Flora and Fauna Impact Assessment:

Proposed three lot subdivision,

Lot 254 DP 773478, 1 Old Highway Turlinjah

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The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy. The location of all mapped features, areas and boundaries are to be confirmed by a registered surveyor.

Executive Summary

This flora and fauna impact assessment accompanies a planning proposal and a development application for a proposed three lot subdivision at Lot 254 DP 773478, 1 Old Highway Turlinjah NSW (Figure 1-1).

Direct impacts on flora and fauna habitat anticipated from the proposal:

- Clearing of up to 0.5 ha of regrowth native shrubland and up to 0.6 ha of derived native grassland for the creation of building envelopes, gardens and bushfire asset protections zones.
- The partial filling of the existing farm dam.

The above direct impacts, along with minor potential impacts are addressed under the impact assessment in this report (Section 5).

Terminology

'Subject site': the land covered by the address listed above.

'Study area': the subject site, plus adjacent land which could be impacted by the development.

Flora

Species – general

A total of 67 flora species were recorded within the study area during the field survey, of which 43 were native species and 24 were exotic species (Table 4–1). One of the exotic species, Blackberry (*Rubus fruticosus* sp. agg.), is listed as noxious under the *NSW Noxious Weeds Act 1993* (DPI 2013a).

Threatened flora species

No threatened flora species, listed under the *Threatened Species Conservation Act 1995* (TSC Act) or the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), were recorded within the study area. A desktop evaluation of potentially occurring threatened species was undertaken (Appendix 1) and it was concluded that it would be unlikely that these species would be found within the subject land during other seasons due to the highly degraded/modified condition of the site and because there are no known records in the locality for such species. Therefore, it is deemed that no further surveys for these species are required for this development.

Vegetation/endangered ecological communities

The site comprises a mix of cleared grassland and regrowth shrubland (map in Figure 4-8). A small number of young regrowth Blackbutt (*Eucalyptus pilularis*) are scattered throughout the shrubland.

The existing house block at the eastern end of the site comprises a large number of exotic pasture grasses. Uphill (west) of this, the vegetation becomes increasingly dominated by native grasses and dense patches of native Bracken Fern (*Pteridium esculentum*) before the regrowth shrubland begins (from the dam upwards).

Due to the highly modified condition of the vegetation on site, the vegetation was not assigned to regional vegetation mapping classification names. Small remnants and scattered trees surrounding the site (plus regrowth shrubs and the soil type on site) suggest that site was probably covered by communities such as Southern Lowland Wet Forest, Batemans Bay Cycad Forest or Murramarang Lowlands Forest (Tozer *et al.* SCIVI classification and mapping). These communities are not components of any EEC.

Swamp Oak Floodplain Forest endangered ecological community (EEC) was recorded about 30 m to the east of the site on the fringe of the estuary.

Refer to Heading 4.2.4 for further information regarding EEC assessments covering the study area.

Conclusion of 7-part test for EECs

Based on an assessment of significance (Appendix A) pursuant to Section 5A of the EP&A Act, it was determined that the proposed activity is unlikely to have a significant effect on the local occurrence of this entity (the EEC is already impacted by weeds from previous land clearing and ongoing farming/grazing etc).

This matter will not require referral to the NSW Director General in regards to EECs.

There are no EPBC Act listed ecological communities within or adjacent to the subject site.

Fauna

Fauna habitats

The subject land comprises three general fauna habitats (Open Grassland, Shrubland, and Aquatic).

Open Grassland and Shrubland dominate the subject land with Aquatic habitat occurring in the form of a constructed farm dam and the adjacent Smarts Creek. Resources for threatened species are virtually absent in that there are no hollow-bearing trees, or large overstorey trees. Adjoining Black Sheoak (overhanging from the northern boundary) were thoroughly inspected for Glossy Black Cockatoo foraging signs, and none were detected. Detailed inspections throughout the Shrubland failed to locate any evidence of conical diggings confirming that the subject land does not support a bandicoot or potoroo population.

The farm dam is surrounded by Shrubland and is characterised by cover of spike-rush providing habitat for common frog species. An absence of grassy banks or surrounds or dense tea-tree within the waterbody infers that this habitat is not suitable for Green and Golden Bell Frog.

Fauna species – general

A total of 63 fauna species were recorded. These comprised 51 species of bird, 10 species of mammal, two species of reptile and five species of frog (Table 4–3). This included one threatened species, Southern Myotis (*Myotis macropus*) which were recorded by echolocation call analysis adjacent to Smarts Creek and one migratory species, Eastern Great Egret (*Ardea modesta*); a single bird foraging within Smarts Creek.

Of note was the prevalence of aggressive honeyeater species on the site, particularly Noisy Friarbirds (*Philemon corniculatus*) and Red Wattlebirds (*Anthochaera carunculata*).

There was no significant or obvious indirect evidence of fauna activity observed on site.

Potential impacts on fauna species

In total, the proposal will result in vegetation disturbance covering up to 1.1 ha. The vegetation on site does not form significant connectivity across the surrounding landscape, and as such connectivity will not be impacted by the proposal.

The following direct impacts on flora and fauna habitat are anticipated from the proposal:

- Clearing of up to 0.5 ha of regrowth shrubland and up to 0.6 ha of derived native grassland for the creation of building envelopes, gardens and bushfire asset protections zones.
- The partial filling of the existing farm dam.

Fauna species requiring significance assessments

A total of 16 threatened or migratory fauna species (Table 5–1) were either recorded on site or considered likely to occur on the site (see likelihood of occurrence table in Appendix 1) and the potential impact of the proposal on these species was assessed under relevant legislation.

Conclusion of 7-part test

Assessments of Significance under Section 5A of the EP&A Act were undertaken (Appendix 1). The outcome of the assessments determined that the proposed activity is unlikely to have a significant effect on the Eastern Bentwing Bat, Eastern Freetail Bat, Southern Myotis, Yellow-bellied Sheathtail Bat, Grey-headed Flying Fox, White-fronted Chat, Australasian Bittern, Square-tailed Kite.

Based on the assessment provided in the appendices and the recommendations in Section 6, it is considered unlikely that the proposal will result in significant impacts to any of these species. Therefore, it is deemed that this matter will not require referral to the NSW Director General.

Conclusion of EPBC Act Assessment

An assessment of significance under the EPBC Act was undertaken on those species observed on the site or considered likely to occur there (Appendix 1). The outcome of this assessment was that it is unlikely that the development would significantly impact on those threatened or migratory species assessed (Table 5–1). Only a small number of individuals will be impacted and the level of habitat removal will be negligible in the context of the available habitat in the locality.

Therefore, it is deemed that referral to the Commonwealth under the EPBC Act is not required.

Recommendations have been provided in Section 6 to further ameliorate the potential impacts on site.

Conclusion of SEPP 44 Koala Habitat

The subject site comprises cleared land, some recent shrub regrowth with only two eucalypt trees (both *Eucalyptus pilularis* - Blackbutt) growing on site. This tree species is not listed as a primary browse tree on Schedule 2 of SEPP 44.

No evidence of koalas was identified on site and no records are known within 10 km of the site. As such the site does not meet the definition of 'Core Koala Habitat'. SEPP 44 does not place any restrictions on the proposal.

Mitigation measures

Recommended mitigation measures are listed in Section 6.2 of this report. Due to the highly modified condition of the site and the expected low impact of the proposed development, the mitigation measures are general in nature, relating to such areas as: erosion and sedimentation control; avoidance of the introduction of environmental weeds; and the assumption that all lots will be connected to the local sewerage scheme rather than employ onsite wastewater disposal.

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1.0 Introduction

1.1 Background

This flora and fauna impact assessment accompanies a planning proposal and a development application for a proposed three lot subdivision at Lot 254 DP 773478, 1 Old Highway Turlinjah NSW (Figure 1-1).

1.2 Site location and description of proposed activities covered by this impact assessment

The subject land is approximately 1.62 ha in area. The proposal comprises the subdivision of the land into three equal-size lots of approximately 0.54 ha (5,400 m^2) each.

The land is currently zoned R5 – Large Lot Residential. As such it is considered a rural zone by Eurobodalla Shire Council and is therefore subject to the *Native Vegetation Act* 2003. Refer to the Planning Context section of this report (Heading 2.1) for further information in regards to the clearing of native vegetation.

It is understood that all three lots would be connected to the existing sewer scheme servicing the village of Turlinjah. Therefore, there is no consideration given to onsite wastewater disposal in this impact assessment.

The following direct impacts on flora and fauna habitat are anticipated from the proposal:

- Clearing of up to 0.5 ha of regrowth native shrubland and up to 0.6 ha of derived native grassland for the creation of building envelopes, gardens and bushfire asset protections zones.
- The partial filling of the existing farm dam.

Potential indirect impacts on flora and fauna habitat anticipated from the proposal include:

- Weed infestation (although the site has been farmed/grazed over a long time period and many exotic plant species are already on site).
- Erosion and sedimentation (e.g. from road and building envelope construction).

1.3 Aims of this study

The aims of this study are to provide:

- a list of legislation/approvals pertinent to threatened flora and fauna
- a list of the flora and fauna species recorded during the field survey
- details of the vegetation communities and fauna habitats present, including information regarding disturbance, the surrounding matrix and potential fauna movement corridors
- an evaluation of the likelihood of occurrence for threatened flora and fauna species, migratory fauna species and endangered fauna populations based on the presence of habitat, proximity to nearest records and the mobility of species
- assessments of the likely impacts associated with the proposed activity pursuant to the NSW *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- a list of mitigation measures to reduce potential impacts on any threatened flora and fauna and general ecological values of the site and surrounds.

Figure 1-1 Site location

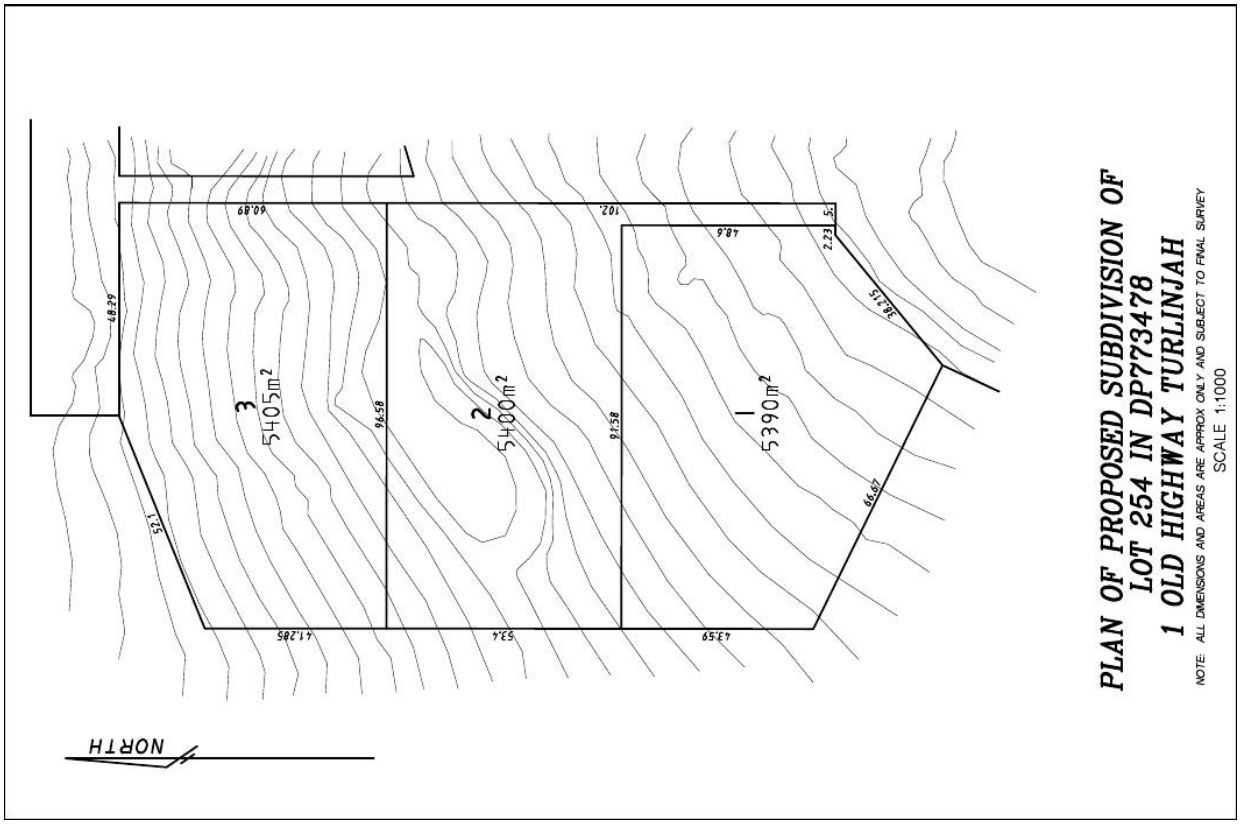


Figure 1-2 Proposed subdivision layout

2.0 Planning context

2.1 Legislative Acts

NSW Environmental Planning and Assessment Act 1979

Section 5A (2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) lists seven factors (the '7-part test') which must be taken into account in making a determination as to whether a proposed action is likely to have a significant effect on species, populations and ecological communities listed on Schedules 1, 1A and 2 of the *NSW Threatened Species Conservation Act 1995* and Schedules 4, 4A and 5 of the *NSW Fisheries Management Act 1994.*

This report applies the 7-part test to threatened entities found within the study area, or which have the potential to occur there, in order to determine whether there would be a significant effect on them.

