Flora & Fauna Impact Assessment

Lot 12, 44A Mayfair Rd, Mulgoa

8 January 2020

SIA ECOLOGICAL & ENVIRONMENTAL PLANNING
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Signed: Date: 8th January 2020

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1 INTRODUCTION

1.1 LOCATION AND SETTING

The property is situated at 44A Mayfair Rd, Mulgoa (Lot 12 DP610186) in the Penrith Local Government Area. The highest part of the property is at the western end of the Mayfair Rd street frontage with an elevation of approximately 135m AHD. The lowest part in the south-east corner has an elevation of approximately 55m AHD. The land has an east to south-easterly aspect. Figures 1.1 and 1.2 are aerial images of the property and surrounding land. Photographs of the property are provided in Appendix B.

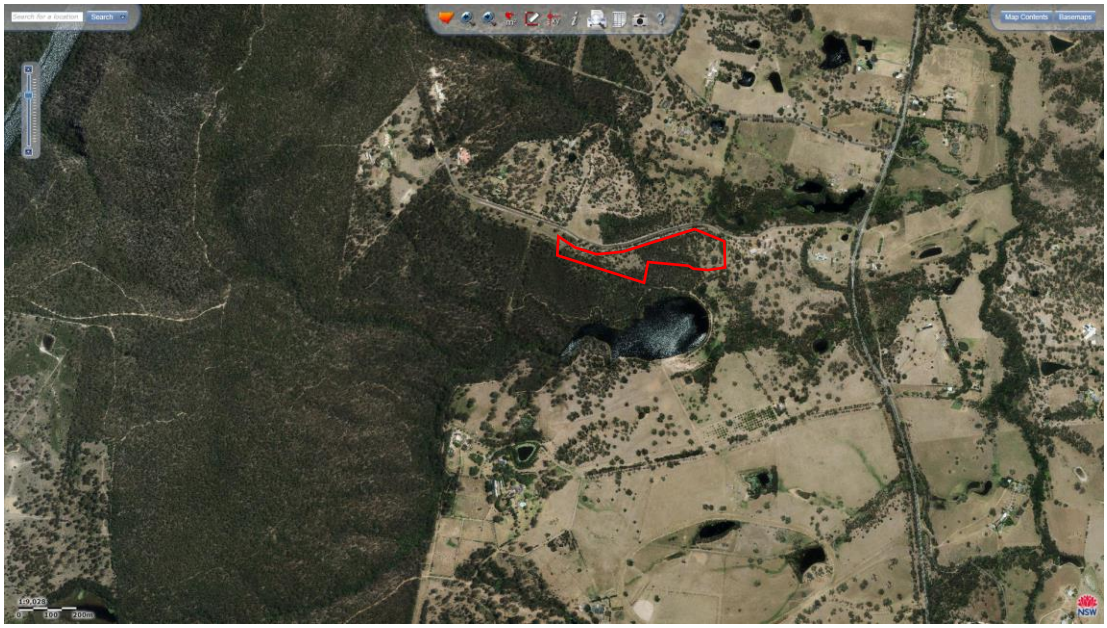


Figure 1.1: Aerial image of property and surrounding land (source: maps.six.nsw.gov.au).

Figure 1.2: Aerial image of property (source: maps.six.nsw.gov.au).

1.2 DESCRIPTION OF DEVELOPMENT PROPOSAL

The development proposal is to construct at the western end of the lot a driveway and dwelling. Approximately 15m to the east a 100,000L concrete rainwater tank is proposed. A wastewater disposal area would also be required, although the final location for this has yet to be determined. It would be approximately 1,000m^2 in size and within that part of Lot 12 outside of the Fernhill Biobank Site. The proposal is illustrated in Figure 1.3 below. A plan drawing is provided in Appendix A.

Figure 1.3: Approximate location of proposed development (yellow).

1.3 PURPOSE OF THIS REPORT

This report describes the flora and fauna habitat within the area of the proposed development. The report identifies species, populations or communities listed under the NSW *Biodiversity Conservation Act 2016* (BC 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 5-part tests (tests of significance) under Section 7.3 of the BC Act.

1.4 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 of the property was undertaken on 28th June 2019. The assessment involved identifying all plant species observed at the project site, determining the plant community types present and their condition, describing fauna habitat present and recording any opportunistic sightings of fauna.

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 and Threatened Species Assessment of Significance Guidelines (DECC, 2007).

2 EXISTING FLORA AND FAUNA

2.1 FLORA

2.1.1 Description of vegetation on the subject area

The vegetation on Lot 12 and the adjoining Lot 2 was previously entirely cleared. The eastern part of Lot 12 (that is within the Fernhill Biobank Site) and the entire Lot 2 comprises young regrowth forest.

