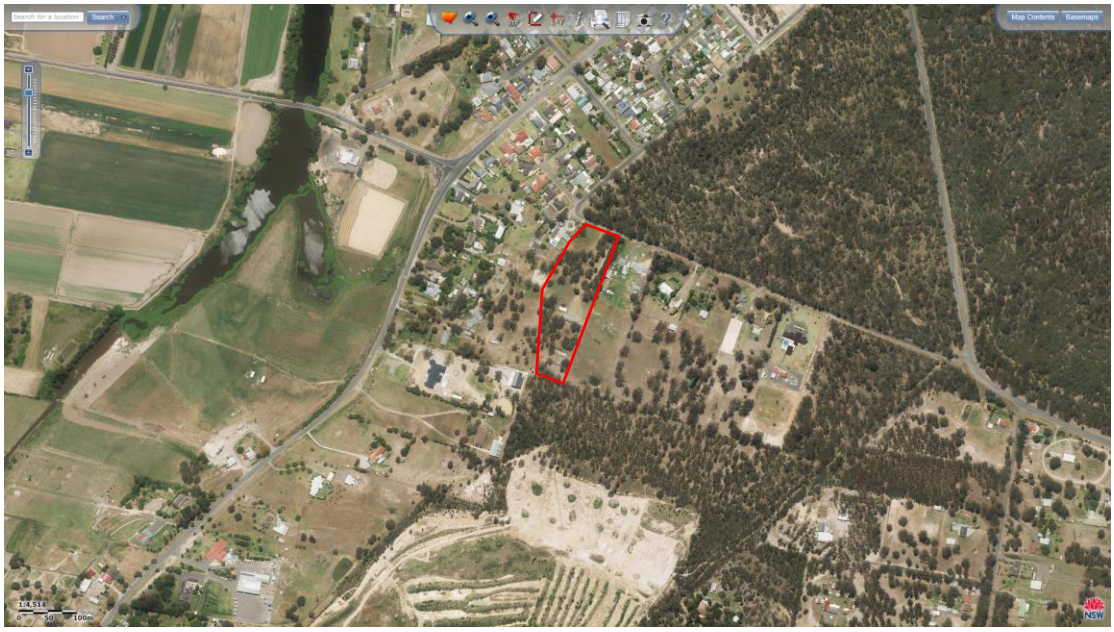


Figure 1-1: Aerial image of property and surrounding land (source: maps.six.nsw.gov.au). Approximate property boundaries are shown in red.

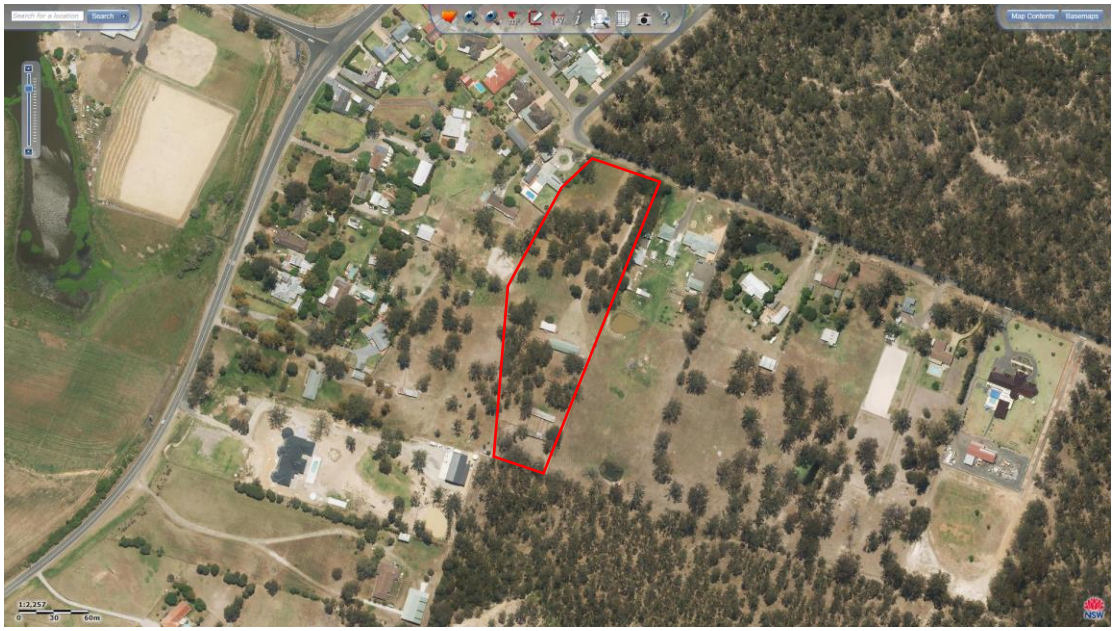


Figure 1-2: Aerial image of property (source: maps.six.nsw.gov.au).

1.2 Description of Development Proposal

The development proposal is to subdivide the property into two lots, a front lot (Lot 1) and a rear lot (Lot 2). Both Lots would be approximately 1 ha in size. Access to the rear lot would be via an existing gravel road that would be formalised into a right of carriage way. The existing dwelling and detached granny flat are located on what would become Lot 2. A new dwelling would be constructed on Lot 1 with a 600m^2 Building Envelope. Wastewater would be managed on site with disposal by surface irrigation on site over an area of 1,048m^2. A plan showing the lot layout and proposed building envelope is provided in Appendix A. A plan showing the wastewater disposal area is provided in Appendix B.

1.3 Bushfire Hazard Management

A Bushfire Attack Level (BAL) Assessment was completed for the property (Bushfire Management Consultants, 2018a and 2018b). The report concluded that "the proposed development can comply with the requirements within *Planning for Bush Fire Protection (2006) – A Guide for Councils, Planners, Fire Authorities and Developers* with regard to asset protection zone requirements ….." The recommended Asset Protection Zones (APZ) for the property are illustrated in Figure 1.3 below.

1.4 Purpose of This Report

This report provides the flora and fauna impact assessment for the development proposal. It describes the flora and fauna habitat on the property and discusses the likely impacts of the proposal. The report identifies species, populations or communities listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act) or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) that occur or may occur on that part of the property. Where the proposal is likely to impact on these the report includes the necessary 7-part tests (under Section 5A of the EP&A Act).

1.5 Assessment Methodology

Background information was collated from relevant sources and databases including, but not limited to, the BioNet Atlas of NSW Wildlife database, EPBC Act Protected Matters Search Tool, Office of Environment and Heritage (OEH) Vegetation mapping, NSW Government Six Viewer website and Google Maps.

A site assessment was undertaken on 7th March 2018. The site assessment involved walking through the entire property but focussing in particular on those parts that would be impacted by the development proposal. All observed species of flora were identified, vegetation community types were identified, fauna habitat described, any opportunistic sightings of fauna documented, and any significant flora or fauna features described. A brief examination of the vegetation in the adjoining and surrounding areas was undertaken to establish the local context for vegetation and fauna habitat on the site. Any changes in the structure or species composition of the vegetation was noted and the location recorded. Digital photographs are taken throughout the assessment for later reference and for inclusion in this report.

The results of the site assessment were analysed with reference to relevant information sources and databases including, but not limited to, NSW Scientific Committee Determinations, Commonwealth Listing Advices, NSW Threatened Species Profiles, Threatened Species Assessment of Significance Guidelines (DECC, 2007) and the Interpretation Guidelines for Native Vegetation Maps of the Cumberland Plain, Western Sydney (NPWS, 2002b).