If the determination is made that there is likely to be a significant effect, then either;

- a Species Impact Statement (SIS) must be prepared and the concurrence of the Director-General of the Department of Environment, Climate Change and Water (DECCW) obtained prior to the consent authority making a determination, or
- the proposal may be modified such that a significant effect on threatened species, populations or ecological communities, or their habitats is unlikely (DEC 2004).

Threatened Species Conservation Act 1995

Schedules 1, 1A and 2 of the *Threatened Species Conservation Act 1995* (TSC Act) list those threatened entities requiring consideration under Section 5A of the EP&A Act. The TSC Act also makes further provision with respect to the conservation of these threatened entities.

The Bionet website (containing the Atlas of NSW Wildlife database) was used to obtain the list of relevant species, populations and communities for this assessment.

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) enables the Australian Government to join with the states and territories in providing a national scheme of environment and heritage protection and biodiversity conservation.

Under the EPBC Act, actions that have, or are likely to have a significant impact on a matter of National Environmental Significance (NES) require approval from the Australian Government Minister for the Environment, Heritage and the Arts (DEWHA 2009).

There are nine matters of NES in total, as listed below. Those pertinent to the proposed development are assessed in this report.

- Listed threatened species and ecological communities
- Listed migratory species
- Wetlands of international importance
- The Commonwealth marine environment
- World heritage properties
- National heritage places
- Nuclear actions
- Great Barrier Reef Marine Park.

- A water resource, in relation to coal seam gas development and large coal mining development.

This report provides an assessment of relevant NES matters to ascertain where the proposed activity will require referral to the Commonwealth. The Protected Matters Search Tool was used to obtain the list of relevant EPBC Act listed species for this assessment.

Native Vegetation Act 2003

Being zoned as rural land, the site is subject to the *Native Vegetation Act* (NV Act). The objectives of the NV Act are to provide for, encourage and promote the management of native vegetation on a regional basis in the social, economic and environmental interests of the State.

Regrowth vegetation on site and its relevance to the NV Act: Historical aerial photography (from 2002) shows that the entire site comprised cleared land at that time (Figure 4-1). Exemptions listed under the NV Act allow for the clearing of regrowth native vegetation which has occurred since 1990 without the need for approval from the Catchment Management Authority. Note, however, this exemption does not affect any other relevant environmental legislation (i.e. a development application must still be accompanied by a flora and fauna impact assessment pursuant to the EPA Act, the EPBC Act, etc.) regardless of the age of the vegetation.

Fisheries Management Act 1994

Schedules 4, 4A and 5 of the *Fisheries Management Act 1994* (FM Act) list those threatened entities requiring consideration under Section 5A of the EP&A Act.

While there is a waterway within 100m of the subject land, no onsite wastewater disposal would occur under the proposal. Additionally, the site already comprises cleared land and the proposed land use (residential) is not expected to cause any detrimental effects on water quality, water quantity or any direct/indirect impacts upon threatened fish species habitat from the proposed action. As such, the provisions of this Act do not require any further consideration in this report.

NSW Noxious Weeds Act 1993

Part 3, Division 1 of this Act requires 'occupiers of land' to control any noxious weed species subject to a weed control order in the local control area (or state-wide). Where applicable, the proponent must comply with the relevant control class of each applicable noxious weed.

Any noxious weeds found on site during this study, as contained on the NSW Department of Primary Industries website (DPI 2013a), are listed in Section 4.2 and recommendations for their management are made in Section 6.

2.2 Planning Instruments

State Environmental Planning Policy (SEPP) No 14 – Coastal Wetlands

The aim of this policy is to ensure that the coastal wetlands of NSW are preserved and protected in the environmental and economic interests of the state.

There are no SEPP 14 wetlands mapped in the locality (based on GIS mapping layer obtained from the OEH Spatial Data Online website). Therefore, the provisions of this SEPP require no further consideration in this assessment.

State Environmental Planning Policy No 44 – Koala Habitat Assessment

SEPP No 44 encourages the conservation and management of natural vegetation areas that provide habitat for koalas to ensure that permanent free-living populations will be maintained over their

present range across 107 local government areas (LGA) in NSW (listed on Schedule 1 of this Act). Eurobodalla LGA is one of these in which the subject site is located. Clause 8 of this SEPP states that local councils cannot approve development in an area affected by this policy without an investigation of core koala habitat.

SEPP No 44 aims to identify areas of *potential* and *core* koala habitat. These are described as follows:

> *Potential Koala Habitat* is defined as areas of native vegetation where the trees listed in Schedule 2 of SEPP 44 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component
>
> *Core Koala Habitat* is defined as an area of land with a resident population of koalas, evidenced by attributes such as breeding females, and recent and historical records of a population.

Potential impact on koala habitat is considered within this report.

3.0 Methods

3.1 Database searches and literature review

3.1.1 Databases searches

Databases used to generate a list of threatened species that are known or predicted within 10 km of the property were:

- the BioNet Atlas of NSW Wildlife (under licence) – searched on 30 October 2013
- the EPBC Act Protected Matters Search Tool – searched on 30 October 2013.

Threatened and migratory species, and threatened populations that have been recorded within the locality were assessed for their likelihood to occur within the property (Appendices 1 and 2). All listed species, populations and EECs considered likely to occur within the subject site, or to be affected by the proposal, require consideration pursuant to Section 5A of the *Environmental Planning and Assessment Act 1979* (EPA Act) and under the EPBC Act.

3.1.2 Literature review

The following documents (and associated spatial layers) relevant to the locality and proposed activity were reviewed:

- *Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands (SCIVI*) v1.0 (Tozer *et al*. 2006).
- *Endangered Ecological Communities – Eurobodalla Shire Survey 2006 Map 11 - Bergalia Area* (ESC 2006).

3.2 Flora survey methods

Flora survey methods were based on *Threatened Species Survey and Assessment: Guidelines for developments and activities* (DEC 2004). A general flora meander within the study area was undertaken for a period of 2.0 hours on 22 November 2013 by senior botanist Mark Harris (B. App. Sci.). All habitat variations were covered to ensure good coverage of potential threatened species habitat. Nomenclature used was in accordance with the Flora of NSW PlantNet internet site (accessed November 2013). Vegetation communities were described and compared with existing regional mapping and vegetation community descriptions (listed above in Section 3.1.2).

Vegetation/ecological communities were also checked against OEH Scientific Committee EEC descriptions and the EPBC Act threatened ecological community information website.

Limitations

The floristic audit undertaken recorded as many species as possible and provides a comprehensive but not definitive species list. More species would probably be recorded during a longer survey over various seasons.

Nevertheless, the techniques used in this investigation are considered adequate to gather the data necessary to assess the impacts of the proposal on the flora species and vegetation communities found in the property.

Any threatened flora species deemed to potentially occur during other seasons are included in our significance assessments.

Mapping accuracy: horizontal accuracy is normally within 5 m of actual locations. As such, our mapping is intended to be indicative only.

3.3 Fauna survey methods

Fauna survey methods were based on *Threatened Species Survey and Assessment: Guidelines for developments and activities* (DEC Draft 2004).

Fauna surveys were undertaken on 14 and 15 November 2013.

Diurnal fauna survey

Diurnal fauna surveys comprised a 20 minute bird survey guided by the standardised bird survey method developed by Watson (2003), and a ten minute scat and sign search at 10 locations across the subject land.

Spotlighting

Spotlighting surveys were carried out at the conclusion of the call playback surveys. Two 50 watt handheld spotlights were used scanning for eye shine and active and inactive fauna. A 1-person hour random meander across the subject land was conducted on two nights. Total survey effort was 2-person hours.

Call playback

Call playback surveys consisted of transmitting a pre-recorded call of individual species, with a two minute listening period between each call. The call was transmitted using a MP3 player and FM modulator through a pair of 50 watt speakers. Calls were played for Powerful Owl, Masked Owl, Barking Owl and Green & Golden Bell Frog. Call playback surveys was completed over 30 minutes on two nights. Total survey effort was one hour.

Anabat surveys

Microchiropteran bats were surveyed using an Anabat unit. The unit was hand held during spotlighting providing a total of two person hours over two nights. Files were analysed by Steve Sass of Envirokey P/L using AnalookW, guided by the 'Key to the bat calls of New South Wales' and Australian Bats 2nd edition as well as the extensive experience of the analyst with the microchiropteran bats of the NSW south coast.

A call was defined as a sequence of three or more consecutive pulses of similar frequency. Due to variability in the quality of calls and the difficulty in distinguishing some species, each file was assigned a confidence rating as follows:

- Definite: Species identification not in doubt

- Probable: Call most likely to represent a particular species, but there exists a low probability of confusion with species of similar call types
- Possible: Call characteristics are comparable with the species, but there exists a reasonable probability of confusion with one or more bat similar species or the quality or length of call prohibits a confident identification.

Microchiropteran bat nomenclature follows that used by Churchill (2008) Australian Bats, 2nd edition.

Opportunistic
Any species of fauna observed opportunistically while on the subject land was recorded.

Motion activated infrared cameras
Motion activated infrared cameras were placed at two locations (near dam and in shrubland at top of site) for nine (9) nights each (14 -22 November), mainly targeting large mammals (e.g. Southern Brown Bandicoot and Spotted-tailed Quoll). Baits, fixed in front of camera view, comprised truffle oil and sardines, with rolled oats/honey/peanut butter scattered around the bait stations. The photographs are available on request.

Limitations
A common limitation of many biodiversity studies is the short period of time in which they are conducted. When combined with a lack of seasonal sampling this can lead to either low detection rates or false absences being reported. This is also particularly relevant to highly mobile species that may not have been in the study area at the time of the survey. Given this, it should be recognised that it may be impossible to rule out species absence for some species during field surveys. To minimise this limitation, further analysis was conducted to evaluate which threatened and migratory biota were likely to occur within the vicinity of the proposal based on the presence and quality of habitats present.

3.3.1 Habitat surveys

The entire site was walked by senior ecologists Mark Harris (Southeast Eng./Env.) and Steve Sass (Envirokey). Fauna habitat features and signs were noted and mapped. Such features and signs include: vegetation structure, hollow-bearing trees, burrows, feed trees, scats and aquatic habitat.

4.0 Results

4.1 Database searches

Lists of threatened species known or predicted to occur within a 10 km radius of the site are contained in Appendix 1. Habitat characteristics, proximity to previous records and local knowledge of the authors were used to determine each species' 'likelihood of occurrence' within the study area. Those species identified from the field survey or considered likely to occur in the study area form part of the significance assessments according to Section 5A of the EPA Act and the EPBC Act where applicable.

4.2 Flora survey results

4.2.1 Species richness

A total of 67 flora species were recorded within the study area during the field survey, of which 43 were native species and 24 were exotic species (Table 4–1). One of the exotic species, Blackberry (*Rubus fruticosus* sp. agg.), is listed as noxious under the *NSW Noxious Weeds Act 1993* (DPI 2013a).

Table 4–1 Flora species inventory for the study area. * = exotic species; ^ = noxious weed.