The dominant tree species in the area of the proposed development are Forest Red Gum (*Eucalyptus tereticornis*) and Narrow-leaved Ironbark (*Eucalyptus crebra*). Several Rough-barked Apple (*Angophora subvelutina*) also occur. A number of small trees of Parramatta Green Wattle (*Acacia Parramattensis*) occur. There are also some Cherry Ballart (*Exocarpus cupressiformis*) and Native Currant (*Leptomeria acida*). The other species are all groundcover vegetation comprising mostly native grasses including Purple Wire Grass (*Aristida ramosa*), Couch (*Cynodon dactylon*), Shorthair Plumegrass (*Dichelachne micrantha*), Forest Hedgehog Grass (*Echinopogon caespitosus*), Wiry Panic (*Entolasia stricta*), Paddock Lovegrass (*Eragrostis leptostachya*), Weeping Grass (*Microlaena stipoides*), Western Rat's Tail Grass (*Sporobolus creber*) and Kangaroo Grass (*Themeda australis*). Introduced grasses include Perennial Quaking Grass (*Briza subaristata**) and Rhodes Grass (*Chloris gayana**). A number of common weeds were present including Cobbler's Pegs (*Bidens pilosa**), Fleabane (*Conyza bonariensis**), Fireweed (*Senecio madagascariensis**) and Paddy's Lucerne (*Sida rhombifolia**).

The complete list of species recorded on the subject area is provided in Appendix C. Photographs are provided in Appendix B.

2.1.2 Plant community types

Based on the site assessment and the distribution of species across the site it is determined that Cumberland Plain Woodland covers the entire Lot 12. 'Cumberland Plain Woodland in the Sydney Basin Bioregion' is listed as a Critically Endangered Ecological Community (CEEC) under both the BC Act and the EPBC Act. Moist Shale Woodland occurs downslope of Lot 12 on the adjoining Lot 2. Moist Shale Woodland in the Sydney Basin Bioregion is listed as an Endangered Ecological Community (EEC) under the BC Act and a CEEC under the EPBC Act.

2.1.3 Threatened Species

A search of the NSW Office of Environment and Heritage (OEH) BioNet Atlas of NSW Wildlife database (on 8/01/2020) indicated that twelve (11) species of flora listed under the BC Act have been recorded within a 10km x 10km square centred on the property. Of these six (6) 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 BC Act or EPBC Act recorded within a 10km x 10km square centred on the project site.

Scientific Name	Common Name	Habitat	BC 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/ -	Yes	No
Tetratheca glandulosa		Associated with shale-sandstone transition habitat where shale-cappings occur over sandstone, with associated soil landscapes such as Lucas Heights, Gymea, Lambert and Faulconbridge. Topographically, the plant occupies ridgetops, upper-slopes and to a lesser extent mid-slope sandstone benches. Soils are generally shallow, consisting of a yellow, clayey/sandy loam. Stony lateritic fragments are also common in the soil profile on many of these ridgetops. Vegetation structure varies from heaths and scrub to woodlands/open woodlands, and open forest. Vegetation communities correspond broadly to Benson & Howell's Sydney Sandstone Ridgetop Woodland (Map Unit 10ar). Common woodland tree species include: Corymbia gummifera, C. eximia, Eucalyptus haemastoma, E. punctata, E. racemosa, and/or E. sparsifolia, with an understorey dominated by species from the families Proteaceae, Fabaceae, and Epacridaceae.	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

Scientific Name	Common Name	Habitat	BC Act/ EPBC Act Status *	Potential Habitat On-site	Observed On-site
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
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
Melaleuca deanei	Deane's Paperbark	The species occurs mostly in ridgetop woodland, with only 5% of sites in heath on sandstone. Flowers appear in summer but seed production appears to be small and consequently the species exhibits a limited capacity to regenerate.	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
Rhodamnia rubescens	Scrub Turpentine	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. This species is characterised as highly to extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	CE/ -	No	No

Scientific Name	Common Name	Habitat	BC Act/ EPBC Act Status *	Potential Habitat On-site	Observed On-site
Pterostylis chaetophora		The preferred habitat is seasonally moist, dry sclerophyll forest with a grass and shrub understorey. Flowers from September to November. Vegetative reproduction is not common in this group of Greenhoods, but some species may form more than one dropper annually. Fails to flower in dry seasons. Plants are deciduous and die back to the large, underground tubers after seed release. New rosettes are produced following soaking autumn and winter rains.	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
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 vegetation on Lot 12 at the project site was previously cleared and now comprises a mostly native groundcover of mainly grasses with scattered forbs, with some scattered regrowth native trees. Consequently, it provides only limited habitat for fauna. The proposed APZ on the adjoining Lot 2 is young regrowth forest. It provides better habitat for fauna. However, since there are no old trees with hollows and the understorey/ shrub layers is mostly absent (apart from the weed Lantana that is being progressively removed from the Biobank site and adjoining areas), this area also provides only limited habitat for fauna. These areas provide habitat mainly for birds, arthropods, insectivorous bats and reptiles (lizards and snakes). Birds observed during the site assessment include the Rainbow Bee-eater (*Merops ornatus*) that is likely to be nesting in the steep embankment on Lot 2, Willie Wagtail (*Rhipidura leucophrys*), Jacky Winter (*Microeca fascinans*), Australian Magpie (*Cracticus tibicen*) and Superb Fairy-wren (*Malurus cyaneus*). Scats of the Red Deer (*Cervus elaphus*) where found on the site (this species was observed previously in the south-eastern corner of Lot 2). The complete list of species recorded on the property is provided in Appendix C. Photographs are provided in Appendix B.