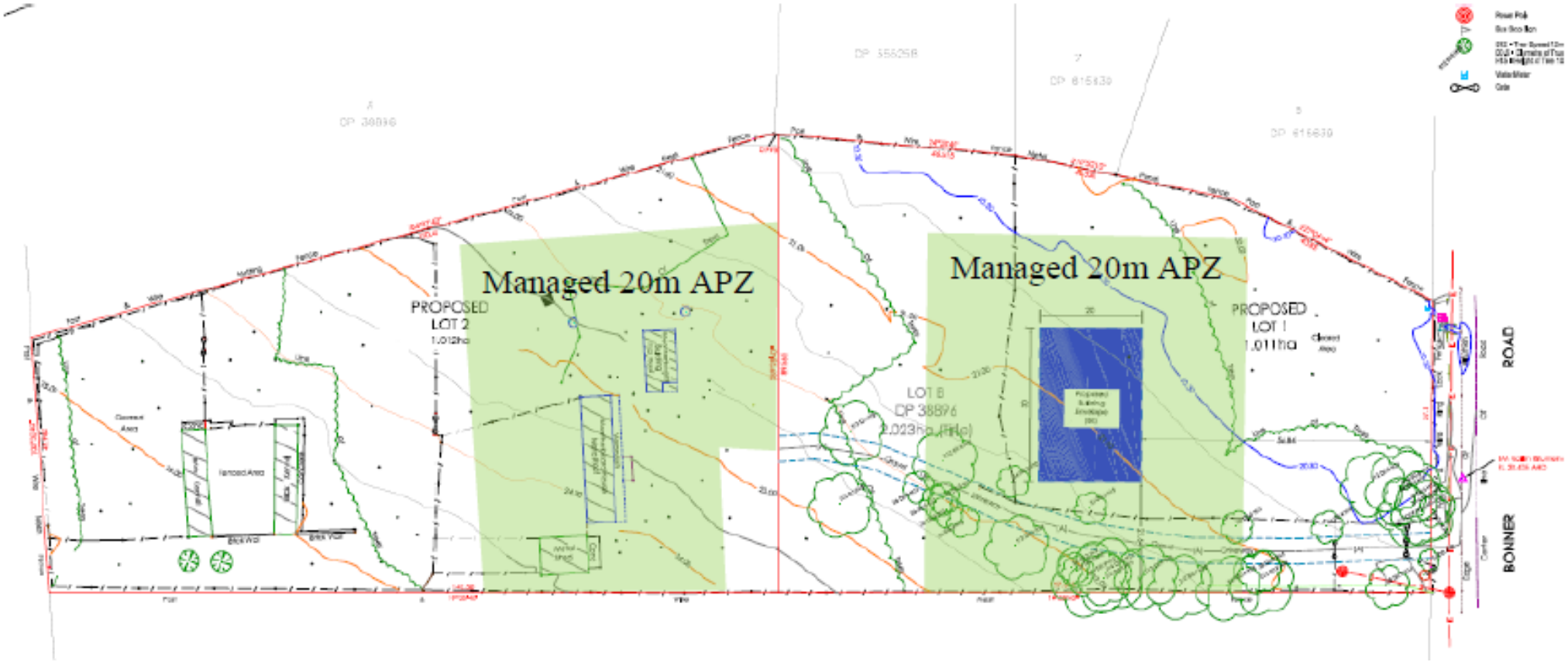


Figure 1.3: Proposed Asset Protection Zones (APZ) to dwellings and building envelope (Figure 1 of Bushfire Management Consultants, 2018b).

Figure 1.4: Aerial image showing proposed waste water disposal area (WWDA), Building Envelope, Asset Protection Zones (APZ) and Right of Carriage Way.

2 EXISTING FLORA AND FAUNA

2.1 Flora

2.1.1 Description of Vegetation on the Property

The native vegetation over the entire property was previously cleared. Two relatively large, cleared areas remain comprising a mixture of native and introduced mostly grasses and herbs. Elsewhere trees have regrown over the groundcover but a shrub layer remains absent. The trees are mostly approximately 10 to 15m in height. The front 1/3 of the property comprises mostly Cabbage Gum (*Eucalyptus amplifolia*) with some Grey Box (*Eucalyptus moluccana*). Then Narrow-leaved Ironbarks (*Eucalyptus crebra*) start to appear and gradually increase in proportion. The rear 1/3 of the property is almost entirely *E.crebra*. The trees across the property are relatively young with most ranging in size from approximately 20cm diameter at breast height (dbh) to approximately 40cm dbh. Some larger trees (up to approx. 60cm dbh and 20m in height) occur along the eastern property boundary. No tree hollows occur in any of the trees on the property.

The grass layer throughout the property is mostly Couch (*Cynodon dactylon*). There are patches of Weeping Grass (*Microlaena stipoides*) and scattered Slender Rat's Tail Grass (*Sporobolus creber*) and Paddock Lovegrass (*Eragrostis leptostachya*). Introduced grasses are scattered throughout including Prairie Grass (*Bromus catharticus**), Panic Veldt Grass (*Ehrharta erecta**), Paspalum (*Paspalum dilatatum**), Slender Pigeon Grass (*Setaria parviflora**) and Crowsfoot (*Eleusine indica**). A variety of native groundcover species are present including Grass Lily (*Murdannia graminea*), Blue Trumpet (*Brunoniella australis*), Native Bluebell (*Wahlenbergia gracilis*), *Einadia hastata*, Scurvy Weed (*Commelina cyanea*), Kidney Weed (*Dichondra repens*), *Oxalis perennans* and Slender Flat-sedge (*Cyperus gracilis*). The twiner Love Creeper (*Glycine microphylla*) is abundant. Several common weeds are abundant including much Khaki Weed (*Alternanthera pungens**) and Dandelion (*Taraxacum officinale**) with some scattered, for example, Fleabane (*Conyza bonariensis**), Paddy's Lucerne (*Sida rhombifolia**), Devil's Apple (*Solanum capsicoides**), etc.

The complete list of species recorded is provided in Appendix D. Photographs of the property are provided in Appendix C.

2.1.2 Endangered Ecological Communities

The vegetation of the Cumberland Plain was mapped by the NSW National Parks and Wildlife Service (NPWS, 2002a) relying on aerial photography with some ground-truthing. The NPWS vegetation mapping is provided below in Figure 2.1. The mapping identifies the vegetation over most of the property as Map Unit 11 Alluvial Woodland with an area of Map Unit 10 Shale Plains Woodland at the rear and the boundary between the two running diagonally across the property.

During the site assessment it was found that there are elements of both communities throughout the property but generally the vegetation conforms to the NPWS vegetation mapping. This is indicated most clearly by *Eucalyptus crebra*, a canopy species of

Cumberland Plain Woodland, that is dominant in the southern part of the property and absent from the northern part.

Map Unit 11 forms part of the "*River-flat Eucalypt Forest on Coastal Floodplains of the North Coast, Sydney Basing and South-east Corner Bioregions*" Endangered Ecological Community (EEC) listed under the TSC Act. Map Unit 10 forms part of the "Cumberland Plain Woodland" Critically Endangered Ecological Community listed under both the TSC Act and EPBC Act.