Scientific Name	Common Name
TREES	
Acacia mearnsii	Black Wattle
Allocasuarina littoralis	Black She-Oak
Eucalyptus pilularis	Blackbutt
**Malus pumila*	Apple tree
**Pinus radiata*	Radiata Pine
Pittosporum undulatum	Sweet Pittosporum
SHRUBS	
Bursaria spinosa	Native Blackthorn
Daviesia ulicifolia	Gorse Bitter Pea
Kunzea ambigua	Tick Bush
Leucopogon juniperinus	Prickly Beard-heath
Ozothamnus diosmifolius	White Dogwood
Persoonia linearis	Narrow-leaved Geebung
Pimelea linifolia subsp. linifolia	Rice Flower
Pultenaea retusa	A Pea
**Rubus fruticosus sp. agg.*	Blackberry complex
FERNS	
Pteridium esculentum	Bracken Fern
VINES AND TWINERS	
Cassytha sp.	Deveil's Twine
Glycine tabacina	Variable Glycine
Veronica plebeia	Trailing Speedwell
HERBS	
Caesia parviflora	Pale Grass-lily
**Centaurium sp.*	A Centaury
Centella asiatica	Indian Pennywort
**Cirsium vulgare*	Spear Thistle
**Conyza bonariensis*	Flaxleaf Fleabane
**Dactylis glomerata*	Cocksfoot
Dichondra repens	Kidney Weed
**Gamochaeta sp.*	A Cudweed

Scientific Name	Common Name
Geranium homeanum	
Opercularia hispida	Hairy Stinkweed
Oxalis perennans	
Gonocarpus teucrioides	Germander Raspwort
**Solanum nigrum*	Black-berry Nightshade
Nothoscordum borbonicum	Onion Weed
Pratia purpurascens	Whiteroot
GRASSES	
**Andropogon virginicus*	Whisky Grass
Aristida vagans	Threeawn Speargrass
Austrodanthonia sp.	A Wallaby Grass
Austrostipa rudis	Speargrass
**Briza maxima*	Quaking Grass
**Briza minor*	Shivery Grass
**Bromus catharticus*	Praire Grass
Cynodon dactylon	*Common Couch*
Dichelachne rara	
Echinopogon caespitosus	Bushy Hedgehog-grass
Entolasia stricta	Wiry Panic
**Holcus lanatus*	Yorkshire Fog
**Hypochaeris radicata*	Catsear
Lachnagrostis aemula	Blowngrass
**Lolium perenne*	Perennial Ryegrass
Microlaena stipoides	Weeping Grass
**Paspalum dilatatum*	Paspalum
**Pennisetum clandestinum*	Kikuyu Grass
**sporobolus africanus*	Parramatta Grass
**Stenotaphrum secundatum*	Buffalo Grass
Themeda australis	Kangaroo Grass
**Vulpia sp.*	Rat's-tail Fescue
GRAMINOIDS / WATERPLANTS	
Carex longebrachiata	Bergalia Tussock
Eleocharis sphacelata	Tall Spike Rush
**Juncus cognatus*	A Rush
Juncus planifolius	
Lepidosperma laterale	Variable Sword-sedge
Lepidosperma urophorum	
Lomandra longifolia	Spiny-headed Mat-rush
Philydrum lanuginosum	Frogsmouth
Schoenus apogon	Fluke Bogrush

4.2.2 Threatened flora species

No threatened flora species, listed under the TSC Act or the EPBC Act, were recorded on site. Refer to Section 5 and Appendix 1 for further information regarding significance assessments for threatened flora species.

4.2.3 Vegetation within the subject land

General description

The site comprises a mix of cleared grassland and regrowth shrubland (map in Figure 4-8). A small number of young regrowth Blackbutt (*Eucalyptus pilularis*) are scattered throughout the shrubland (the seed is likely to have emanated from a large Blackbutt tree on adjoining property to the west).

The existing house block at the eastern end of the site comprises a large number of exotic pasture grasses. Uphill (west) of this, the vegetation becomes increasingly dominated by native grasses and dense patches of native Bracken Fern (*Pteridium esculentum*) before the regrowth shrubland begins (from the dam upwards).

Swamp Oak Floodplain Forest endangered ecological community (EEC) was recorded about 30 m to the east of the site on the fringe of the estuary. Refer to Heading 4.2.4 for further information regarding EECs.

Relevance to the NSW *Native Vegetation Act* (NV Act) in relation to regrowth vegetation

Historical aerial photography (from 2002) shows that the entire site comprised cleared land at that time (Figure 4-1). Exemptions listed under the NV Act allow for the clearing of regrowth native vegetation which has occurred since 1990 without the need for approval from the determining authority (i.e. the Catchment Management Authority). Note, however, this exemption does not affect any other relevant environmental legislation (i.e. a development application must still be accompanied by a flora and fauna impact assessment pursuant to the EPA Act, the EPBC Act, etc.) regardless of the age of the vegetation.

Figure 4-1 Historical aerial photograph (taken in 2002), showing cleared land across the entire site (source: Google Earth).

Vegetation / land cover descriptions

Due to the nature of the vegetation on site (i.e. either cleared or recent regrowth and the low number of tree/shrub species), it is not possible to assign vegetation community names from standard regional vegetation mapping (i.e. Tozer *et al*. 2006). Therefore, we have produced generic/descriptive names to the vegetation on site as listed in Table 4–2.

Table 4–2 Vegetation communities / land cover within the subject site.

Community / land cover	Area (m2)
Regrowth Kunzea shrubland	5,018
Derived native grassland - weedy	5,824
Exotic pasture and lawn	4,484
Dam	848

Regrowth Kunzea shrubland

This vegetation community covers most of the western half of the site where there is a dense cover of Tick Bush (*Kunzea ambigua*) (map in Figure 4-8). A number of young regrowth Blackbutt (*Eucalyptus pilularis*) are scattered throughout the shrubland, as are a few Black Wattle (*Acacia mearnsii*) and Black She-Oak (*Allocasuarina littoralis*). Very few groundlayer plants occur within this community due mainly to the dense shrub cover.

Existing/recent disturbance factors include informal motorbike tracks and grazing (e.g. Alpacas observed entering via derelict fence from adjacent property). Weeds and exotic pasture grasses are less abundant in this community than the more open/grassy parts of the site.

Figure 4-2 Regrowth Kunzea shrubland

Derived native grassland - weedy

This vegetation community occurs around the perimeter of the shrubland and downslope of if for some 25 m or so where it becomes increasingly dominated by exotic species (map in Figure 4-8).

The predominant native species include: Kangaroo Grass (*Themeda australis*), Wiry Panic (*Entolasia stricta*), Blowngrass (*Lachnagrostis aemula*) and Bracken Fern.

Existing/recent disturbance factors include informal motorbike tracks and grazing (e.g. Alpacas observed entering via derelict fence from adjacent property). Weeds and exotic pasture grasses are common and include Paspalum (*Paspalum dilatatum*), Buffalo Grass (*Stenotaphrum secundatum*), Shivery Grass (*Briza minor*) and Yorkshire Fog (*Holcus lanatus*).

Figure 4-3 Derived native grassland - weedy

Exotic Pasture and lawn

This vegetation occurs predominantly within the existing house block at the east of the site and continues uphill where it grades into the derived native grassland described above (map in Figure 4-8). Species composition comprises a large number of exotic pasture/lawn grasses, weeds and garden/fruit trees.

This section of the site is in a highly disturbed condition based on the almost complete dominance by exotic species and general disturbance associated with an eroding access road, grazing and rubbish dumping.

Figure 4-4 Exotic pasture and lawn

Dam

The dam comprises open water, with a small number of emergent waterplant species including Tall Spike Rush (*Eleocharis sphacelata*), Frogsmouth (*Philydrum lanuginosum*), Fluke Bogrush (*Schoenus apogon*) and Bog Bullrush (*Schoenoplectus mucronatus*). The dam is surrounded mainly by regrowth Tick Bush (*Kunzea ambigua*) .

Figure 4-5 Dam, located in the centre of the site

4.2.4 Endangered ecological community (EEC) determination

Within the subject site

Based on remnant/regrowth plants species within and adjacent to the site, along with geology/soils and landscape position, it has been determined that the subject land does not contain any endangered ecological communities pursuant to Schedules of the TSC Act or the EPBC Act. This is based on the following factors:

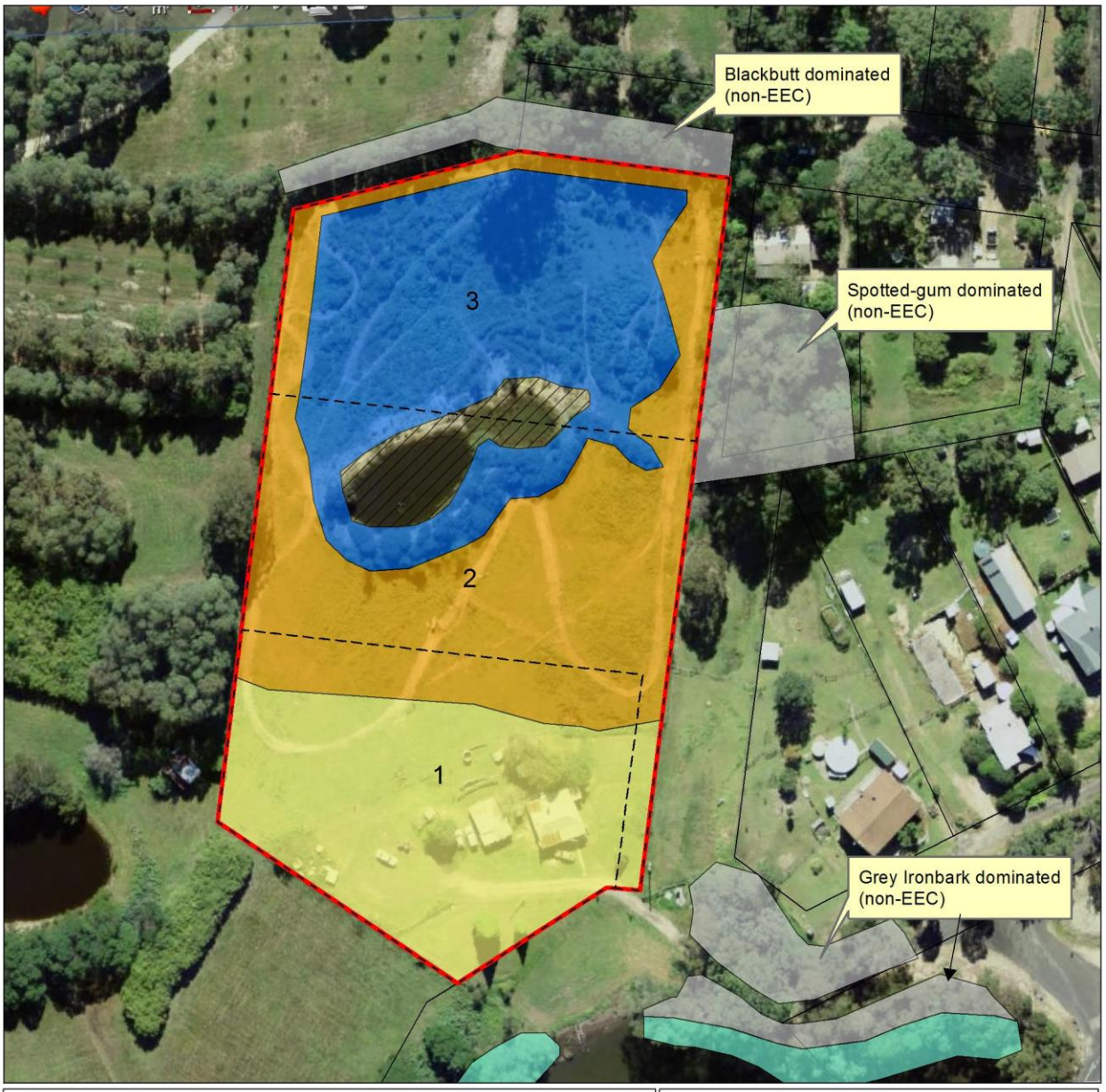
- The remnant and regrowth native eucalypts trees within and/or adjacent to the subject land are Blackbutt (*Eucalyptus pilularis*), Spotted Gum (*Corymbia maculata*) and Grey Ironbark (*Eucalyptus paniculata*).
- The soils are shale derived (as shown in the photograph below).
- The above combination of eucalypt species along the soil type are best aligned with regional vegetation communities such as Southern Lowland Wet Forest, Batemans Bay Cycad Forest and Murramarang Lowlands Forest (Tozer *et al.* SCIVI classification and mapping). These communities are not components of any EEC.
- None of the eucalypt species that characterise the most likely EEC for the landscape and geographic position are present (i.e. Lowland Grassy Woodland). This is most likely due to the poor soil characteristics of the shale derived soils on site compared the granitic soils on which that EEC mostly occurs.