No threatened species of fauna were observed in the project area. However, the area potentially provides marginal habitat for a number of threatened species of fauna that have been recorded nearby (refer Section 2.2.2 below). These are discussed in the following section.

2.2.2 Threatened Species

A search of the OEH BioNet Atlas of NSW Wildlife database (on 26/06/2019) indicated that thirty-eight (38) species of fauna listed under the BC Act have been recorded within a 10km x 10km square centred on the project site. Of these ten (10) are also listed under the EPBC Act. The species are listed in Table 2.2 below. The table indicates whether suitable habitat is present on site and whether or not they were observed on site during the site assessment.

Table 2.2: Species of fauna listed under the BC Act or EPBC Act recorded within a 10km x 10km square centred on the project site.

Scientific Name	Common Name	Habitat	BC 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
Pseudophryne australis	Red-crowned Toadlet	Occurs in Open Forests, mostly on sandstones. Inhabits periodically wet drainage lines below sandstones ridges that often have shale lenses. Shelters under rocks and amongst masses of dense vegetation or thick piles of leaf litter. Breeding congregations occur in dense vegetation and debris beside ephemeral creeks and gutters. Disperses outside the breeding period when it is found under rocks and logs on sandstone ridges and forage amongst leaf litter. Largely restricted to the immediate vicinity of suitable breeding habitat.	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
Reptilia					
Hoplocephalus bungaroides	Broad-headed Snake	elters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks to shelter in crevices or hollows in large trees within 500m of escarpments in summer.	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.	E/ -	No	No
Botaurus poiciloptilus	Australasian Bittern	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spikerushes (*Eleocharis* spp.).	E/ E	No	No
Ixobrychus flavicollis	Black Bittern	Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves.	V/ -	No	No

Scientific Name	Common Name	Habitat	BC 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.	V/ C	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
Limosa limosa	Black-tailed Godwit	marily a coastal species. Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Further inland, it can also be found on mudflats and in water less than 10 cm deep, around muddy lakes and swamps. lividuals have been recorded in wet fields and sewerage treatment works. Forages for insects, crustaceans, molluscs, worms, larvae, spiders, fish eggs, frog eggs and tadpoles in soft mud or shallow water. Roosts and loafs on low banks of mud, sand and shell bars. Frequently recorded in mixed flocks with Bar-tailed Godwits.	V/ C, J, K	No	No
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/ -	No	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

Scientific Name	Common Name	Habitat	BC Act/ EPBC Act Status *	Potential Habitat On-site	Observed On-site
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	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	No

Scientific Name	Common Name	Habitat	BC 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/ -	Yes	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/ -	Yes	No
Tyto tenebricosa	Sooty Owl	Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. Roosts by day in the hollow of a tall forest tree or in heavy vegetation; hunts by night for small ground mammals or tree-dwelling mammals such as the Common Ringtail Possum (Pseudocheirus peregrinus) or Sugar Glider (Petaurus breviceps). Nests in very large tree-hollows.	V/ -	No	No

Scientific Name	Common Name	Habitat	BC 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
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/ -	Yes	No
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/ -	Yes	No

Scientific Name	Common Name	Habitat	BC Act/ EPBC Act Status *	Potential Habitat On-site	Observed On-site
Melanodryas cucullata	Hooded Robin (south-eastern form)	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and Mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey. Territories range from around 10 ha during the breeding season, to 30 ha in the non-breeding season.	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/ -	Yes	No
Stagonopleura guttata	Diamond Firetail	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum *Eucalyptus pauciflora* Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.	V/ -	Yes	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 3,500 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.	V/ V	Yes	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	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	No
Micronomus norfolkensis	Eastern Coastal Free-tailed 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	No
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.		Yes	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/ -	No	No
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	No

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/ -	Yes	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 orianae oceanensis	Large 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 300 km range of maternity caves. Hunt in forested areas, catching moths and other flying insects above the tree tops.	V/ -	No	No
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.	E/ -	Yes	No

* V = Vulnerable, E = Endangered, EP = Endangered Population, C = China Australia Migratory Bird Agreement (CAMBA).

3 IMPACT ASSESSMENT

3.1 FLORA

The proposed development would have a minor impact on native flora. It would remove approximately thirty-five (35) small to medium sized trees from the western side of the lot within the areas of the building envelope and associated asset protection zone. The trees to be removed are identified in the Tree Removal Plan provided in Appendix A. The trees comprise Forest Red Gum, Narrow-leaved Ironbark, Broad-leaved Apple and Parramatta Green Wattle. Most of the trees are small (i.e. < 30cm dbh). Several trees are larger (<40cm DBH) but still not considered large. One Narrow-leaved Ironbark that occurs in the road reserve and would need to be removed for the driveway is approximately 50cm DBH. None of the trees contain tree hollows. None of these trees is considered significant. It is recommended that an equal number of trees of the same species be replanted to the east of the proposed development on Lot 12 following completion of the development.

No threatened or otherwise significant species of flora would be impacted by the proposal.