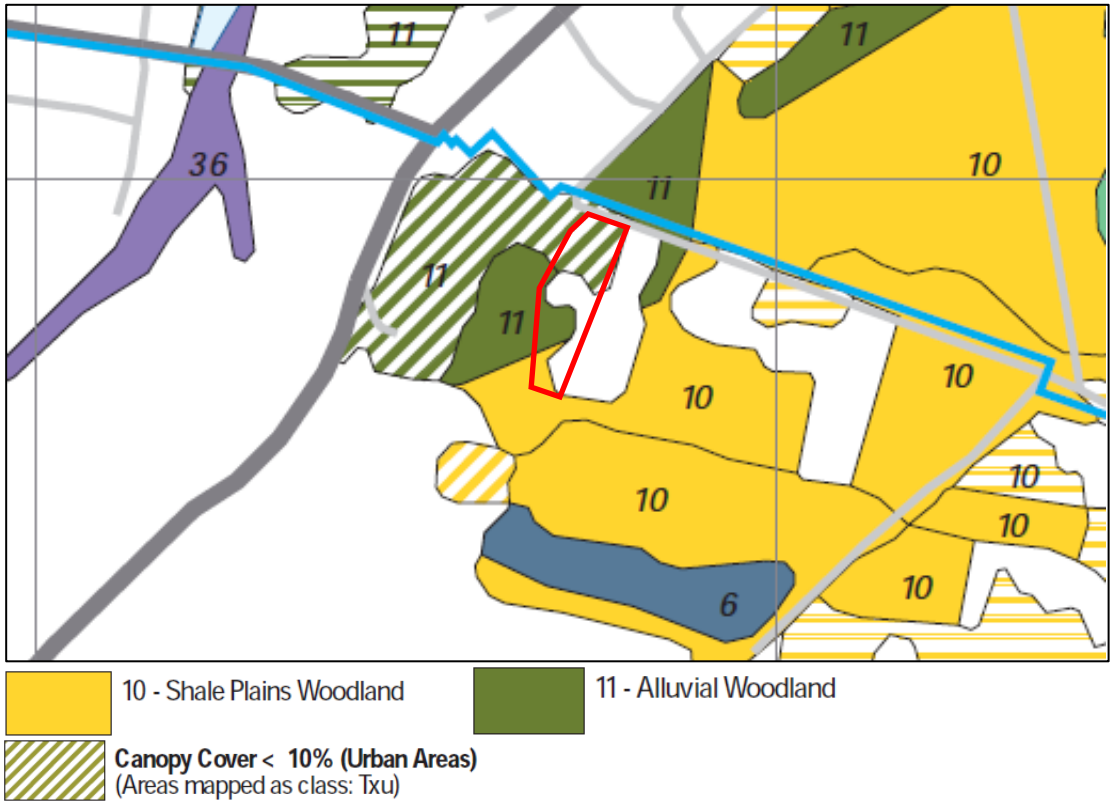


Figure 2.1: NPWS (2002a) vegetation mapping with property boundaries in red.

2.1.3 Threatened Species

A search of the NSW Office of Environment and Heritage (OEH) Atlas of NSW Wildlife database (on 5/03/2018) indicated that thirteen (13) species of flora listed under the TSC Act have been recorded within an approximately 5km radius of the property. Of these ten (10) species are also listed under the EPBC Act. The species are presented in Table 2.1 below. The table indicates whether potential habitat for the species exists on the site and whether it was observed during the site assessment.

Table 2.1: Species of flora listed under the TSC Act or EPBC Act recorded within approximately 5km of the project site.

Scientific Name	Common Name	Habitat	TSC Act/ EPBC Act Status *	Potential Habitat On-site	Observed On-site
Marsdenia viridiflora R. Br. Subsp. viridiflora population		Grows in vine thickets and open shale woodland.	E2/ -	No	No
Allocasuarina glareicola		Grows in Castlereagh woodland on lateritic soil. Found in open woodland with *Eucalyptus parramattensis, Eucalyptus fibrosa, Angophora bakeri, Eucalyptus sclerophylla* and *Melaleuca decora*. Common associated understorey species include *Melaleuca nodosa*, *Hakea dactyloides, Hakea sericea*, *Dillwynia tenuifolia, Micromyrtus minutiflora, Acacia elongata, Acacia brownei, Themeda australis* and *Xanthorrhoea minor*.	E/ E	No	No
Leucopogon exolasius	Woronora Beard-heath	The plant occurs in woodland on sandstone. Flowering occurs in August and September.	V/ V	No	No
Dillwynia tenuifolia		In western Sydney, may be locally abundant particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. May also be common in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland.	V/ -	No	No
Pultenaea parviflora		May be locally abundant, particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. May also be common in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland.	E/ V	No	No
Acacia bynoeana		Occurs in heath or dry sclerophyll forest on sandy soils. Seems to prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. Associated overstorey species include *Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksia* and *Narrow-leaved Apple*.	E/ V	No	No

Scientific Name	Common Name	Habitat	TSC Act/ EPBC Act Status *	Potential Habitat On-site	Observed On-site
Eucalyptus benthamii		Requires a combination of deep alluvial sands and a flooding regime that permits seedling establishment. Recruitment of juveniles appears to be most successful on bare silt deposits in rivers and streams. The recorded elevation range for the species is from 30m ASL at Bents Basin to 750m ASL in the Kedumba population. Most of the individuals are around 60 to 300m ASL. Occurs in open forest. Associated species at the Bents Basin site include *Eucalyptus elata, E. bauerina, E. amplifolia, E. deanei* and *Angophora subvelutina*. Understorey species include Bursaria spinosa, Pteridium esculentum and a wide variety of agricultural weeds. The Kedumba Valley site lists *E. crebra, E. deanei, E. punctata, Leptospermum flavescens, Acacia filicifolia* and *Pteridium esculentum* among its associated species.	V/ V	No	No
Micromyrtus minutiflora		Grows in Castlereagh Scribbly Gum Woodland, Ironbark Forest, Shale/Gravel Transition Forest, open forest on tertiary alluvium and consolidated river sediments.	E/ V	No	No
Syzygium paniculatum	Magenta Lilly Pilly	On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.	E/ V	No	No
Grevillea juniperina ssp. *juniperina*		Grows on reddish clay to sandy soils derived from Wianamatta Shale and Tertiary alluvium (often with shale influence), typically containing lateritic gravels. Recorded from Cumberland Plain Woodland, Castlereagh Ironbark Woodland, Castlereagh Scribbly Gum Woodland and Shale/Gravel Transition Forest.	V/ -	Yes	No
Persoonia hirsuta	Hairy Geebung	The Hairy Geebung is found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone. It is usually present as isolated individuals or very small populations. It is probably killed by fire (as other Persoonia species are) but will regenerate from seed.	E/ E	No	No

Scientific Name	Common Name	Habitat	TSC Act/ EPBC Act Status *	Potential Habitat On-site	Observed On-site
Persoonia nutans	Nodding Geebung	Northern populations are confined to aeolian and alluvial sediments and occur in a range of sclerophyll forest and woodland vegetation communities, with the majority of individuals occurring within Agnes Banks Woodland or Castlereagh Scribbly Gum Woodland and some in Cooks River / Castlereagh Ironbark Forests. Southern populations also occupy tertiary alluvium, but extend onto shale sandstone transition communities and into Cooks River / Castlereagh Ironbark Forest.	E/ E	No	No
Pimelea spicata	Spiked Rice-flower	In both the Cumberland Plain and Illawarra environments this species is found on well-structured clay soils. On the Cumberland Plain sites it is associated with Grey Box communities (particularly Cumberland Plain Woodland variants and Moist Shale Woodland) and in areas of ironbark. The co-occurring species in the Cumberland Plain sites are grey box (*Eucalyptus moluccana*), Forest Red Gum (*E. tereticornis*) and Narrow-leaved Ironbark (*E. crebra*). Blackthorn (*Bursaria spinosa*) is often present at sites (and may be important in protection from grazing) and Kangaroo Grass (*Themeda australis*) is usually present in the groundcover (also indicative of a less intense grazing history).	E/ E	Yes	No

* E = Endangered, E2 = Endangered Population, V = Vulnerable.

2.2 Fauna

2.2.1 Description of Fauna Habitat on the Property

The property provides only limited habitat for fauna as it was previously cleared and now has only a relatively young regrowth tree cover over some areas with other parts remaining cleared, comprising only a relatively sparse groundcover layer of mostly grasses and herbs. There is no shrub layer and no tree hollows are present.