Nearby the subject site

About 30 m east of the subject site, the TSC Act listed EEC *Swamp Oak Floodplain Forest* is present along the fringe of the estuary, (photograph in Figure 4-7, map in Figure 4-8). This determination is based the presence of *Casuarina glauca* and the landscape position being on a coastal floodplain/estuary. Due to the close proximity of the EEC to the subject land, it is addressed under the EPA Act 7-part test (Appendix A). Summaries of the 7-part test results are outlined in Section 5.3 and Section 6.

Figure 4-6 Photograph of shale derived soils on site

Figure 4-7 Swamp Oak Floodplain Forest (SOFF) 30 m east of site along estuary fringe



Legend

Vegetation community

- Regrowth Kunzea shrubland
- Derived native grassland - weedy
- Exotic pasture and lawn
- Swamp-oak Floodplain Forest (EEC)
- Various native vegetation remnants - as labelled
- Dam
- Proposed lot boundaries
- Study area

Map datum, projection: GDA 1994, MGA Zone 56

Data sources.
Vegetation, study area: Southeast
Prposed lot layout: John Healey Surveyors
Aerial image: SIX Mapper (NSW LPI)

Mapping date: 20 January 2014

0 12.5 25 50 Meters

N

southeast
engineering + environmental
16/25 Church Street Moruya NSW 2537, T: (02) 4474 4439

Vegetation communities within the study area (and surrounds)

Figure 4-8 Vegetation map

4.3 Fauna Survey Results

Weather conditions during the fauna survey (source: BOM, 2013, Moruya Heads)

Date	Min temp (C)	Max temp (C)	Rainfall 24hr (mm)	Notes
14/11/2013	7.7	22	0	
15/11/2013	13.1	20.5	4.8	Intermittent showers

A total of 63 fauna species were recorded. These comprised 51 species of bird, 10 species of mammal, two species of reptile and five species of frog (Table 4–3). This included one threatened species, Southern Myotis (*Myotis macropus*) which were recorded by echolocation call analysis adjacent to Smarts Creek and one migratory species, Eastern Great Egret (*Ardea modesta*); a single bird foraging within Smarts Creek.

Of note was the prevalence of aggressive honeyeater species on the site, particularly Noisy Friarbirds (*Philemon corniculatus*) and Red Wattlebirds (*Anthochaera carunculata*).

Avian diversity was recorded in accordance with Watson (2003) to develop an understanding of species presence and absence within the subject land. Ten standard bird surveys were completed, with as few as 6 species, and as many as 22 species recorded in each 20-minute survey (Table 4–3). The most commonly detected species were Red Wattlebird (8 surveys), Rainbow Lorikeet, Noisy Friarbird and Grey Fantail (all 7 surveys). Of the 51 bird species recorded, 15 species were recorded within only one survey.

Table 4–3 Fauna species recorded on site. * denotes introduced species. ** denotes listed threatened or migratory species

Class	Common Name	Scientific Name
Amphibia	Smooth Toadlet	*Uperoleia laevigata*
Amphibia	Common Froglet	*Crinia signifera*
Amphibia	Peron's Tree Frog	*Litoria peronii*
Amphibia	Southern Brown Tree Frog	*Litoria ewingii*
Amphibia	Striped Marsh Frog	*Limnodynastes peronii*
Aves	Eurasian Coot	*Fulica atra*
Aves	Welcome Swallow	*Hirundo neoxena*
Aves	**Eastern Great Egret	*Ardea modesta*
Aves	Red Wattlebird	*Anthochaera carunculata*
Aves	White-eared Honeyeater	*Lichenostomus leucotis*
Aves	White-faced Heron	*Egretta novaehollandiae*
Aves	Pied Cormorant	*Phalacrocorax varius*
Aves	Grey Fantail	*Rhipidura albiscapa*
Aves	Eastern Yellow Robin	*Eopsaltria australis*
Aves	Australian Magpie	*Cracticus tibicen*
Aves	Chestnut Teal	*Anas castanea*
Aves	Pied Currawong	*Strepera graculina*
Aves	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
Aves	Rainbow Lorikeet	*Trichoglossus haematodus*
Aves	*Common Starling	*Sturnus vulgaris*
Aves	Satin Bowerbird	*Ptilonorhynchus violaceus*
Aves	Noisy Friarbird	*Philemon corniculatus*

Class	Common Name	Scientific Name
Aves	Eastern Spinebill	*Acanthorhynchus tenuirostris*
Aves	Grey Butcherbird	*Cracticus torquatus*
Aves	Rufous Whistler	*Pachycephala rufiventris*
Aves	New Holland Honeyeater	*Phylidonyris novaehollandiae*
Aves	Australian Raven	*Corvus coronoides*
Aves	White-browed Scrubwren	*Sericornis frontalis*
Aves	Yellow Thornbill	*Acanthiza nana*
Aves	Yellow-faced Honeyeater	*Lichenostomus chrysops*
Aves	Striated Thornbill	*Acanthiza lineata*
Aves	Brown Thornbill	*Acanthiza pusilla*
Aves	Little Friarbird	*Philemon citreogularis*
Aves	Willie Wagtail	*Rhipidura leucophrys*
Aves	Australian King-Parrot	*Alisterus scapularis*
Aves	Common Bronzewing	*Phaps chalcoptera*
Aves	Olive-backed Oriole	*Oriolus sagittatus*
Aves	Silvereye	*Zosterops lateralis*
Aves	Galah	*Eolophus roseicapillus*
Aves	Fan-tailed Cuckoo	*Cacomantis flabelliformis*
Aves	Superb Fairy-wren	*Malurus cyaneus*
Aves	Little Wattlebird	*Anthochaera chrysoptera*
Aves	Channel-billed Cuckoo	*Scythrops novaehollandiae*
Aves	Brown-headed Honeyeater	*Melithreptus brevirostris*
Aves	Laughing Kookaburra	*Dacelo novaeguineae*
Aves	White-throated Treecreeper	*Cormobates leucophaea*
Aves	White-throated Gerygone	*Gerygone albogularis*
Aves	Sulphur-crested Cockatoo	*Cacatua galerita*
Aves	Pacific Black Duck	*Anas superciliosa*
Aves	Whistling Kite	*Haliastur sphenurus*
Aves	Crimson Rosella	*Platycercus elegans*
Mammalia	Eastern Grey Kangaroo	*Macropus giganteus*
Mammalia	Red-necked Wallaby	*Macropus rufogriseus*
Mammalia	Little Forest Bat	*Vespedales vulturnus*
Mammalia	Large Forest Bat	*Vespedales darlingtoni*
Mammalia	Chocolate Wattled Bat	*Chalinolobus morio*
Mammalia	Gould's Wattled Bat	*Chalinolobus gouldii*
Mammalia	White-striped Freetail Bat	*Austronomus australis*
Mammalia	**Southern Myotis	*Myotis macropus*
Mammalia	Echidna	*Echidna hystrix*
Mammalia	*Cat	*Felis catus*
Reptilia	Garden Skink	*Lampropholis guichenoti*
Reptilia	Grass Skink	*Lampropholis delicata*

Table 4–4 Confidence ranking from analysis of 329 Anabat detections (by Steve Sass of Envirokey P/L)

Species	Confidence Ranking			
	PO	**PR**	**D**	**Total**
Not of bat origin (wind, walking through grass, insects, etc.)	-	-	5	5
Austronomus australis	-	-	3	3
Chalinolobus gouldii	-	4	6	10
Chalinolobus morio	-	1	-	1
Myotis macropus	-	4	1	5
Vespedales darlingtoni	2	4	2	8
Vespedales vulturnus	5	3	1	9
			Total	41

Table 4–5 Avian species detected during each bird survey (by Steve Sass of Envirokey P/L) (P = Present)

Common Name	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	Totals
Australian King-Parrot							P				1
Australian Magpie	P			P		P	P			P	5
Australian Raven				P			P	P			3
Black-faced Cuckoo-shrike						P			P		2
Brown Thornbill	P			P			P	P			4
Brown-headed Honeyeater			P	P							2
Channel-billed Cuckoo	P			P	P						3
Chestnut Teal										P	1
Common Bronzewing						P					1
Common Starling									P		1
Crimson Rosella	P										1
Eastern Great Egret										P	1
Eastern Spinebill	P			P	P		P	P	P		6
Eastern Yellow Robin	P		P		P			P		P	5
Eurasian Coot										P	1
Fan-tailed Cuckoo				P	P	P					3
Galah						P					1
Grey Butcherbird				P			P		P		3
Grey Fantail	P		P			P	P	P	P	P	7
Laughing Kookaburra				P							1
Little Friarbird				P		P	P				3
Little Wattlebird					P						1
New Holland Honeyeater			P		P	P		P			4
Noisy Friarbird	P	P			P	P	P	P	P		7
Olive-backed Oriole		P		P	P	P					4
Pacific Black Duck	P										1
Pied Cormorant										P	1

Common Name	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	Totals
Pied Currawong								P	P		2
Rainbow Lorikeet	P	P		P	P	P	P		P		7
Red Wattlebird	P			P	P	P	P	P	P	P	8
Rufous Whistler	P	P		P	P	P		P			6
Satin Bowerbird	P					P	P	P	P		5
Silvereye				P		P					2
Striated Thornbill			P	P	P			P			4
Sulphur-crested Cockatoo			P								1
Superb Fairy-wren	P	P				P					3
Welcome Swallow	P										1
Whistling Kite	P										1
White-browed Scrubwren			P					P			2
White-eared Honeyeater			P	P		P				P	4
White-faced Heron	P	P		P						P	4
White-throated Gerygone	P			P							2
White-throated Treecreeper				P						P	2
Willie Wagtail					P		P				2
Yellow Thornbill				P				P			2
Yellow-faced Honeyeater			P	P	P			P			4
Total each survey	18	6	9	22	14	17	13	15	10	11	

4.3.1 Habitat surveys

The subject land comprises three general fauna habitats (Open Grassland, Shrubland, and Aquatic).

Open Grassland and Shrubland dominate the subject land with Aquatic habitat occurring in the form of a constructed farm dam and the adjacent Smarts Creek. Resources for threatened species are virtually absent in that there are no hollow-bearing trees, or large overstorey trees. Adjoining Black Sheoak (overhanging from the northern boundary) were thoroughly inspected for Glossy Black Cockatoo foraging signs, and none were detected. Detailed inspections throughout the Shrubland failed to locate any evidence of conical diggings confirming that the subject land does not support a bandicoot or potoroo population.

The farm dam is surrounded by Shrubland and is characterised by cover of spike-rush providing habitat for common frog species. An absence of grassy banks or surrounds or dense tea-tree within the waterbody infers that this habitat is not suitable for Green and Golden Bell Frog.

5.0 Impact assessment

5.1 Description of direct and potential indirect impacts

In total, the proposal will result in vegetation disturbance covering up to 1.1 ha. The vegetation on site does not form significant connectivity across the surrounding landscape, and as such connectivity will not be impacted by the proposal.

The following direct impacts on flora and fauna habitat are anticipated from the proposal:

- Clearing of up to 0.5 ha of regrowth shrubland and up to 0.6 ha of derived native grassland for the creation of building envelopes, gardens and bushfire asset protections zones.
- The partial filling of the existing farm dam.

Potential indirect impacts on flora and fauna habitat anticipated from the proposal include:

- Simplification of native flora species richness/diversity in the remaining 0.3 ha of derived native grassland through possible intensive grazing or regular mowing.
- Weed infestation (however the site has been farmed/grazed over a long time period and many exotic plant species are already on site).
- Erosion and sedimentation (e.g. from road and building envelope construction)

The assessment of these potential impacts on threatened species is provided below. Mitigation measures addressing these issues are listed in Section 6.

5.2 Species and ecological communities requiring significance assessment

The following species (Table 5–1) were either recorded on site or considered likely to occur on the site (see likelihood of occurrence table in Appendix 1) and the potential impact of the proposal on these species has been assessed under relevant legislation. The conclusions of these assessments are provided below in Sections 5.3 and 5.4.