Application of nutrient rich wastewater over the wastewater disposal area is likely to result in increased plant growth there. If the plants do not take up all of the nutrients the nutrients may be washed downslope in overland flow or there may be some leaching of nutrients through the soil into the groundwater. As the volume of wastewater and quantities of nutrients would be small this is unlikely to detrimentally affect either the native vegetation or the environment more generally. However, there is a possibility that nutrient enrichment may result in an increase in the number and variety of weed species present at and downslope of the wastewater disposal area. Due to the presence of a Biobank site downslope of the wastewater disposal area, it is recommended that the area be regularly monitored for weeds and that weeds be controlled as required to prevent the proliferation of weeds on the property. Also, it is recommended that the wastewater disposal area be kept a minimum of 20m from the Biobank site boundary.

The vegetation impacted by the proposal comprises Cumberland Plain Woodland (listed under both the TSC Act and EPBC Act as a CEEC). The proposal would impact only a small area of this community that is in a disturbed condition. A five-part test under Section 7.3 of the BC Act confirms that the proposal would not have a significant impact on this ecological community. The 5-part test is provided in Appendix D.

3.2 FAUNA

The removal of a small area of grassland and regenerating open woodland comprised of relatively young trees for the driveway, dwelling and APZ would have only a minor impact on native fauna. The trees are relatively young and do not contain tree hollows and there is little or no understorey/ shrub layer. There is an abundance of similar habitat locally.

Application of nutrient rich wastewater over the wastewater disposal area would result in increased plant growth there and this may benefit native fauna, particularly arthropods including insects and the birds and insectivorous bats that feed on them.

The property could potentially provide marginal habitat for a number of threatened species of fauna that have been recorded nearby. However, as the area impacted is small

and there are relatively vast areas of similar and better-quality habitat locally and more broadly in the region there is unlikely to be any significant impact on these species. This is confirmed in a 5-part test undertaken for the proposal (refer Appendix D).

4 CONCLUSION AND RECOMMENDATIONS

The proposed development would remove a small number of relatively young trees and a small area of groundcover vegetation. No threatened or otherwise significant species of flora or fauna would be impacted.

The vegetation impacted is Cumberland Plain Woodland that is listed as a CEEC under both the BC Act and EPBC Act. However, only a small and disturbed area would be impacted. There would be no significant impact on the CEEC. This is confirmed in a 5-part test (test of significance under Section 7.3 of the BC Act). The 5-part test is provided in Appendix D.

Application of nutrient rich wastewater over the wastewater disposal area would result in increased plant growth there. This may benefit native fauna. It may also result in an increase in the number and variety of weed species present at and downslope of the wastewater disposal area.

The following recommendations are made to minimise the risk of any potentially adverse impacts from the development.

Recommendations:

1) Thirty-five trees should be re-planted on Lot 12 following completion of the works to compensate for those removed as part of the development. These should comprise locally occurring native species characteristic of Cumberland Plain Woodland. The trees should comprise a least three of the following species:

Angophora bakeri	*Angophora subvelutina*
Corymbia maculata	*Eucalyptus crebra*
Eucalyptus eugenioides	*Eucalyptus fibrosa*
Eucalyptus globoidea	*Eucalyptus moluccana*
Eucalyptus paniculata	*Eucalyptus punctata*
Eucalyptus tereticornis	*Syncarpia glomulifera*

2) The wastewater disposal area should be regularly monitored for weeds and weeds controlled as required and in accordance with the *Noxious and Environmental Weed Control Handbook* (Ensbey, R., 4th Edition) to prevent the proliferation of problem weeds.

3) The wastewater disposal area should be kept a minimum of 20m from the Fernhill Biobank Site boundary.

5 REFERENCES

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

Ensbey, R. undated. *Noxious and Environmental Weed Control Handbook:* A guide to weed control in non-crop, aquatic and bushland situations. 4th Edition. NSW Government Industry & Investment.