The property provides habitat mainly for birds, invertebrates, insectivorous bats and small lizards. Birds observed during the site assessment comprised mostly Noisy Miners (*Manorina melanocephala*) and Eastern Rosellas (*Platycercus eximius*) with some Grey Butcherbirds (*Cracticus torquatus*), Common Mynas (*Acridotheres tristis*) and Australian Magpies (*Cracticus tibicen*). Several species of insects were observed and despite some searching around the base of Eucalypts no snails were found. No other fauna was observed on site. The complete list of species observed on the property is provided in Appendix D.

2.2.2 Threatened Species

A search of the OEH BioNet Atlas of NSW Wildlife database (on 5/03/2018) indicated that forty-three (43) species of fauna listed under the TSC Act have been recorded within an approximately 5km radius of the property. Of these ten (10) species are also listed under the EPBC Act. The species are presented in Table 2.1 below. The table indicates whether potential habitat for the species exists on the site and whether it was observed during the site assessment.

Table 2.2: Species of fauna listed under the TSC Act or EPBC Act recorded within approximately 5km of the project site.

Scientific Name	Common Name	Habitat	TSC Act/ EPBC Act Status *	Potential Habitat On-site	Observed On-site
Amphibia					
Heleioporus australiacus	Giant Burrowing Frog	Home range approx. 0.04ha in size (i.e. 20mx20m). Heath, woodland and dry sclerophyll forest in range of soil types except clay based. Burrows in soil or leaf litter within 300m of breeding habitat that is soaks or pools within 1st or 2nd order streams.	V/ V	No	No
Litoria aurea	Green and Golden Bell Frog	Inhabits marshes, dams and streamsides, particularly those containing bullrushes (*Typha* sp.) or spikerushes (*Eleocharis* sp.). Optimum habitat includes waterbodies that are unshaded, free of predatory fish, have a grassy area nearby and diurnal sheltering sites available.	E/ V	No	No
Aves					
Ephippiorhynchus asiaticus	Black-necked Stork	Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries. Storks usually forage in water 5-30cm deep for vertebrate and invertebrate prey. Eels regularly contribute the greatest biomass to their diet, but they feed on a wide variety of animals, including other fish, frogs and invertebrates (such as beetles, grasshoppers, crickets and crayfish). Black-necked Storks build large nests high in tall trees close to water. Trees usually provide clear observation of the surroundings and are at low elevation (reflecting the floodplain habitat). The NSW breeding population has been estimated at about 75 pairs. Territories are large and variable in size. They have been estimated to average about 9,000ha, ranging from 3,000-6,000ha in high quality habitat and 10,000-15,000ha in areas where habitat is poor or dispersed.	E/ -	No	No
Botaurus poiciloptilus	Australasian Bittern	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleocharis spp.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains.	E/ E	No	No
Circus assimilis	Spotted Harrier	Occurs in grassy open woodland including Acacia and Mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months. Preys on terrestrial mammals (e.g. bandicoots, bettongs, and rodents), birds and reptile, occasionally insects and rarely carrion.	V/ -	No	No

Scientific Name	Common Name	Habitat	TSC Act/ EPBC Act Status *	Potential Habitat On-site	Observed On-site
Haliaeetus leucogaster	White-bellied Sea Eagle	White-bellied Sea-Eagles are normally seen perched high in a tree, or soaring over waterways and adjacent land. Birds form permanent pairs that inhabit territories throughout the year. They feed mainly on aquatic animals, such as fish, turtles and sea snakes, but they takes birds and mammals as well. They are skilled hunters, and will attack prey up to the size of a swan. Sea-Eagles also feed on carrion (dead prey) such as sheep and fish along the waterline. They harass smaller birds, forcing them to drop any food that they are carrying. White-bellied Sea-Eagles build a large stick nest, which is used for many seasons in succession. The nest can be located in a tree up to 30m above the ground, but may also be placed on the ground or on rocks, where there are no suitable trees. (source: www.birdsinbackyards.net).	V/ -	No	No
Hieraaetus morphnoides	Little Eagle	Occupies open eucalypt forest, woodland or open woodland. She-oak 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. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion. Single population in NSW.	V/ -	No	No
Lophoictinia isura	Square-tailed Kite	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. Appears to occupy large hunting ranges of more than 100km^2. Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs.	V/ -	No	No
Falco subniger	Black Falcon	The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. Some reports of 'Black Falcons' on the tablelands and coast of New South Wales are likely to be referable to the Brown Falcon. In New South Wales there is assumed to be a single population that is continuous with a broader continental population, given that falcons are highly mobile, commonly travelling hundreds of kilometres (Marchant & Higgins 1993). The Black Falcon occurs as solitary individuals, in pairs, or in family groups of parents and offspring.	V/ -	No	No
Irediparra gallinacea	Comb-crested Jacana	Inhabit permanent freshwater wetlands, either still or slow-flowing, with a good surface cover of floating vegetation, especially water-lilies, or fringing and aquatic vegetation. Forage on floating vegetation, walking with a characteristic bob and flick. They feed primarily on insects and other invertebrates, as well as some seeds and other vegetation.	V/ -	No	No
Onychoprion fuscata	Sooty Tern	Large flocks can be seen soaring, skimming and dipping but seldom plunging in off shore waters. Breeds in large colonies in sand or coral scrapes on offshore islands and cays including Lord Howe and Norfolk Islands. Occasionally seen along coastal NSW, especially after cyclones.	V/ -	No	No

Scientific Name	Common Name	Habitat	TSC Act/ EPBC Act Status *	Potential Habitat On-site	Observed On-site
Callocephalon fimbriatum	Gang-gang Cockatoo	In summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas. Nests in tree hollows, often near water. Eucalypt trees and acacia shrubs are used for foraging. Feeds on seeds mostly from eucalypts and wattles, though it eats some seeds of introduced trees and shrubs around human settlements in winter, and also insect larvae (galls, sawflies).	V/ -	Yes, foraging habitat	No
Calyptorhynchus lathami	Glossy Black-Cockatoo	Inhabits 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 foods. Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.	V/ -	No	No
Glossopsitta pusilla	Little Lorikeet	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. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like Allocasuarina.	V/ -	No	No
Lathamus discolor	Swift Parrot	Migrates to the Australian south-east mainland between March and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany (*Eucalyptus robusta*), Spotted Gum (*Corymbia maculata*), Red Bloodwood (*C. gummifera*), Mugga Ironbark (*E. sideroxylon*), and White Box (*E. albens*). Commonly used lerp infested trees include Inland Grey Box (*E. microcarpa*), Grey Box (*E. moluccana*) and Blackbutt (*E. pilularis*). Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum (*Eucalyptus globulus*).	E/ CE	Yes, foraging habitat	No

Scientific Name	Common Name	Habitat	TSC Act/ EPBC Act Status *	Potential Habitat On-site	Observed On-site
Neophema pulchella	Turquoise Parrot	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Usually seen in pairs or small, possibly family, groups and have also been reported in flocks of up to thirty individuals. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter. Forages quietly and may be quite tolerant of disturbance. However, if flushed it will fly to a nearby tree and then return to the ground to browse as soon as the danger has passed. Nests in tree hollows, logs or posts, from August to December.	V/ -	Yes, foraging habitat	No
Polytelis swainsonii	Superb Parrot	Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. In the Riverina the birds 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.	V/ V	No	No
Ninox connivens	Barking Owl	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. Preferentially hunts small arboreal mammals such as Squirrel Gliders and Ringtail Possums, but when loss of tree hollows decreases these prey populations the owl becomes more reliant on birds, invertebrates and terrestrial mammals such as rodents and rabbits. Can catch bats and moths on the wing, but typically hunts by sallying from a tall perch. Requires very large permanent territories in most habitats due to sparse prey densities. Monogamous pairs hunt over as much as 6000 hectares, with 2000 hectares being more typical in NSW habitats.	V/ -	Yes, foraging habitat	No