Table 5–1 Species requiring an assessment of significance

Scientific Name	Common Name	TSC Act	EPBC Act	Occurrence
SPECIES				
Litoria aurea	Green and Golden Bell Frog	E	V	Predicted
Botaurus poiciloptilus	Australasian Bittern	V	E	Predicted
Daphoenositta chrysoptera	Varied Sittella	V	—	Predicted
Ephippiorhynchus asiaticus	Black-necked Stork	E	—	Predicted
Glossopsitta pusilla	Little Lorikeet	V	—	Predicted
Lathamus discolor	Swift Parrot	E	E	Predicted
Rostratula australis	Australian Painted Snipe	E	E, M	Predicted
Miniopterus schreibersii oceanensis	Eastern Bent-wing Bat	V	—	Predicted
Mormopterus norfolkensis	East Coast Freetail Bat	V	—	Predicted
Myotis macropus	Southern Myotis	V	—	On site
Pteropus poliocephalus	Grey-headed Flying Fox	V	V	On site
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	V	—	Predicted
Scoteanax rueppellii	Greater Broad-nosed Bat	V	—	Predicted

Scientific Name	Common Name	TSC Act	EPBC Act	Occurrence
Myiagra cyanoleuca	Satin Flycatcher	—	M	Predicted
Ardea alba	Great Egret	—	M	Predicted
Gallinago hardwickii	Latham's Snipe	—	M	Predicted
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions EEC	*Swamp Oak Floodplain Forest*	EEC		30 m east of site

E = Endangered, V = Vulnerable, M = Migratory, EEC = Endangered Ecological Community

5.3 Conclusion of 7-part test

Assessments of Significance under Section 5A of the EP&A Act were undertaken on those species and ecological communities observed on the site or considered likely to occur there (Appendix 1). The outcome of the assessments determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on the Eastern Bentwing Bat, Eastern Freetail Bat, Southern Myotis, Yellow-bellied Sheathtail Bat, Grey-headed Flying Fox, White-fronted Chat, Australasian Bittern, Square-tailed Kite and Swamp Oak Floodplain Forest EEC provided that the recommendations outlined in Section 6 are fully adopted. Therefore, it is deemed that this matter will not require referral to the NSW Director General.

5.4 Conclusion of EPBC Act assessment

An assessment of significance under the EPBC Act was undertaken on those species observed on the site or considered likely to occur there (Appendix 1). The outcome of this assessment was that it is unlikely that the development would significantly impact on those threatened or migratory species assessed (Table 5–1). Only a small number of individuals will be impacted and the level of habitat removal will be negligible in the context of the available habitat in the locality.

Therefore, it is deemed that referral to the Commonwealth under the EPBC Act is not required.

Recommendations have been provided in Section 6 to further ameliorate the potential impacts on site.

5.5 SEPP 44 Koala Habitat assessment

The subject site comprises cleared land, some recent shrub regrowth with only a small number of eucalypt trees growing on site (all *Eucalyptus pilularis* - Blackbutt). This tree species is not listed as a primary browse tree on Schedule 2 of SEPP 44.

No evidence of koalas was identified on site and no records are known within 10 km of the site. As such the site does not meet the definition of 'Core Koala Habitat'. SEPP 44 does not place any restrictions on the proposal.

6.0 Conclusion and recommendations

6.1 Impact assessment summary

6.1.1 Anticipated direct and potential impacts

The following direct impacts on flora and fauna habitat are anticipated from the proposal:

- Clearing of up to 0.5 ha of regrowth native shrubland and up to 0.6 ha of derived native grassland for the creation of building envelopes, gardens and bushfire asset protections zones.
- The partial filling of the existing farm dam.

Potential indirect impacts on flora and fauna habitat anticipated from the proposal include:

- Simplification of native flora species richness/diversity in the remaining 0.3 ha of derived native grassland through possible intensive grazing or regular mowing.
- Weed infestation (however the site has been farmed/grazed over a long time period and many exotic plant species are already on site).
- Erosion and sedimentation (e.g. from road and building envelope construction)

6.1.2 Threatened flora species and populations

Based on desktop searches, field studies and likelihood of occurrence evaluations, it has been determined that there are no threatened flora species issues in relation to the proposed activity.

This matter will not require referral to the NSW Director General or the Commonwealth Minster in regards to threatened flora species.

It is deemed that no further flora surveys are required for this development despite certain flora species being undetectable at the time of this survey (e.g. *Cryptostylis hunteriana* - Leafless Tongue Orchid). There are no records for this species in the locality (i.e. predicted in the EPBC Act search tool only). The nearest record for this species is at Batemans Bay to the north, with the nearest southern record being at Eden.

6.1.3 Endangered ecological communities

Within the site: No EECs occur within the subject site (refer to Heading 4.2.4 for further information).

Nearby the site: A narrow band of *Swamp Oak Floodplain Forest* EEC (TSC Act listed) occurs along the fringe of Smarts Creek about 30 m to the east of the subject site. Based on an assessment of significance (Appendix A) pursuant to Section 5A of the EP&A Act, it was determined that the proposed activity is unlikely to have a significant effect on the local occurrence of this entity (the EEC is already impacted by weeds from previous land clearing and ongoing farming/grazing etcetera).

This matter will not require referral to the NSW Director General or the Commonwealth Minster in regards to EECs.

Refer to the mitigation measures listed below

6.1.4 Threatened fauna species

Based on desktop searches, species evaluations (Appendix 1), field studies and significance assessments (Appendix 1) pursuant to Section 5A of the EP&A Act and the EPBC Act, this assessment

has determined that there are no threatened fauna species issues in relation to the proposed activity. Refer to Headings 5-3, 5-4 and 5-5 for summaries of the impact assessments.

This matter will not require referral to the NSW Director General or the Commonwealth Minster in regards to threatened fauna species.

Refer to the mitigation measures listed below.

6.2 Mitigation measures

1. Erosion and sedimentation control during the construction period: Sediment fences or equivalent should be erected prior to the removal of any vegetation and kept in place until all bare areas of soil have been stabilised. If non-native grasses are used for soil stabilisation, they should be sterile/non-invasive species such as Oats (*Avena* species).
2. Sewage management: As planned by the proponent, all three lots shall be connected to the existing sewer scheme servicing the village of Turlinjah.
3. The planting of any species listed on the Weeds Australia NSW weeds list (www.weeds.org.au) should be prohibited for the life of the development. No exotic perennial grasses listed on the Final Determination of the NSW Scientific Committee for the key threatening process *Invasion of native plant communities by exotic perennial grasses* should be sown on the property for the life of the development.

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Appendix 1 – Threatened and migratory assessments

Likelihood of occurrence assessment - fauna

An assessment of likelihood of occurrence was made for threatened and migratory species identified from the database search. Five terms for the likelihood of occurrence of species are used in this report. This assessment was based on database or other records, presence or absence of suitable habitat, features of the proposal site, results of the field survey and professional judgement. The terms for likelihood of occurrence are defined below:

- "yes" = the species was or has been observed on the site
- "likely" = a medium to high probability that a species uses the site
- "potential" = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- "unlikely" = a very low to low probability that a species uses the site
- "no" = habitat on site and in the vicinity is unsuitable for the species.

E = Endangered; E2 = Endangered Population; V = Vulnerable; M = Migratory.

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
FROGS					
Heleioporus australiacus	Giant Burrowing Frog	V	V	Forages in woodlands, wet heath, dry and wet sclerophyll forest (Ehmann 1997). Associated with semi-permanent to ephemeral sand or rock based streams (Ehmann 1997), where the soil is soft and sandy so that burrows can be constructed (Environment Australia 2000).	No
Litoria aurea	Green and Golden Bell Frog	E	V	This species has been observed utilising a variety of natural and man-made waterbodies (Pyke & White 1996) such as coastal swamps, marshes, dune swales, lagoons, lakes, other estuary wetlands, riverine floodplain wetlands and billabongs, stormwater detention basins, farm dams, bunded areas, drains, ditches and any other structure capable of storing water (DECC 2007). Fast flowing streams are not utilised for breeding purposes by this species (Mahony 1999). Preferable habitat for this species includes attributes such as shallow, still or slow flowing, permanent and/or widely fluctuating water bodies that are unpolluted and without heavy shading (DECC 2007). Large permanent swamps and ponds exhibiting well-established fringing vegetation (especially bulrushes–*Typha* sp. and spikerushes–*Eleocharis* sp.) adjacent to open grassland areas for foraging are preferable (Ehmann 1997; Robinson 1993). Ponds that are typically inhabited tend to be free from predatory fish such as Mosquito Fish (*Gambusia holbrooki*) (DECC 2007).	Unlikely

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
Litoria littlejohni	Heath Frog	V	V	It appears to be restricted to sandstone woodland and heath communities at mid to high altitude (NSW Scientific Committee 2000). It forages both in the tree canopy and on the ground, and it has been observed sheltering under rocks on high exposed ridges during summer (NSW Scientific Committee 2000). Littlejohn's Tree Frog has a distribution that includes the plateaus and eastern slopes of the Great Dividing Range from Watagan State Forest (90 km north of Sydney) south to Buchan in Victoria (DECC 2007). It occurs along permanent rocky streams with thick fringing vegetation associated with eucalypt woodlands and heaths among sandstone outcrops. It hunts either in shrubs or on the ground. Breeding is triggered by heavy rain and can occur from late winter to autumn, but is most likely to occur in spring when conditions are favourable. Males call from low vegetation close to slow flowing pools. Eggs and tadpoles are mostly found in slow flowing pools that receive extended exposure to sunlight, but will also use temporary isolated pools	No
Mixophyes balbus	Stuttering Barred Frog	E	V	Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range.	No
DIURNAL BIRDS					
Actitis hypoleucos	Common Sandpiper		M		Unlikely
Anthochaera phrygia (Xanthomyza phrygia)	Regent Honeyeater	CE	E, M	Associated with temperate eucalypt woodland and open forest including forest edges, wooded farmland and urban areas with mature eucalypts, and riparian forests of River Oak (Casuarina cunninghamiana) (Garnett 1993). Areas containing Swamp Mahogany (Eucalyptus robusta) in coastal areas have been observed to be utilised (NPWS 1997). The Regent Honeyeater primarily feeds on nectar from box and ironbark eucalypts and occasionally from banksias and mistletoes (NPWS 1995). As such it is reliant on locally abundant nectar sources with different flowering times to provide reliable supply of nectar (Environment Australia 2000).	No
Apus pacificus	Fork-tailed Swift		M	Sometimes travels with Needletails. Varied habitat with a possible tendency to more arid areas but also over coasts and urban areas (Simpson & Day 1999).	Likely
Ardea alba	Great Egret	—	M	The Great Egret is common and widespread in Australia (McKilligan, 2005). It forages in a wide range of wet and dry habitats including permanent and ephemeral freshwaters, wet pasture and estuarine mangroves and mudflats (McKilligan, 2005).	Yes. Recorded on site
Ardea ibis	Cattle Egret	—	M	Cattle Egrets forage on pasture, marsh, grassy road verges, rain puddles and croplands, but not usually in the open water of streams or lakes and they avoid marine environments (McKilligan, 2005). Some individuals stay close to the natal heronry from one nesting season to the next, but the majority leave the district in autumn and return the next spring. Cattle Egrets are likely to spend the winter dispersed along the coastal plain and only a small number have been recovered west of the Great Dividing Range (McKilligan, 2005).	Likely

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
Arenaria interpres	Ruddy Turnstone	—	M		Unlikely
Botaurus poiciloptilus	Australasian Bittern	V	E	Terrestrial wetlands with tall dense vegetation, occasionally estuarine habitats (Marchant, S. & Higgins, P.J., 1993). Reedbeds, swamps, streams, estuaries (Simpson & Day 1999).	Potential
Calamanthus fuliginosus	Striated Fieldwren	E		The Striated Fieldwren is found in coastal swamp heaths and tussock fields of south-eastern NSW, into southern Victoria and the south-east of South Australia. It is also found in Tasmania. There are four recognised subspecies, but only one (albiloris) occurs in NSW. Most records are from two main regions - the far south coast (Nadgee NR and Ben Boyd NP) and in Morton NP (Little Forest, Tianjara Falls) though there are scattered records in between these two areas (particularly in coastal habitats). Is occasionally recorded further north with records at Bilpin (1979), Kurnell (1979) and Mittagong (1992), though there do not appear to be resident populations at any of these sites. Mainly a bird of ground and understorey vegetation, and can be found in swampy, coastal heathlands, tussocky grasslands, low shrubby vegetation and margins of swamps.	No
Calidris alba	Sanderling	V	M		Unlikely
Calidris acuminata	Sharp-tailed Sandpiper	—	M		Unlikely
Calidris canutus	Red Knot	—	M		Unlikely
Calidris ferruginea	Curlew Sandpiper	E	M		Unlikely
Calidris ruficollis	Red-necked Stint		M		Unlikely
Calidris tenuirostris	Great Knot	V	M		Unlikely
Callocephalon fimbriatum	Gang-gang Cockatoo	V	—	During summer in dense, tall, wet forests of mountains and gullies, alpine woodlands (Morcombe 2004). In winter they occur at lower altitudes in drier more open forests and woodlands, particularly box-ironbark assemblages (Shields & Chrome 1992). They sometimes inhabit woodland, farms and suburbs in autumn/winter (Simpson & Day 2004).	No
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	—	Associated with a variety of forest types containing Allocasuarina species, usually reflecting the poor nutrient status of underlying soils (Environment Australia 2000; NPWS 1997; DECC 2007). Intact drier forest types with less rugged landscapes are preferred (DECC 2007). Nests in large trees with large hollows (Environment Australia 2000).	No
Charadrius leschenaultii	Greater Sand-plover	V	M	Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks.	Unlikely
Charadrius mongolus	Lesser Sand-plover	V	M	Almost entirely coastal in NSW, favouring the beaches of sheltered bays, harbours and estuaries with large intertidal sandflats or mudflats; occasionally occurs on sandy beaches, coral reefs and rock platforms.	Unlikely
Chlidonias leucopterus	White-winged Black Tern		M		Unlikely
Chthonicola sagittata	Speckled Warbler	V		The Speckled Warbler has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. The species is most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast. There has been a decline in population density throughout its range, with the decline exceeding 40% where no vegetation remnants larger than 100ha survive. 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.	No