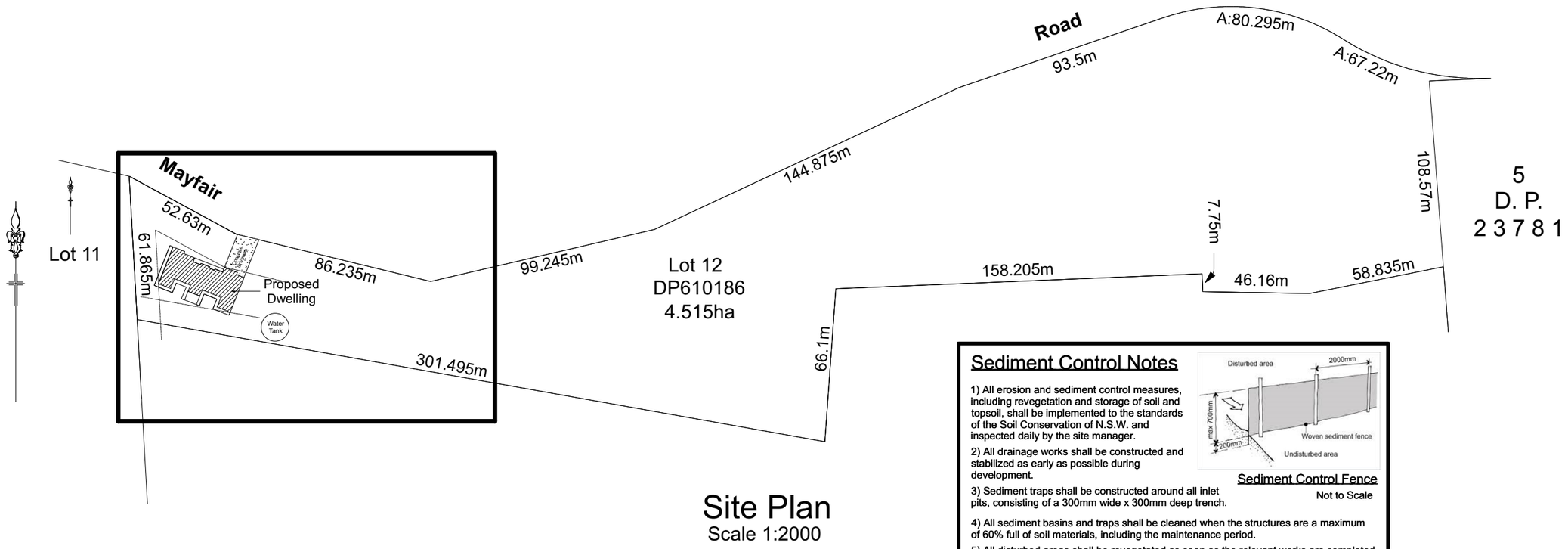
GHD, 2013. *Fernhill Biobanking Assessment Report*.

NPWS, 2002. *Native Vegetation of the Cumberland Plain – Map 10 of 16.* NSW National Parks and Wildlife Service, Hurstville.

Appendices

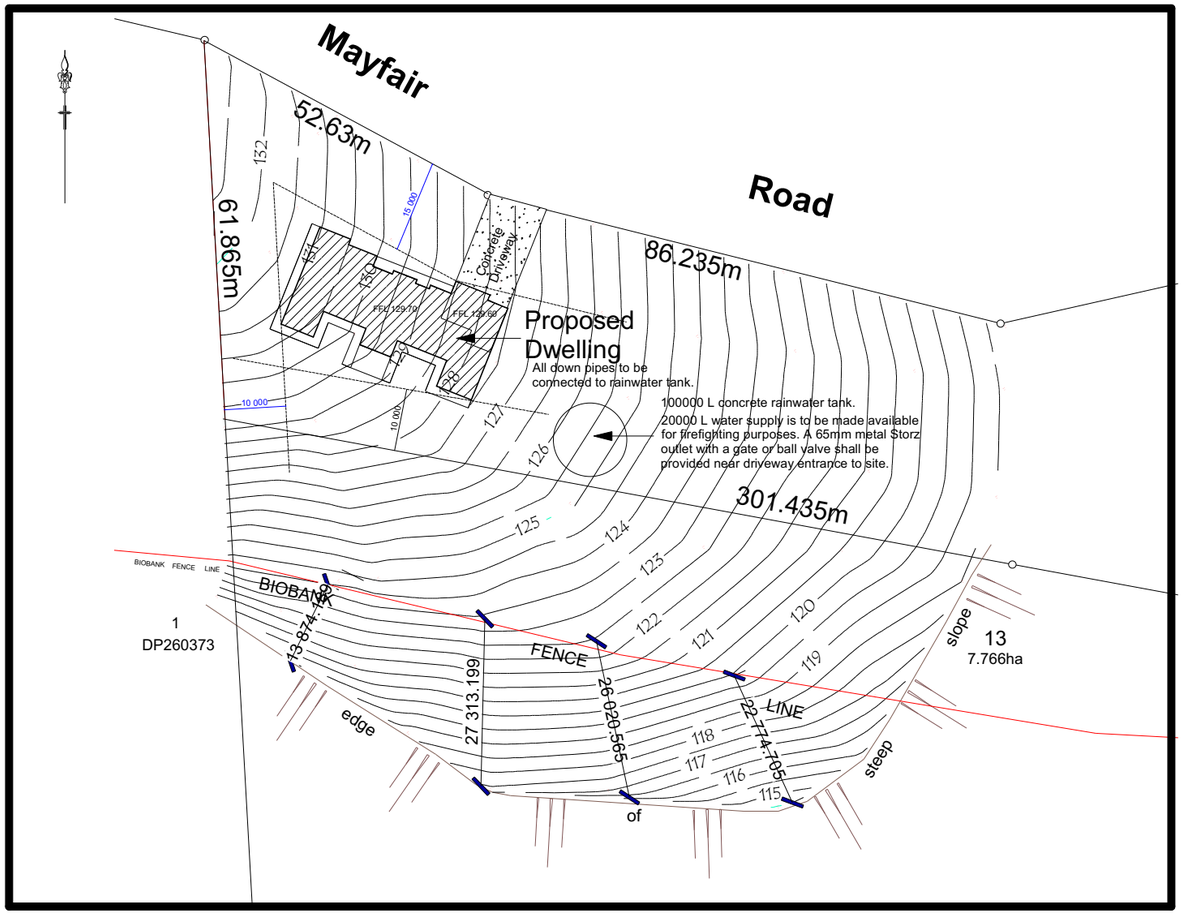
APPENDIX A

PLAN DRAWING OF PROPOSAL AND TREE REMOVAL PLAN



Site Plan
Scale 1:2000

Inset - Scale 1:1000



Sediment Control Notes

Sediment Control Fence
Not to Scale

1) All erosion and sediment control measures, including revegetation and storage of soil and topsoil, shall be implemented to the standards of the Soil Conservation of N.S.W. and inspected daily by the site manager.