Scientific Name	Common Name	Habitat	TSC Act/ EPBC Act Status *	Potential Habitat On-site	Observed On-site
Ninox strenua	Powerful Owl	Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine (*Syncarpia glomulifera*), Black She-oak (*Allocasuarina littoralis*), Blackwood (*Acacia melanoxylon*), Rough-barked Apple (*Angophora floribunda*), Cherry Ballart (*Exocarpus cupressiformis*) and a number of eucalypt species. The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider. Flying foxes are important prey in some areas; birds comprise about 10-50% of the diet depending on the availability of preferred mammals. As most prey species require hollows and a shrub layer, these are important habitat components for the owl. In good habitats a mere 400 ha can support a pair; where hollow trees and prey have been depleted the owls need up to 4000 ha. Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. While the female and young are in the nest hollow the male Powerful Owl roosts nearby (10-200 m) guarding them, often choosing a dense "grove" of trees that provide concealment from other birds that harass him.	V/ -	No	No
Tyto noveahollandiae	Masked Owl	Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Pairs have a large home-range of 500 to 1000 hectares. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	V/ -	No	No
Chthonicola sagittata	Speckled Warbler	The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area.	V/ -	No	No

Scientific Name	Common Name	Habitat	TSC Act/ EPBC Act Status *	Potential Habitat On-site	Observed On-site
Anthochaera phrygia	Regent Honeyeater	The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. Birds are occasionally seen on the south coast. The Regent Honeyeater is a generalist forager, which mainly feeds on the nectar from a wide range of eucalypts and mistletoes. Nectar and fruit from mistletoes are also eaten during the breeding season. When nectar is scarce lerp and honeydew comprise a large proportion of the diet. Insects make up about 15% of the total diet and are important components of the diet of nestlings. A shrubby understorey is an important source of insects and nesting material. The species can undertake large-scale nomadic movements in the order of hundreds of kilometres. However, the exact nature of these movements is still poorly understood. It is likely that movements are dependent on spatial and temporal flowering and other resource patterns.	E4A/ CE	No	No
Epthianura albifrons	White-fronted Chat	Gregarious species, usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. They are insectivorous, feeding mainly on flies and beetles caught from or close to the ground.	V/ -	No	No
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts. Also inhabits open forests of smooth-barked gums, Stringybarks, Ironbarks, river She-oaks (nesting habitat) and tea-trees. Feeding territories are large making the species locally nomadic. Recent studies have found that the Black-chinned Honeyeater tends to occur in the largest woodland patches in the landscape as birds forage over large home ranges of at least 5 hectares.	V/ -	No	No
Daphoenositta chrysoptera	Varied Sittella	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, Mallee and *Acacia* woodland. Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.	V/ -	No	No

Scientific Name	Common Name	Habitat	TSC Act/ EPBC Act Status *	Potential Habitat On-site	Observed On-site
Artamus cyanopterus cyanopterus	Dusky Woodswallow	The Dusky Woodswallow is found in open forests and woodlands, and may be seen along roadsides and on golf courses. The Dusky Woodswallow feeds on insects taken on the wing, as well as from foliage and on the ground. It also eats nectar from flowers. The Dusky Woodswallow 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. Each pair builds the nest, incubates the eggs and feeds the young.	V/ -	No	No
Petroica boodang	Scarlet Robin	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. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees.	V/ -	No	No
Petroica phoenicea	Flame Robin	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following regeneration. In winter lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees. In winter, occasionally seen in heathland or other shrublands in coastal areas.	V/ -	No	No
Petroica rodinogaster	Pink Robin	Inhabits rainforest and tall, open eucalypt forest, particularly in densely vegetated gullies. Catches prey by the perch-and-pounce method, foraging more on the ground than the more flycatcher-like Rose Robin. Insects and spiders are the main dietary items. The nest is a deep, spherical cup made of green moss bound with cobweb and adorned with camouflaging lichen, and is lined with fur and plant down. It is situated in an upright or oblique fork, from 30cm to 6m above the ground, in deep undergrowth. The most common call most closely resembles a snapping twig.	V/ -	No	No

Mammalia					
Dasyurus maculatus	Spotted-tailed Quoll	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Mostly nocturnal, although will hunt during the day; spends most of the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds. A generalist predator with a preference for medium-sized (500g-5kg) mammals. Consumes a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits, reptiles and insects. Also eats carrion and takes domestic fowl. Females occupy home ranges up to about 750 hectares and males up to 3500 hectares. Are known to traverse their home ranges along densely vegetated creeklines.	V/ E	No	No
Phascolarctos cinereus	Koala	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Home range size varies according to quality of habitat, ranging from less than two hectares to several hundred hectares. Around Sydney, red gums and mahoganies are their most favoured trees. In northern areas of the State, Tallowwood and forest red gum are important, manna gum tops the bill in the south, and in the west koalas prefer river red gum and ribbon gum.	V/ V	No	No
Petaurus australis	Yellow-bellied Glider	Occur in tall, mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein. Extract sap by incising (or biting into) the trunks and branches of favoured food trees, often leaving a distinctive 'V'-shaped scar. Live in small family groups of two - six individuals and are nocturnal. Den, often in family groups, in hollows of large trees. Very mobile and occupy large home ranges between 20ha to 85ha to encompass dispersed and seasonally variable food resources.	V/ -	No	No
Petaurus norfolcensis	Squirrel Glider	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey. Require abundant tree hollows for refuge and nest sites. Diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.	V/ -	No	No
Pteropus poliocephalus	Grey-headed Flying-fox	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. Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines.	V/ V	Yes, foraging habitat	No

Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.	V/ -	Yes, foraging habitat	No
Mormopterus norfolkensis	Eastern Freetail-bat	Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures. Usually solitary but also recorded roosting communally, probably insectivorous.	V/ -	Yes, foraging habitat	Yes
Chalinolobus dwyeri	Large-eared Pied Bat	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies. The relatively short, broad wing combined with the low weight per unit area of wing indicates manoeuvrable flight. This species probably forages for small, flying insects below the forest canopy. Likely to hibernate through the coolest months.	V/ V	Yes, foraging habitat	No
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. Hunts beetles, moths, weevils and other flying insects above or just below the tree canopy. Hibernates in winter.	V/ -	Yes, foraging habitat	No
Miniopterus australis	Little Bentwing-bat	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. They often share roosting sites with the Common Bentwing-bat and, in winter, the two species may form mixed clusters. In NSW the largest maternity colony is in close association with a large maternity colony of Eastern Bentwing-bats (Miniopterus schreibersii) and appears to depend on the large colony to provide the high temperatures needed to rear its young. Maternity colonies form in spring and birthing occurs in early summer. Males and juveniles disperse in summer. Only five nursery sites /maternity colonies are known in Australia.	V/ -	No	No
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. At other times of the year, populations disperse within about 300km range of maternity caves. Hunt in forested areas, catching moths and other flying insects above the tree tops.	V/ -	Yes, foraging habitat	Yes

Myotis macropus	Southern Myotis	Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, stormwater channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface.	V/ -	No	Yes
Scoteanax rueppellii	Greater Broad-nosed Bat	Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species.	V/ -	No	No
Gastropoda					
Meridolum corneovirens	Cumberland Plain Land Snail	Primarily inhabits Cumberland Plain Woodland. It is also known from Shale Gravel Transition Forests, Castlereagh Swamp Woodlands and the margins of River-flat Eucalypt Forest. Lives under litter of bark, leaves and logs, or shelters in loose soil around grass clumps. Occasionally shelters under rubbish. Can dig several centimetres into soil to escape drought. Is a fungus specialist. Unlike the Garden Snail, does not eat green plants. It is generally active at night. (Note: the habitat on the property is not considered suitable as the topography is flat and the land is subject to frequent and extensive water inundation, as was the case during the time of the site assessment).	E/ -	Yes	No

* V = Vulnerable, E = Endangered, CE = Critically Endangered (EPBC Act), E4A = Critically Endangered (TSC Act).