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
Climacteris picumnus victoriae	Brown Treecreeper (eastern subsp.)	V		Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (Eucalyptus camaldulensis) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains. Sedentary, considered to be resident in many locations throughout its range; present in all seasons or year-round at many sites; territorial year-round, though some birds may disperse locally after breeding.	No
Daphoenositta chrysoptera	Varied Sittella	V	-	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	No
Diomedea exulans	Wandering Albatross	E	E, M		No
Egretta sacra	Eastern Reef Egret		M		No
Epthianura albifrons	White-fronted Chat	V		The White-fronted Chat is found across the southern half of Australia, from southernmost Queensland to southern Tasmania, and across to Western Australia as far north as Carnarvon. Found mostly in temperate to arid climates and very rarely sub-tropical areas, it occupies foothills and lowlands up to 1000 m above sea level. In NSW, it occurs mostly in the southern half of the state, in damp open habitats along the coast, and near waterways in the western part of the state. Along the coastline, it is found predominantly in saltmarsh vegetation but also in open grasslands and sometimes in low shrubs bordering wetland areas. Gregarious species, usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. They are insectivorous, feedin mainly on flies and beetles caught from or close to the ground. Have been observed breeding from late July through to early March, with 'open-cup' nests built in low vegetation. Nests in the Sydney region have also been seen in low isolated mangroves.	Likely
Erythrotriorchis radiatus	Red Goshawk	—	V		No
Gallinago hardwickii	Latham's Snipe	—	M	A variety of permanent and ephemeral wetlands, preferring open fresh water wetlands with nearby cover (Marchant and Higgins 1999). Occupies a variety of vegetation around wetlands (Marchant and Higgins 1999) including wetland grasses and open wooded swamps (Simpson and Day 1999).	Likely
Glossopsitta pusilla	Little Lorikeet	V	—	In New South Wales Little Lorikeets are distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri. Little Lorikeets mostly occur in dry, open eucalypt forests and woodlands. They have been recorded from both old-growth and logged forests in the eastern part of their range, and in remnant woodland patches and roadside vegetation on the western slopes. They feed primarily on nectar and pollen in the tree canopy, particularly on profusely-flowering eucalypts, but also on a variety of other species including melaleucas and mistletoes. On the western slopes and tablelands White Box *Eucalyptus albens* and Yellow Box *E. melliodora* are particularly important food sources for pollen and nectar respectively.	No
Haematopus fuliginosus	Sooty Oystercatcher	V			No
Haematopus longirostris	Pied Oystercatcher	E			No

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
Haliaeetus leucogaster	White-bellied Sea-Eagle	—	M	Forages over large open fresh or saline waterbodies, coastal seas and open terrestrial areas (Marchant, S. & Higgins, P.J., 1993, Simpson & Day 1999). Breeding habitat consists of tall trees, mangroves, cliffs, rocky outcrops, silts, caves and crevices and is located along the coast or major rivers. Breeding habitat is usually in or close to water, but may occur up to a kilometre away (Marchant, S. & Higgins, P.J., 1993).	Unlikely
Hieraaetus morphnoides	Little Eagle	V	—	The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. Occupies open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living rees 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.	No
Hirundapus caudacutus	White-throated Needletail	—	M	Forages aerially over a variety of habitats usually over coastal and mountain areas, most likely with a preference for wooded areas (Marchant, S. & Higgins, P.J., 1993; Simpson & Day 1999). Has been observed roosting in dense foliage of canopy trees, and may seek refuge in tree hollows in inclement weather (Marchant, S. & Higgins, P.J., 1993).	Likely
Hydroprogne caspia	Caspian Tern		M		Unlikely
Ixobrychus flavicollis	Black Bittern	V	—	Occurs in both terrestrial and estuarine wetlands generally in areas of permanent water and dense vegetation (DECC 2007). In areas with permanent water it may occur in flooded grassland, forest, woodland, rainforest and mangroves (DECC 2007)	Unlikely
Lathamus discolor	Swift Parrot	E	E	Breeds in Tasmania between September and January. Migrates to mainland in autumn, where it forages on profuse flowering Eucalypts (Blakers *et al.* 1984; Schodde and Tidemann 1986; Forshaw and Cooper 1981). Hence, in this region, autumn and winter flowering eucalypts are important for this species. 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) (DECC 2007).	No
Limosa lapponica	Bar-tailed Godwit	—	M	Mainly coastal, usually sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats. Breeds in Northern Russia, Scandinavia, NW Alaska (DEH 2005a).	No
Limosa limosa	Black-tailed Godwit	—	M	Mainly coastal, usually sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats (DEH 2005a). Often found inland in small numbers (ibid). Breeds in Iceland, Nth Atlantic, Europe, Russian and China (ibid).	No
Lophoictinia isura	Square-tailed Kite	V	—	In coastal areas associated tropical and temperate forests and woodlands on fertile soils with an abundance of passerine birds (Marchant & Higgins 1993, DECC 2007). May be recorded inland along timbered watercourses (DECC 2007). In NSW it is commonly associated with ridge or gully forests dominated by Woollybutt (Eucalyptus logifloria), Spotted Gum (E. maculata), or Peppermint Gum (E. elata, E. smithii) (DECC 2007).	Likely
Merops ornatus	Rainbow Bee-eater	—	M	Resident in coastal and subcoastal northern Australia; regular breeding migrant in southern Australia, arriving September to October, departing February to March, some occasionally present April to May (Pizzey and Doyle 1988). Occurs in open country, chiefly at suitable breeding places in areas of sandy or loamy soil: sand-ridges, riverbanks, road-cuttings, sand-pits, occasionally coastal cliffs (ibid). Nest is a chamber a the end of a burrow, up to 1.6 m long, tunnelled in flat or sloping ground, sandy back or cutting (ibid).	No
Monarcha melanopsis	Black-faced Monarch	—	M	Rainforest and eucalypt forests, feeding in tangled understorey (Blakers et al. 1984).	No
Monarcha trivirgatus	Spectacled Monarch	—	M	Wet forests, mangroves (Simpson and Day 1999).	No
Myiagra cyanoleuca	Satin Flycatcher	—	M	Associated with drier eucalypt forests, absent from rainforests (Blakers et al. 1984), open forests, often at height (Simpson & Day 1999).	No

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
Neophema chrysogaster	Orange-bellied Parrot	E	CE	Breeds only in coastal south-west Tasmania and spends the winter in coastal Victoria and South Australia. It nests in hollows in eucalypt trees which grow adjacent to its feeding plains. In early October the birds arrive in the south west and depart after the breeding season usually in March and April. It feeds on the seeds of several sedges and heath plants, including buttongrass. Its main food preferences are found in sedgelands which have not been burned for between 3-15 years. Also included in the diet are seeds of three Boronia species and the everlasting daisy *Helichrysum pumilum*. After breeding, migrating birds move gradually northwards up the west coast, through the Hunter Group and King Island in Bass Strait and on to the mainland. On the journey the birds usually feed on beach-front vegetation including salt tolerant species such as sea rocket *Cakile maritima*. They also eat various coastal native and introduced grasses.	No
Numenius madagascariensis	Eastern Curlew	—	M	Intertidal coastal mudflats, coastal lagoons, sandy spits (DEH 2005a). Breeds in Russia, NE China (ibid).	Unlikely
Numenius minutus	Little Curlew, Little Whimbrel	—	M	The Little Curlew is known to breed in Siberia, with migrants arriving after early April. Southern migration begins in September following the Chinese coast and, after a staging in Mongolia, continues to Northern Australia and New Guinea (Barter 2002). Outside of the breeding season, the species inhabits grasslands, open plains, parklands and mud-flats of Northern Australia (Simpson and Day 1999).	Unlikely
Numenius phaeopus	Whimbrel	—	M	Intertidal coastal mudflats, river deltas and mangroves, occasionally sandy beaches (DEH 2005a). Breeds Siberia and Alaska (ibid.).	No
Pachycephala olivacea	Olive Whistler	V		Elevated (>500 MASL), cool temperate rainforest and moist eucalypt forest in the northern part of their range. This species appears to favour large tracts of undisturbed and densely vegetated forest (SFNSW 1995).	No
Pandion haliaetus	Eastern Osprey	V	—	Associated with waterbodies including coastal waters, inlets, lakes, estuaries, beaches, offshore islands and sometimes along inland rivers (Schodde and Tidemann 1986; Clancy 1991; Olsen 1995). Osprey may nest on the ground, on sea cliffs or in trees (Olsen 1995). Osprey generally prefer emergent trees, often dead or partly dead with a broken off crown (Olsen 1995).	No
Petroica boodang	Scarlet Robin	V	-	The Scarlet Robin is primarily a resident in dry forests and woodlands, but some adults and young birds disperse to more open habitats after breeding	No
Phoebetria fusca	Sooty Albatross	V	V		No
Pluvialis fulva	Pacific Golden Plover		M		No
Pluvialis squatarola	Grey Plover		M		No
Ptilinopus superbus	Superb Fruit-Dove	V	—	Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms (DECC 2007). It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees (ibid.). Part of the population is migratory or nomadic (ibid.). At least some of the population, particularly young birds, moves south through Sydney, especially in autumn (ibid.). Breeding takes place from September to January (ibid.). Will feed in adjacent mangroves or eucalypt forests (Blakers et al. 1984).	No
Puffinus assimilis	Little Shearwater	V			No
Puffinus carneipes	Flesh-footed Shearwater		M		No

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
Rostratula australis (Rostratula benghalensis)	Australian Painted Snipe	E	E, M	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber (DECC 2007). Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds (ibid.). Breeding is often in response to local conditions; generally occurs from September to December (DECC 2007). Roosts during the day in dense vegetation (NSW Scientific Committee 2004). Forages nocturnally on mud-flats and in shallow water (DECC 2007). Feeds on worms, molluscs, insects and some plant-matter (ibid.).	Unlikely
Rhipidura rufifrons	Rufous Fantail	—	M	The Rufous Fantail is a summer breeding migrant to southeastern Australia (Morcombe, 2004). The species is found in rainforest, dense wet eucalypt and monsoon forests, paperbark and mangrove swamps and riverside vegetation (Morcombe, 2004). Open country may be used by the Rufous Fantail during migration (Morcombe, 2004).	No
Stagonopleura guttata	Diamond Firetail	V	—	Typically found in grassy eucalypt woodlands, but also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities (DECC 2007). It is often found in riparian areas and sometimes in lightly wooded farmland (DECC 2007). Appears to be sedentary, though some populations move locally, especially those in the south (DECC 2007).	No
Sterna hirundo	Common Tern		M		No
Sternula albifrons	Little Tern	E	M	Sheltered coastal environments (DSEWPC, 2012). Nests in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands (OEH, 2012).	No
Sternula nereis nereis	Australian Fairy Tern		E		No
Stictonetta naevosa	Freckled Duck	V	—	Associated with a variety of plankton-rich wetlands, such as heavily vegetated, large open lakes and their shores, creeks, farm dams, sewerage ponds and floodwaters (DECC 2007).	Unlikely
Thinornis rubricollis	Hooded Plover	E		In south-eastern Australia this species uses long stretches of sandy shore, backed by tussock and creeper-covered dunes with nearby inland lakes (DECC 2007). Preferred habitat is beaches with a wide wash zone with seaweed mounds for feeding (Murlis 1989).	No
Tringa brevipes	*Grey-tailed Tattler*		M		No
Tringa glareola	*Wood Sandpiper*		M		Unlikely
Tringa nebularia	*Common Greenshank*		M		Unlikely
Tringa stagnatilis	*Marsh Sandpiper*		M		Unlikely
NOCTURNAL BIRDS					
Ninox connivens	Barking Owl	V	—	Associated with a variety of habitats such as savanna woodland, open eucalypt forests, wetland and riverine forest. The habitat is typically dominated by Eucalypts (often Redgum species), however often dominated by Melaleuca species in the tropics (DECC 2007). It usually roosts in dense foliage in large trees such as River She-oak (Allocasuarina cunninghamiana), other Casuarina and Allocasuarina, eucalypts, Angophora, Acacia and rainforest species from streamside gallery forests (NPWS 2003). It usually nests near watercourses or wetlands (NPWS 2003) in large tree hollows with entrances averaging 2-29 metres above ground, depending on the forest or woodland structure and the canopy height (Debus 1997).	Unlikely
Ninox strenua	Powerful Owl	V	—	Powerful Owls are associated with a wide range of wet and dry forest types with a high density of prey, such as arboreal mammals, large birds and flying foxes (Environment Australia 2000, Debus & Chafer 1994). Large trees with hollows at least 0.5m deep are required for shelter and breeding (Environment Australia 2000).	No
MAMMALS (EX BATS)					