2) All drainage works shall be constructed and stabilized as early as possible during development.

3) Sediment traps shall be constructed around all inlet pits, consisting of a 300mm wide x 300mm deep trench.

4) All sediment basins and traps shall be cleaned when the structures are a maximum of 60% full of soil materials, including the maintenance period.

5) All disturbed areas shall be revegetated as soon as the relevant works are completed.

6) Soil and top soil stockpiles shall be located away from drainage lines and area where water may concentrate. All roads and footpaths are to be swept daily.

7) Filter shall be constructed by stretching a filter fabric ('Propex' or approved equivalent), between posts at 2.0m centres. Fabric shall be buried 200mm along it's lower edge.

8) Dust prevention measures are to be maintained at all times.

Provide sediment control fencing on all down hill slopes - unless noted otherwise.

Site Calculations

Allotment = 4.514ha.
Ground Floor Foootprint = 474.60m²

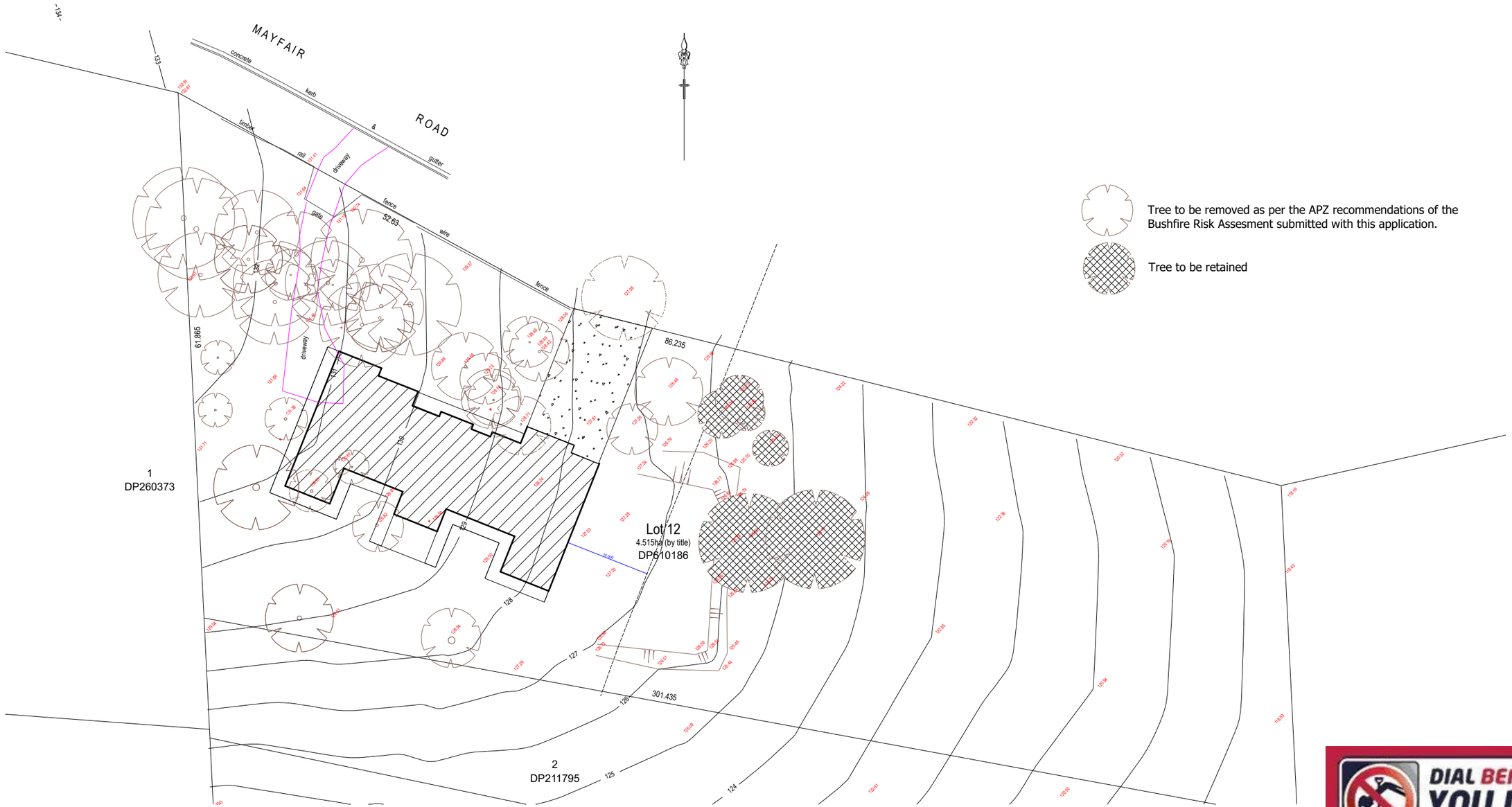
DIAL BEFORE YOU DIG
www.1100.com.au

Site Plan	Scales:	Plan No.:	Date:
	1:1000 1:2000	19-03 Sheet 1	6.1.20

For:
Mr. A. Delipetar
44a Mayfair Road,
Mulgoa, 2745.