3 IMPACT ASSESSMENT

3.1 Flora

The development proposal would involve subdividing the property into two lots, constructing a fence along the boundary separating the lots, providing a right of carriage way over the existing gravel road, clearing the building envelope, thinning trees from within the APZ and disposing of waste water over the WWDA. This would result in the removal of approximately ten (10) Eucalyptus trees from within the building envelope and another approximately ten (10) Eucalyptus trees from within the surrounding APZ (extending 20m out from the building envelope) (refer Figure 1.4). All of the trees from within the building envelope and most of the trees from within the APZ are young with a dbh < 40cm. The APZ would encroach upon the row of larger trees along the eastern boundary. It is recommended that, when selecting which trees to thin along the eastern boundary, only the smaller trees are selected for removal and the larger trees retained. None of the trees to be removed are old or contain tree hollows. Beneath the trees are various common native groundcover species and weeds. No threatened or otherwise significant species would be impacted. However, the vegetation is part of the *River-flat Eucalypt Forest on Coastal Floodplains* EEC. A Section 5A Assessment of Significance (7-part test) confirms that there would be no significant impact on this EEC. The 7-part test is provided in Appendix E. Photographs of the areas where trees would be removed are provided in Appendix C.

The proposal to irrigate within the WWDA with treated effluent would have little impact on flora. It would increase nutrient concentrations in the soil within that area. Plants in general benefit from nutrient enrichment. However, it may also create an environment more conducive to weeds. Therefore, it is recommended that the area at and around the wastewater disposal area be regularly monitored for weeds, and that any weeds there be controlled.

There would be no significant impact on flora from the proposal.

3.2 Fauna

The proposal would remove approximately twenty (20) Eucalyptus trees. The trees are all relatively young (mostly around 20cm to 40cm dbh). None of the trees have tree hollows, there is no understorey shrub layer and the groundcover vegetation is sparse. The removal of these trees would have only a minor impact on native fauna as there are vast areas of similar habitat both locally and more broadly throughout the region. The main species impacted would be birds commonly found in urban to semi-urban environments, invertebrates and possibly some insectivorous bats that would be impacted by a minor reduction in area of habitat.

The trees could potentially provide marginal habitat for up to eleven (11) threatened species of fauna that have been recorded in the general area. The species are: Gang-gang Cockatoo (*Callocephalon fimbriatum*), Swift Parrot (*Lathamus discolor*), Turquoise Parrot (*Neophema pulchella*), Barking Owl (*Ninox connivens*), Grey-headed Flying-fox (*Pteropus poliocephalus*), Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*), Eastern Freetail-bat (*Mormopterus norfolkensis*), Large-eared Pied Bat

(*Chalinolobus dwyeri*), Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*), and Cumberland Plain Land Snail (*Meridolum corneovirens*). A 7-part test confirms there would be no significant impact to these species. The 7-part test is provided in Appendix E.

There would be no significant impact on fauna from the proposal.

4 CONCLUSION AND RECOMMENDATIONS

The proposal to subdivide the property into two lots, construct a fence along the boundary separating the lots, provide a right of carriage way over the existing gravel road, clear the building envelope, thin trees from within the APZ and dispose of waste water over the WWDA would not have a significant impact on flora or fauna.

The proposal would remove approximately twenty (20) Eucalyptus trees. However, the trees are all relatively young. None contain tree hollows, there is no shrub layer and the groundcover vegetation is sparse comprising many introduced species. No threatened or otherwise significant species of flora would be impacted.

The vegetation to be cleared is part of the *River-flat Eucalypt Forest on Coastal Floodplains* EEC. However, the community is in poor condition having been completely cleared and now comprising regrowth trees with no shrub layer and only a sparse groundcover. A Section 5A Assessment of Significance (7-part test) confirms that there would be no significant impact on this EEC from the proposal. The 7-part test is provided in Appendix E.

The vegetation could potentially provide marginal habitat for up to eleven (11) threatened species of fauna that have been recorded in the general area. However, only a small area would be impacted and there are relatively vast areas of similar and better quality habitat throughout the locality. A 7-part test confirms there would be no significant impact to these species. The 7-part test is provided in Appendix E.

While there would be no significant impact from the proposal there would be a minor impact from the clearing of trees. Also the proposal may encourage the growth of weeds on the property. The following recommendations are made to address these impacts.

Recommendation:

1) Fifteen (15) trees of Cabbage Gum (*Eucalyptus amplifolia*) should be planted on Lot 1 outside the APZ.
2) Fifteen (15) trees selected from the following list of locally occurring trees species that are characteristic of the *River-flat Eucalypt Forest on Coastal Floodplains* EEC should be planted on Lot 1 to increase tree species diversity on the property.

Angophora floribunda	Rough-barked Apple
Angophora subvelutina	Broad-leaved Apple
Melaleuca decora	
Melaleuca linariifolia	Flax-leaved Paperbark
Eucalyptus baueriana	Blue Box

3) The WWDA should be regularly monitored for weeds and any weeds found there controlled to prevent them spreading into the surrounding native vegetation.

5 REFERENCES

Bushfire Management Consultants, 2018a. *Bushfire Attack Level (BAL) Assessment Lot B DP 38869 No.60 Bonner Road, AGNES BANKS NSW 2753*. 20th February 2018.

Bushfire Management Consultants, 2018b. *Lot B DP 38869 No.60 Bonner Road, AGNES BANKS NSW 2753*. 31st August 2018.

DECC, 2007. *Threatened Species Assessment Guidelines - The Assessment of Significance*. NSW Department of Environment and Climate Change.