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
Cercartetus nanus	Eastern Pygmy-possum	V	—	Found in wet and dry eucalypt forest, subalpine woodland, coastal banksia woodland and wet heath (Menkhorst & Knight 2004). Pygmy-Possums feed mostly on the pollen and nectar from banksias, eucalypts and understorey plants and will also eat insects, seeds and fruit (Turner & Ward 1995). The presence of Banksia sp. and Leptospermum sp. are an important habitat feature (DECC 2007). Small tree hollows are favoured as day nesting sites, but nests have also been found under bark, in old birds nests and in the branch forks of tea-trees (Turner & Ward 1995).	No
Dasyurus maculatus *Dasyurus maculatus maculatus*	Spotted-tailed Quoll Spotted-tailed Quoll (SE Mainland Population)	V —	— E	The Spotted-tailed Quoll inhabits a range of forest communities including wet and dry sclerophyll forests, coastal heathlands and rainforests (Mansergh 1984; DECC 2007j), more frequently recorded near the ecotones of closed and open forest. This species requires habitat features such as maternal den sites, an abundance of food (birds and small mammals) and large areas of relatively intact vegetation to forage in (DECC 2007). Maternal den sites are logs with cryptic entrances; rock outcrops; windrows; burrows (Environment Australia 2000).	No
Petauroides volans - (Congo-Bingi pop'n only)	Greater Glider (Congo-Bingi pop'n only)	EP	-	Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelter during the day in tree hollows and will use up to 18 hollows in their home range.	No. Site not within the location defined in the Scientific Determination
Petaurus australis	Yellow-bellied Glider	V	—	This species is restricted to tall mature forests, preferring productive tall open sclerophyll forests with a mosaic of tree species including some that flower in winter (Environment Australia 2000, Braithwaite 1984, Davey 1984, Kavanagh 1984; DECC 2007). Large hollows within mature trees are required for shelter, nesting and breeding (Henry and Craig 1984; DECC 2007).	No
Pseudomys novaehollandiae	New Holland Mouse	—	V	The New Holland Mouse has a fragmented distribution across Tasmania, Victoria, NSW and Queensland. In NSW, the New Holland Mouse is known from: Royal National Park (NP) and the Kangaroo Valley (Posamentier & Recher 1974); Kuringai Chase NP (Prosser et al. 2007); and Port Stephens to Evans Head near the Queensland border (Prosser et al. 2007). The New Holland Mouse has been found from coastal areas and up to 100 km inland on sandstone country (Wilson & Laidlaw 2003). The species has been recorded from sea level up to around 900 m above sea level (Menkhorst et al. 2008). Soil type may be an important indicator of suitability of habitat for the New Holland Mouse, with deeper top soils and softer substrates being preferred for digging burrows. Habitats include open heathland and open woodland with a heathland understorey and vegetated sand dunes	No
Phascolarctos cinereus	Koala	V	V	Associated with both wet and dry Eucalypt forest and woodland that contains a canopy cover of approximately 10 to 70% (Reed et al. 1990), with acceptable Eucalypt food trees. Some preferred Eucalyptus species are: Eucalyptus tereticornis, E. punctata, E. cypellocarpa, E. viminalis	No
Potorous tridactylus *Potorous tridactylus tridactylus*	Long-nosed Potoroo Long-nosed Potoroo (SE Mainland Population)	V —	— V	Associated with dry coastal heath and dry and wet sclerophyll forests (Strahan 1998) with dense cover for shelter and adjacent more open areas for foraging (Menkhorst & Knight 2004).	No

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
Sminthopsis leucopus	White-footed Dunnart	V	—	The White-footed Dunnart occurs in Tasmania and along the Victorian and southern NSW coast as far north as the Shoalhaven area. The species is found in a range of different habitats across its distribution, including coastal dune vegetation, coastal forest, tussock grassland and sedgeland, heathland, woodland and forest. In NSW, the species seems to favour vegetation communities with an open understorey structure. Mating occurs in late July and August. Breeding populations have been recorded in logged forest shortly after disturbance, but these usually do not persist as regeneration proceeds and a dense ground cover of vegetation establishes. The White-footed Dunnart is an opportunistic carnivore that feeds on a variety of ground-dwelling invertebrates and, occasionally, small lizards. They shelter in bark nests in hollows beneath standing or fallen timber, burrows in the ground, piles of logging debris, large grass clumps such as provided by Grass Trees Xanthorrhoea sp. and Macrozamias and rock crevices.	No
MAMMALS (BATS)					
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	The Large-eared Pied Bat has been recorded in a variety of habitats, including dry sclerophyll forests, woodland, sub-alpine woodland, edges of rainforests and wet sclerophyll forests (Churchill 1998; DECC 2007). This species roosts in caves, rock overhangs and disused mine shafts and as such is usually associated with rock outcrops and cliff faces (Churchill 1998; DECC 2007).	No
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	—	Prefers moist habitats with trees taller than 20m (DECC 2007). Roosts in tree hollows but has also been found roosting in buildings or under loose bark (DECC 2007).	No
Kerivoula papuensis	Golden-tipped Bat	V	—	Found in rainforest and adjacent wet and dry sclerophyll forest up to 1000m. Also recorded in tall open forest, Casuarina-dominated riparian forest and coastal Melaleuca forests. Roost mainly in abandoned hanging Yellow-throated Scrubwren and Brown Gerygone nests, also in tree hollows, dense foliage and epiphytes; located in rainforest gullies on small first- and second-order streams.	No
Miniopterus schreibersii oceanensis	Eastern Bent-wing Bat	V	—	Associated with a range of habitats such as rainforest, wet and dry sclerophyll forest, monsoon forest, open woodland, paperbark forests and open grassland (Churchill 1998). It forages above and below the tree canopy on small insects (AMBS 1995, Dwyer 1995, Dwyer 1981). Will utilise caves, old mines, and stormwater channels, under bridges and occasionally buildings for shelter (Environment Australia 2000, Dwyer 1995).	Likely
Mormopterus norfolkensis	Eastern Freetail Bat	V	—	Most records of this species are from dry eucalypt forest and woodland east of the Great Dividing Range (Churchill 1998). Individuals have, however, been recorded flying low over a rocky river in rainforest and wet sclerophyll forest and foraging in clearings at forest edges (Environment Australia 2000; Allison & Hoye 1998). Primarily roosts in hollows or behind loose bark in mature eucalypts, but have been observed roosting in the roof of a hut (Environment Australia 2000; Allison & Hoye 1998).	Likely
Myotis macropus	Southern Myotis	V	—	The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water 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.	Yes. Recorded on site
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Inhabits a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and cultivated areas (Churchill 1998, Eby 1998). Camps are often located in gullies, typically close to water, in vegetation with a dense canopy (Churchill 1998).	Likely

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	—	Found in almost all habitats, from wet and dry sclerophyll forest, open woodland (Churchill 1998), open country, mallee, rainforests, heathland and waterbodies (SFNSW 1995). Roosts in tree hollows; may also use caves; has also been recorded in a tree hollow in a paddock (Environment Australia 2000) and in abandoned sugar glider nests (Churchill 1998). The Yellow-bellied Sheathtail-bat is dependent on suitable hollow-bearing trees to provide roost sites, which may be a limiting factor on populations in cleared or fragmented habitats (Environment Australia 2000).	Likely
Scoteanax rueppellii	Greater Broad-nosed Bat	V	—	Associated with moist gullies in mature coastal forest, or rainforest, east of the Great Dividing Range (Churchill, 1998), tending to be more frequently located in more productive forests (Hoye & Richards 1998). Within denser vegetation types use is made of natural and man made openings such as roads, creeks and small rivers, where it hawks backwards and forwards for prey (Hoye & Richards 1998).	Unlikely
Disclaimer: Data extracted from the Atlas of NSW Wildlife and DEW Protected Matters Report are only indicative and cannot be considered a comprehensive inventory. 'Migratory marine species' and 'listed marine species' listed on the EPBC Act (and listed on the DEW protected matters report) have not been included in this table, since they are considered unlikely to occur within the study area due to the absence of marine habitat.					

Likelihood of occurrence assessment – flora

An assessment of likelihood of occurrence was made for threatened and migratory species identified from the database search. Five terms for the likelihood of occurrence of species are used in this report. This assessment was based on database or other records, presence or absence of suitable habitat, features of the proposal site, results of the field survey and professional judgement. The terms for likelihood of occurrence are defined below:

- "yes" = the species was or has been observed on the site
- "likely" = a medium to high probability that a species uses the site
- "potential" = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- "unlikely" = a very low to low probability that a species uses the site
- "no" = habitat on site and in the vicinity is unsuitable for the species.

E = Endangered; E2 = Endangered Population; V = Vulnerable; C = Critically; EEC = Endangered ecological community.

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
FLORA SPECIES / POPULATIONS					
Caladenia tessellata	Thick-lipped Spider-orchid	E	V	Grows on clay loam or sandy soils; south from Swansea (OEH 2013). Flowers Sept.–Nov.	No. No records in locality. Not found during survey. (Predicted only – EPBC search tool).
Correa baeuerlenii	Chef's Cap Correa	V	V	Grows in sclerophyll forest, from the Clyde R. district to Bega. Flowers spring and sporadically at other times (OEH 2013)	No. No records in locality. Conspicuous, but not found during survey. (Predicted only – EPBC search tool).
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	This species does not appear to have well defined habitat preferences and is known form a range of communities, including swamp-heath and woodland, but always on infertile sandy soils. The larger populations typically occur in woodland dominated by Scribbly Gum (Eucalyptus sclerophylla), Silvertop Ash (E. sieberi), Red Bloodwood (Corymbia gummifera) and Black She-oak (Allocasuarina littoralis). The species appears to prefer open areas in the understorey of this community, and is often found in association with the Large Tongue Orchid (C. subulata) and the Tartan Tongue Orchid (C. erecta). Flowers Dec.-Feb.	No. No records in locality. Not found during survey. (Predicted only – EPBC search tool).
Distichlis distichophylla	Australia Salt-grass	E		Australian Salt-grass is a spreading perennial grass, in the form of a loose, somewhat prickly clump of spreading underground stems (rhizomes). In its limited NSW range it grows only in coastal situations, except for one existing population at Lake Cargellico. Scattered records are from the areas of Jervis Bay, Bermagui, Wonboyn, Narooma, Bodalla and Nadgee Nature Reserve. It is a coloniser of damp saline soils; found at the edges of salt marshes and on low dunes. Flowers and sets seed in late spring and summer	No. Unsuitable habitat (no saltmarsh near site) and not recorded during survey of lake edge.