Drawn By:
Wayne Ryan
Draftsman
Email: w.rhino@optusnet.com.au
0410589961
02- 47312726

A3



DIAL BEFORE YOU DIG www.1100.com.au

Tree Removal Plan	Scales:	Plan No.:	Date:
	1:500	19-03	6.1.20
		Sheet 2	

For:
Mr. A. Delipetar
44a Mayfair Road,
Mulgoa, 2745.

Drawn By:
Wayne Ryan
Draftsman
Email: w.rhino@optusnet.com.au
0410589961
02- 47312726

A3

APPENDIX B

PHOTOGRAPHS

Photo 1: Approximate footprint of the proposed dwelling (red) and driveway (blue), looking west.

Photo 2: Looking south-west with the approximate footprint of the proposed dwelling in red and proposed driveway in blue.

Photo 1: Approximate alignment of the proposed driveway (blue) and location of dwelling (red), looking east. Note the Ironbark in the road reserve that would need to be removed.

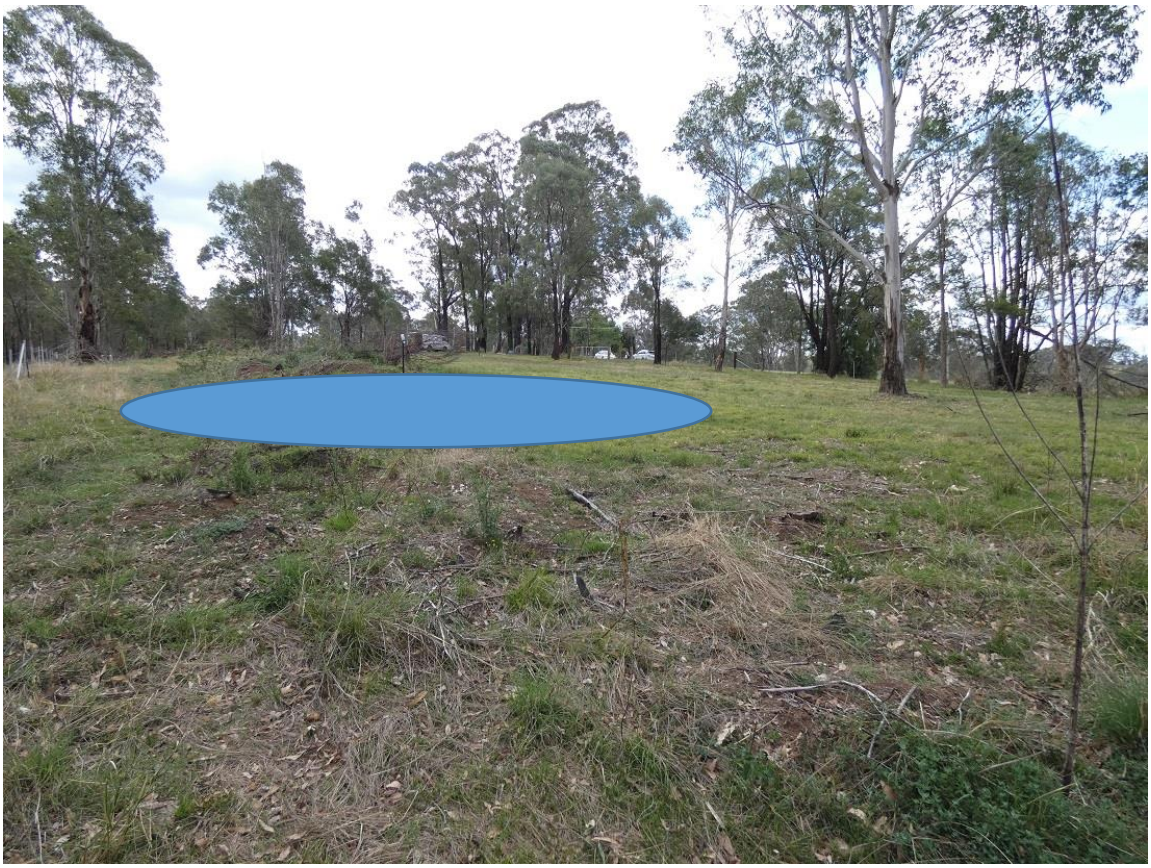


Photo 4: The approximate location of the proposed rainwater tank, looking west back towards the proposed location of the dwelling.

Photo 5: The stand of Ironbarks in the north-western corner that would need to be thinned to comply with bushfire management requirements. The site of the proposed dwelling is shown in red.