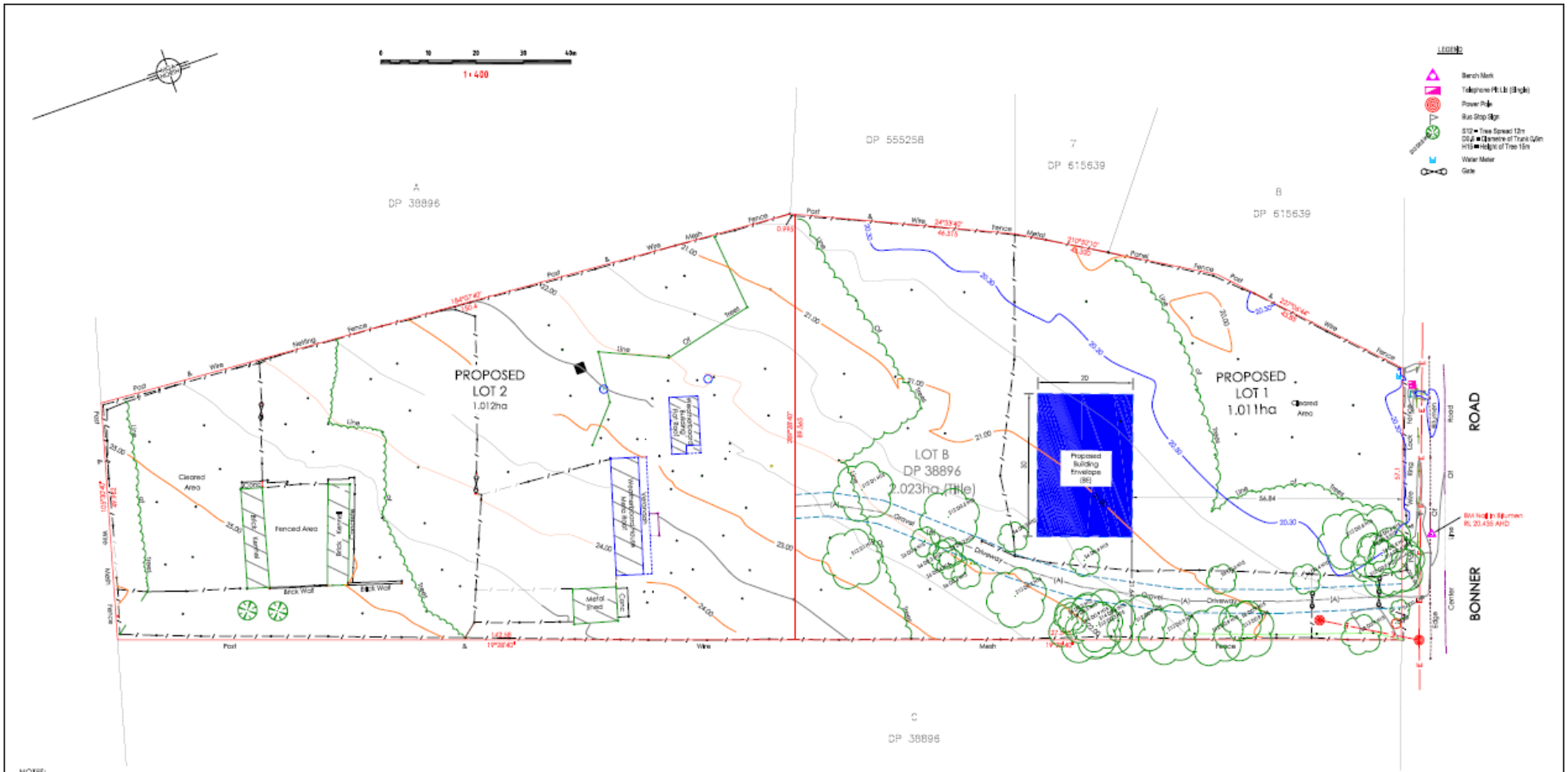
Envirotech, 2018. *On-site Waste Water Management Report for 60-64 Bonner Rd, Agnes Banks*. 8th August 2018.

NPWS, 2002a. *Native Vegetation of the Cumberland Plain: Map 11 of 16 Penrith LGA (Northern Section)*. NSW National Parks and Wildlife Service, Hurstville.

NPWS, 2002b. *Interpretation Guidelines for the Native Vegetation of the Cumberland Plain, Western Sydney*. NSW National Parks and Wildlife Service, Hurstville.

Appendices

APPENDIX A – PLAN DRAWING OF DEVELOPMENT PROPOSAL



NOTES:

- THE POSITION OF FEATURES ARE INDICATIVE ONLY.
- SERVICES SHOWN HEREON HAVE BEEN LOCATED WHERE POSSIBLE BY FIELD SURVEY. PRIOR TO ANY EXCAVATION OR CONSTRUCTION ON THE SITE, THE RELEVANT AUTHORITY SHOULD BE CONTACTED FOR POSSIBLE LOCATION OF ANY OTHER SERVICES INCLUDING THOSE WHICH MAY BE UNDERGROUND.
- INDICATES EXISTING SURFACE LEVEL.
- CONTOURS SHOWN DEPICT THE GENERAL TOPOGRAPHY. THEY DO NOT REPRESENT EXACT LEVELS OTHER THAN AT SPOT LEVELS SHOWN.
- RELATIONSHIP OF IMPROVEMENTS TO BOUNDARIES IS DIAGRAMMATIC ONLY. WHERE OFFSETS ARE CRITICAL THEY SHOULD BE CONFIRMED BY FURTHER SURVEY.
- BEARINGS AND DISTANCES ARE BY TITLE ONLY. NO BOUNDARY INVESTIGATION HAS BEEN CARRIED OUT.
- THE TREE SIZES ARE APPROXIMATE ONLY. FURTHER FIELD INSPECTION SHOULD BE CARRIED OUT WHERE TREE DETAILS ARE CONSIDERED TO CRITICALLY AFFECT DESIGN.
  THE TREE SIZES ARE SHOWN AS:- TRUNK DIAMETER/CANOPY SPREAD/HEIGHT
- ORIGIN OF LEVELS: PM 74705 (SCIMS 18-07-2017)

(A) PROPOSED RIGHT OF CARRIAGE WAY OVER APPROXIMATE POSITION OF EXISTING TRACK IN USE 5 WIDE.

NOTE:
APPROXIMATE POSITION OF CENTRELINE OF TRACK AS RECORDED IN FIELD NOTES.

NOTE:
THESE PLANS SHOULD BE READ IN CONJUNCTION WITH DIGITAL DATA ISSUED TO CLIENT. THE DIGITAL DATA CONTAINS NUMEROUS LAYERS OF INFORMATION WHICH ARE NOT SHOWN ON THESE PLANS FOR THE SAKE OF CLARITY.

DIAL BEFORE YOU DIG

Client: SUSAN KING	Project: PLAN OF DETAIL SURVEY OVER LOT B IN DP 38896 No.60 BONNER ROAD, AGNES BANKS	FREEBURN SURVEYING	MATTHEW FREEBURN LAND, ENGINEERING & MINING SURVEYOR SUITE 2, FIRST FLOOR, "SURVEYOR HOUSE" 2 CASTLEREAGH STREET PENRITH 2750	Telephone 02 4721 2289 Fax 02 4721 5646 email a.dean@freeburnsurveyors.com or matthew@freeburnsurveyors.com	Scale 1:400 / Datum: AHD / Contour: 0.5m	
					Surveyor: CR / Drawn By: LJMc / Checked: MF	
					Date of Survey: 04/08/2017	Sheet 1 of 1
					AUTOCAD / REVISION 04 30/08/18	36 031 PPD SUB

A1 SHEET

APPENDIX B – PLAN SHOWING WASTE WATER DISPOSAL AREA

envirotech
Environmental and Engineering Consultancy Services

Wastewater | Contamination | Geotechnical
Stormwater | Ecology | Occupational Hygiene
Bushfire | Acoustic & Noise

LEGEND: Site Boundary, Other Fences, Landform Element, Watercourses, Dams, Overland Flow Path, Surface Spray Sprinkler, Irrigation Pipework, Soil Borehole, Photo Location, Building Area, Land App. Area, Paved Area

A: Unit 1, 23 Rowood Road, Prospect NSW 2148
P: PO Box 3086, EAST BLAXLAND NSW 2774
E: info@envirotech.com.au
F: (02) 8834 0760
T: 1300 888 324 | (02) 4739 9232

TITLE: LOT 1: AWTS+SURFACE IRRIGATION, LOT 2: SEPTIC+BEDS		SHEET SIZE: A4	SCALE: 1:800 @ A4
CLIENT: HARDY	PROJECT: 60-64 BONNER ROAD, AGNES BANKS, NSW (PENRITH LGA)	SHEET: 1/1	DATE: 27/08/18
		PROJECT REF / DRAWING NUMBER:	DWG-6508-18-A2

APPENDIX C – PHOTOGRAPHS

Photo 1: The approximate location of the proposed BE, looking from the western boundary towards the gravel driveway and eastern boundary.

Photo 2: The approximate location of the proposed BE as seen from near the gravel driveway.