APPENDIX C

SPECIES LISTS

FLORA

Trees

Acacia parramattensis	Parramatta Green Wattle
Angophora subvelutina	Broad-leaved Apple
Eucalyptus crebra	Narrow-leaved Ironbark
Eucalyptus tereticornis	Forest Red Gum
Exocarpus cupressiformis	Cherry Ballart
*Solanum mauritianum**	Wild Tobacco Tree

Shrubs and Brambles

Bursaria spinosa	Blackthorn
*Lantana camara**	Lantana
Leptomeria acida	Native Currant

Groundcovers and Climbers

Aristida ramosa	Purple Wire Grass
*Bidens pilosa**	Cobbler's Pegs
*Briza subaristata**	Perennial Quaking Grass
Caesia parviflora var. *parviflora*	Pale Grass-lily
*Chloris gayana**	Rhodes Grass
*Conyza bonariensis**	Fleabane
Cynodon dactylon	Couch
Dichelachne micrantha	Shorthair Plumegrass
Dichondra repens	Kidney Weeds
Echinopogon caespitosus	Forest Hedgehog Grass
Entolasia stricta	Wiry Panic
Eragrostis leptostachya	Paddock Lovegrass
Gahnia aspera	
Glycine tabacina	Love Creeper
*Ipomoea cairica**	Coastal Morning Glory
Juncus usitatus	Common Rush
*Lysimachia arvensis**	Pimpernel
Microlaena stipoides	Weeping Grass
Oxalis perennans	
*Plantago lanceolata**	Ribwort
*Senecio madagascariensis**	Fireweed
Senna pendula var. *glabrata**	Cassia
*Sida rhombifolia**	Paddy's Lucerne
Sporobolus creber	Western Rat's Tail Grass
*Taraxacum officinale**	Dandelion
Themeda australis	Kangaroo Grass

** = Introduced species*

FAUNA

Birds

Coracina noveahollandiae	Black-faced Cuckoo-shrike
Corvus coronoides	Australian Raven
Rhipidura albiscapa	Grey Fantail
Merops ornatus	Rainbow Bee-eater
Geopelia humeralis	Bar-shouldered Dove
Gymnorhina tibicen	Australian Magpie
Microeca fascinans	Jacky Winter
Rhipidura leucophrys	Willi Wagtail
Malurus cyaneus	Superb Fairy-wren

Mammals

*Cervus elaphus**	Red Deer

Insects

Cyclochila australasiae	Green Grocer Cicada
Macrotristria angularis	Cherrynose Cicada
*Pieris rapae**	Cabbage White Butterfly
Heteronympha merope	Common Brown Butterfly
Micraspis frenata	Striped Ladybird Beetle

* = *Introduced species*

APPENDIX D

5-PART TEST
(TEST OF SIGNIFICANCE UNDER SECTION 7.3 OF THE *BIODIVERSITY CONSERVATION ACT 2016*)

5-Part Test for Cumberland Plain Woodland

(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,

N/A.

(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

The ecological community on the property is in a degraded condition with a mostly cleared tree cover and a complete absence of shrubs. Many of the groundcover species are also absent. There are vast areas of the community in similar and better condition throughout the local area. There are also a number of conservation reserves that retain relatively large areas in good condition including parts of the adjoining Fernhill Biobanking site and Mulgoa Nature Reserve located approximately 2.5km away. The proposal to remove a small area of this community would not place at risk of extinction the local occurrence of the ecological community.

(i) 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 not modify the composition of the community on the property as it is already highly modified, comprising only scattered trees and a relatively small proportion of the groundcover species. The proposal would remove a small number of young trees (approximately twenty-five (25) trees) retaining the majority of trees in the subject area. As discussed above there are large areas of this community in the local area and the proposal would not place the local occurrence of this community at risk of extinction.

(c) 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 proposed development or activity, and

The proposal would remove only a small area of habitat for this community.

(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

No areas of habitat would become isolated or fragmented as a result of the proposal as all areas of habitat on the property remain connected following the proposal.

(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,

The small area of degraded habitat to be removed would have low importance for the long-term survival of the community.

(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),

No areas of outstanding biodiversity value have been declared in the vicinity of the proposal.

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

Conclusion

Taking into consideration the above factors it is concluded that the proposed works would not have a significant impact on the Cumberland Plain Woodland critically endangered ecological community.

5-Part Test for the Barking Owl (*Ninox connivens*), Dusky Woodswallow (*Artamus cyanopterus cyanopterus*), Koala (*Phascolarctos cinereus*), Grey-headed Flying Fox (*Pteropus poliocephalus*), Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*), Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*), Large-eared Pied Bat (*Chalinolobus dwyeri*), and Large Bentwing-bat (*Miniopterus orianae oceanensis*).

(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,

The property provides only marginal habitat for these species. There are relatively vast areas of similar and better-quality habitat throughout the general area. The proposal to remove a small area of marginal 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 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

N/A.

(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,

N/A.

(c) 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 proposed development or activity, and

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

(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

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

(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,

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

(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),

No areas of outstanding biodiversity value have been declared near the project site.

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

Conclusion

Based on the above assessment it is concluded that the proposed works would not have a significant impact on the Barking Owl (*Ninox connivens*), Dusky Woodswallow (*Artamus cyanopterus cyanopterus*), Koala (*Phascolarctos cinereus*), Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*), Large-eared Pied Bat (*Chalinolobus dwyeri*) and Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*).