Photo 3: Looking down the driveway towards Bonner Rd. The proposed BE is on the left.

Photo 4: The proposed BE seen from the driveway.

Photo 5: The rear part of proposed Lot 1. The approximately boundary between the two lots is marked and part of the BE is on the right. The WWDA is in the middle (blue).

Photo 6: Approximate APZ around proposed building envelope on Lot 1 along eastern boundary.

Photo 7: Approximate APZ around proposed building envelope on Lot 1.

Photo 8: Looking towards the rear of the proposed Lot 1 with the WWDA marked in the foreground (blue).

Photo 9: Approximate location of boundary separating proposed Lots 1 and 2. The approximately location of the WWDA is illustrated (blue).

APPENDIX C – SPECIES LISTS

FLORA

Trees

Eucalyptus amplifolia ssp. *amplifolia*	Cabbage Gum
Eucalyptus crebra	Narrow-leaved Ironbark
Eucalyptus moluccana	Grey Box
Melaleuca decora	
Melia azedarach	White Cedar
Olea europaea ssp. *cuspidata**	African Olive
*Pinus radiata**	Monterey Pine
*Solanum mauritianum**	Wild Tobacco Tree

Groundcovers and Climbers

*Alternanthera pungens**	Khaki Weed
*Araujia sericifera**	Moth Vine
*Asparagus aethiopicus**	Ground Asparagus
*Asparagus asparagoides**	Common Bridal Creeper
*Bromus catharticus**	Prairie Grass
Brunoniella australis	Blue Trumpet
Commelina cyanea	Scurvy Weed
*Conyza bonariensis**	Fleabane
Cynodon dactylon	Couch
Cyperus gracilis	Slender Flat-sedge
Dichondra repens	Kidney Weed
Einadia hastata	
*Ehrharta erecta**	Panic Veldt Grass
*Eleusine indica**	Crowsfoot Grass
Eragrostis parviflora	Weeping Lovegrass
Eragrostis leptostachya	Paddock Lovegrass
Glycine microphylla	Love Creeper
Microlaena stipoides	Weeping Grass
Murdannia graminea	Grass Lily
Oxalis perennans	
*Paspalum dilatatum**	Paspalum
*Setaria parviflora**	Slender Pigeon Grass
*Sida rhombifolia**	Paddy's Lucerne
*Solanum capsicoides**	Devil's Apple
Sporobolus creber	Slender Rat's Tail Grass
*Taraxacum officinale**	Dandelion
Wahlenbergia communis	Tufted Bluebell
Wahlenbergia gracilis	Native Bluebell

** = Introduced species*

FAUNA

Birds

*Acridotheres tristis**	Common Myna
Cracticus tibicen	Australian Magpie
Cracticus torquatus	Grey Butcherbird
Grallina cyanoleuca	Magpie Lark
Manorina melanocephala	Noisy Miner
Platycercus eximius	Eastern Rosella
Trichoglossus haematodus	Rainbow Lorikeet

Insects

Camponotus nigroaneus	Golden-tailed Sugar Ant
Myrmecia pilosula	Jack Jumper Ant
Poecilometis patruelis	Common Gum Tree Shield Bug
Order *Polydesmida*	Polydesmid Millipede
Tetragonula carbonaria	Native Stingless Bee

** = Introduced species*

APPENDIX D – ASSESSMENTS OF SIGNIFICANCE (7-PART TESTS)

7-Part Test for "River-flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South-east Corner Bioregions"

(a) in the case of a threatened species, whether the action proposed 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,

N/A.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

N/A.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(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

A small area (600m^2) of forest would be cleared and a small area thinned of trees (3,600m^2) for the proposal. In total this equals 0.42ha. There are substantial areas of the EEC locally including a relatively large patch approximately 10ha in size within bushland on the opposite side of Bonner Rd. The small area to be removed would not place at risk of extinction the local occurrence of this community.

(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 would completely remove a small area and alter a slightly larger area of the community. However, as discussed above, as there are substantial areas of the community locally this would not place at risk of extinction the local occurrence of this community.

(d) in relation to the habitat of a threatened species, population or ecological community:

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

The proposal would remove a small area and alter a slightly larger area, totalling 0.42ha.

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

The trees on the property are part of a scattering of trees on the property and adjoining properties that provide some connectivity between remnants of the community in the local area. The proposal would remove a small area of the forest and thin a slightly larger area and thus would slightly reduce the amount of connectivity in the area.

However, it would not completely sever connectivity and thus would not result in any areas becoming fragmented or isolated from other areas. It should also be noted that it is proposed to replant trees on the property to compensate for the proposed tree clearing.

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

The area of habitat is small and in poor condition, being relatively young regrowth with no shrub layer and a sparse groundcover layer of vegetation. The area of habitat would not be important for the long-term survival of the community in the locality as there are substantial areas of similar and better quality habitat locally, including approximately 10ha in good condition in the bushland on the opposite side of Bonner Rd.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared for this community.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

No recovery plan or threat abatement plan has been developed for this ecological community. However, the proposal would not be consistent with any such recovery plan or threat abatement plan as the removal of habitat represents an adverse impact on the community. The recommendation to replant trees to compensate for the proposed tree clearing would be consistent with such a recovery plan or threat abatement plan as it minimises adverse impacts on the community from the proposal.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The proposed works would involve the clearing of native vegetation that is identified as a key threatening process.

Conclusion

The small area of River-flat Eucalypt Forest to be removed and thinned as part of the proposal would not result in a significant impact on this Endangered Ecological Community.

7-Part Test for the Gang-gang Cockatoo (*Callocephalon fimbriatum*), Swift Parrot (*Lathamus discolor*), Turquoise Parrot (*Neophema pulchella*), Barking Owl (*Ninox connivens*), Grey-headed Flying-fox (*Pteropus poliocephalus*), Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*), Eastern Freetail-bat (*Mormopterus norfolkensis*), Large-eared Pied Bat (*Chalinolobus dwyeri*), Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*), and Cumberland Plain Land Snail (*Meridolum corneovirens*).

(a) in the case of a threatened species, whether the action proposed 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,

The area of habitat to be removed and thinned is small. There are relatively vast areas of similar and better quality habitat throughout the local area. This includes vast areas of partially cleared land with scattered trees and also relatively vast areas of forest in good condition, including approximately 400ha on the opposite side of Bonner Rd. The proposal to remove and thin a small area of habitat would not have an adverse effect on the life cycle of these species, such that viable local populations would be placed at risk of extinction.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

N/A.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(ii) 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

N/A.

(iii) 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,

N/A.

(d) in relation to the habitat of a threatened species, population or ecological community:

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

Only a small area of habitat for these species would be removed and modified.

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

Habitat for these species would not become fragmented or isolated as a result of the proposal.

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

The habitat to be removed and thinned is marginal quality only and would not be important for the long-term survival of these species in the locality as there are relatively large areas of similar and better quality habitat in the local area.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared for these species.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

The proposal would not be consistent with any recovery plan or threat abatement plan for these species as the proposal removes habitat and this represents an adverse impact, albeit minor.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The proposed works would involve the clearing of native vegetation that is identified as a key threatening process.

Conclusion

The proposed works would not have a significant impact on the Gang-gang Cockatoo (*Callocephalon fimbriatum*), Swift Parrot (*Lathamus discolor*), Turquoise Parrot (*Neophema pulchella*), Barking Owl (*Ninox connivens*), Grey-headed Flying-fox (*Pteropus poliocephalus*), Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*), Eastern Freetail-bat (*Mormopterus norfolkensis*), Large-eared Pied Bat (*Chalinolobus dwyeri*), Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*), and Cumberland Plain Land Snail (*Meridolum corneovirens*).