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
Galium australe	Tangled Bedstraw	E		Once regarded as presumed extinct in NSW, this species is now known from the Towamba Valley near Bega, Lake Yarrunga near Kangaroo Valley, Cullendulla Creek Nature Reserve near Batemans Bay, Conjola National Park, Swan Lake near Swanhaven, and the Big Hole in Deua National Park. It was recorded historically from the Clyde River near Batemans Bay and the Mongarlowe area near Braidwood. The species also occurs beside Lake Windemere in the Australian Capital Territory at Jervis Bay. In NSW Tangled Bedstraw has been found in moist gullies of tall forest, Eucalyptus tereticornis forest, coastal Banksia shrubland, and Allocasuarina nana heathland. In other States the species is found in a range of near-coastal habitats, including sand dunes, sand spits, shrubland and woodland.	No. Despite targeted searches this distinctive species was not detected.
Genoplesium vernale	East Lynne Midge Orchid	V	V	Grows in 'poorer' dry sclerophyll woodland and forest on the south coast of New South Wales between Mogo and Ulladulla, being confined to areas with well-drained shallow soils of low fertility. The plant exists only as a dormant tuber for part of the year, dying back after flowering and fruiting in mid November to late December. Has an ability to re-colonise previously disturbed sites.	No. No records in locality. Not found during survey. (Predicted only – EPBC search tool).
Monotaxis macrophylla	Large-leafed Monotaxis	E		Known from several highly disjunct populations in NSW: eastern edge of Deua NP (west of Moruya), Bemboka portion of South East Forests National Park, Cobar area (Hermitage Plains), the Tenterfield area, and Woodenbong (near the Queensland border) (OEH 2013). It is also in Queensland. A recent record from the eastern spur of the Nandewar Range is in the Namoi catchment. The distribution and supposed rarity of Monotaxis macrophylla within NSW is related to the occurrence of fire. At least within NSW, the species has not been found in the absence of fire. There is a great diversity in the associated vegetation within NSW, encompassing coastal heath, arid shrubland, forests and montane heath from almost sea level to 1300 m altitude.	Unlikely. Not found during survey. Nearest record about 18 km from site.
Persicaria elatior	Tall Knotweed	V	V	This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance (DECC 2007).	No. Easily detectable species, not found during survey.
Streblus brunonianus (Streblus pendulinus)	Siah's Backbone		E	On the Australian mainland, this species is found in warmer rainforests, chiefly along watercourses.	No. Unsuitable habitat. Easily detectable species, not found during survey.
Thesium australe	Austral Toadflax	V	V	Occurs in grassland or grassy woodland. Often found in damp sites in association with Kangaroo Grass (Themeda australis) (DECC 2007). Flowers in spring–summer. Widespread but rare. NSW subdivisions: NC, CC, SC, NT, ST, NWS, CWS. Other Australian states: Qld, Tas.	No. Targeted searches failed to find this species.
Wilsonia backhousei		V		Grows in coastal saltmarshes in the Sydney Region and Jervis Bay (Harden 1990)	No. Unsuitable habitat (no saltmarsh near site) and not recorded during survey of lake edge.

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
Wilsonia rotundifolia	Round-leaf Wilsonia	E		Round-leafed Wilsonia is a hairy, prostrate, perennial plant with succulent leaves and woody stems. Round-leafed Wilsonia is known from several sites in the Jervis Bay area, Royal National Park, near Deniliquin and in Lake George and Lake Bathurst. The Lake George population appears to be locally extensive. Also found Western Australia, South Australia and Victoria. Grows in mud in coastal salt marsh and inland saline lakes. Flowers mainly in spring and summer.	No. Unsuitable habitat (no saltmarsh near site) and not recorded during survey of lake edge.
Zieria tuberculata	Warty Zieria	V	V	Warty Zieria grows in the Mt Dromedary and Tilba Tilba area. The population in the Cambewarra Mountain area near Nowra is now referable to a separate taxon. The Warty Zieria grows in heath amongst rocky outcrops on rain forest edges and in tall forest and shrubland. The flowers appear from late winter to spring.	No. Unsuitable habitat. Easily detectable species, not found during survey.
ECOLOGICAL COMMUNITIES					
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions EEC	*Coastal Saltmarsh*	E	V	Occurs in the intertidal zone on the shores of estuaries and lagoons that are permanently or intermittently open to the sea. It is frequently found as a zone on the landward side of mangrove stands (OEH 2013).	No. Not found within study area (relatively steep bank on creek/lake)
Lowland Grassy Woodland in the South East Corner Bioregion EEC	*Lowland Grassy Woodland*	E	CE	The community typically occurs in undulating terrain up to 500 m elevation on granitic substrates (e.g. adamellites, granites, granodiorites, gabbros, etc.) but may also occur on locally steep sites and on acid volcanic, alluvial and fine-grained sedimentary substrates (OEH 2013). Characterised by an overstorey that is usually dominated by Eucalyptus tereticornis (Forest Red Gum), often with Eucalyptus globoidea (White Stringybark) and/or Angophora floribunda (Rough-barked Apple) and other eucalypts at some sites. For example, Eucalyptus melliodora (Yellow Box) and E. pauciflora (White Sally) may be locally common within the community (OEH 2013).	No. Not found within study area Not typical habitat, i.e. site has shale derived soils rather than granitic/basaltic.
River-flat eucalypt forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions EEC	*River-flat eucalypt forest*	E		Associated with silts, clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains (OEH 2013). Typically form mosaics with other floodplain forest communities and treeless wetlands, and often fringe treeless floodplain lagoons or wetlands with semi-permanent standing water. It has an open tree layer of eucalypts. Composition of the tree stratum varies considerably - the common trees include Eucalyptus tereticornis (forest red gum), E. amplifolia (cabbage gum), Angophora floribunda (rough-barked apple) and A. subvelutina (broad-leaved apple). Eucalyptus baueriana (blue box), E. botryoides (bangalay) and E. elata (river peppermint) may be common south from Sydney, E. ovata (swamp gum) occurs on the far south coast, E. saligna (Sydney blue gum) and E. grandis (flooded gum) may occur north of Sydney, while E. benthamii is restricted to the Hawkesbury floodplain.	No. Not found within study area Not typical habitat (i.e. the site is on a hill side)

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	*Swamp Oak Floodplain Forest*	EEC		Found on the coastal floodplains of NSW (OEH 2013). It has a dense to sparse tree layer in which Casuarina glauca (swamp oak) is the dominant species northwards from Bermagui.	Yes. Found 30 m east of site on lake fringe.

Assessment of Significance (7-part test) – fauna and flora

The EP&A Act includes in Section 5A, seven factors which are to be considered when determining if a proposed development or activity '*is likely to have a significant effect on the threatened species, populations or ecological communities, or their habitats'.* These seven factors must be taken into account by consent or determining authorities when considering a development proposal or development application. This enables a decision to be made as to whether there is likely to be a significant effect on the species and hence if a Species Impact Statement is required (DECC 2007).

Based on the field surveys and likelihood of occurrence tables **eight fauna species and one ecological community** were known, or have the potential to occur within the study area. These were the:

- Eastern Bentwing Bat
- Eastern Freetail Bat
- Southern Myotis
- Yellow-bellied Sheathtail Bat
- Grey-headed Flying-fox
- Square-tailed Kite
- White-fronted Chat
- Australasian Bittern
- Swamp Oak Floodplain Forest EEC

The following section provides significance assessments for these entities.

(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,

All microchiropteran bats

All four species considered within this assessment are forest dependant species (Churchill 2008; OEH 2013b). Habitat essential to the lifecycle of these species includes forest (foraging habitat) that contains HBT (roost and breeding sites). The study area provides no HBT so at best, is considered foraging habitat particularly given the high mobility of these species that can extend their foraging ranges over tens of kilometres (Barclay *et al.* 2000; Pavey and Burwell 2004). One of these, Southern Myotis, was recorded during the field survey by echolocation call recording. Six echolocation calls were recorded while walking adjacent to Smarts Creek; next to the study area. Individuals are likely to forage along Smarts Creek as they predate on small fish and invertebrates which they catch from the waterbody with the enlarged feet. The species was not detected at the farm dam that occurs in the central portion of the subject land, and this is likely due to the dense cover of aquatic vegetation making foraging virtually impossible for the species.

OEH (2013b) identify the following threats to these species:

- Damage to or disturbance of roosting caves, particularly during winter or breeding.
- Loss of foraging habitat.
- Loss of Hollow-bearing Trees.
- Application of pesticides in or adjacent to foraging areas.
- Predation by feral cats and foxes.
- Introduction of exotic pathogens, specifically known White-nosed fungus.
- Threat of cave entrances being blocked for human safety reasons. Also, vegetation encroaching and blocking cave entrances.
- Potential for large scale wildfire to impact on resource availability in surrounding habitat. Direct threats at caves from fire.
- Weeds (blackberry) encroaching over cave entrances restrict access; need to ensure sympathetic control techniques for blackberry.

Of these threats, only the loss of potential foraging habitat applies to this proposal. However, given their high mobility and that potential foraging habitat remains across adjacent areas and the locality, it is considered *unlikely* that the proposed activity would have an adverse effect on the life cycle of these species such that a viable local population is likely to be placed at risk of extinction.

Grey-headed Flying Fox

The Grey-headed Flying Fox is the largest Australian bat found within 200km of the east coast of Australia. They occur in rainforest, forests, woodland, heaths and swamps as well as urban areas (DECCW 2009a). Roosting camps are generally located within 20km of a regular food source and are commonly found in gullies or swamp areas. Fidelity to roost sites is high and impacts to this species largely come about from direct impacts to roost camps through disturbance. Grey-headed Flying Foxes are highly mobile and can forage up to 50km from their roost camp in one night (Churchill 2008). No Grey-headed Flying Fox were recorded during the field survey.

OEH (2013) identify the following threats to this species:

- Loss of foraging habitat.
- Loss and disturbance of roosting sites.
- Unregulated shooting.
- Electrocution on powerlines, entanglement in netting and on barbed-wire.
- Competition with Black Flying-foxes.
- Negative public attitudes and conflict with humans.
- Impacts from climate change.
- Disease.

Of these threats, none are relevant to the proposed activity as the study area does not provide any foraging habitat, nor any past or current roost camps. At best, the species could traverse the study area by overflying it.

Given their high mobility and that the study area contains no foraging or roosting habitat, it is considered *unlikely* that the proposed activity would have an adverse effect on the life cycle of this species such that a viable local population is likely to be placed at risk of extinction.

Square-tailed Kite

This species' preferred habitat is open eucalypt forest and woodland where it is a predator primarily of small birds and their nestlings, foraging in the tree tops of the forest (DECCW 2009b; Morcombe 2004; NPWS 1999c). It is sparsely distributed with resident pairs having territories of greater than 100 km², and is also believed to be nomadic (Garnett and Crowley 2000; NPWS 1999c). Habitat requirements essential for the lifecycle of these species are areas of intact forest that provide forage habitat and nest sites (OEH 2013b). It has been suggested however, that the Square-tailed Kite prefers a landscape that is structurally diverse and that the mixed landscape created by partial clearing may favour it. No Square-tailed Kite were recorded during the field survey.

OEH (2013) identify the following threats to this species:

- Clearing, logging, burning, and grazing of habitats resulting in a reduction in nesting and feeding resources.
- Disturbance to or removal of potential nest trees near watercourses.
- Illegal egg collection and shooting.

Of these threats, only the first if of marginal relevance, as the subject land will be cleared, yet it does not contain any potential nest trees, only marginal foraging habitat as does the remainder of the land adjacent.

Given the relative mobility of this species and the large home ranges that it forages within, the low quality of marginal habitat to be removed (shrubland not forest) and that potential foraging habitat remains across adjacent areas and the locality, it is considered *unlikely* that the proposal would have an adverse effect on the life cycle of Square-tailed Kite (should it even occur there) such that a viable local population is likely to be placed at risk of extinction.

White-fronted Chat

White-fronted Chat can be found across the southern half of Australia mostly within temperate and arid climates. In New South Wales they are mostly in the southern half of the state, occurring in damp open habitats along the coast, and near waterways in the western part of the state (Higgins *et al.* 2001). No White-fronted Chat were recorded during the field survey.

OEH (2013c) identify the following threats to this species:

- Reduction in habitat size and quality.
- Human disturbance (particularly in urban areas) and elevated nest-predation levels.
- Much of their natural habitat is prone to alteration due to modification of river flows and floodplains.
- Prone to predation from snakes and mammals, particularly Feral Cats, European Red Foxes and rodents, as well as birds, particularly ravens.
- In coastal areas mangrove encroachment and sea-level rise associated with global warming present an additional future threat to their preferred habitat.

Of these, only the first threat is of potential relevance when considering the likely impacts of the proposed activity. However, habitats dominated by samphire and saltmarsh appear to be preferred by the species in coastal areas; not open grasslands. Given that only open grassland is present, and that the species is relatively mobile and likely to rely on saltmarsh and samphire dominated habitats in the locality, it is *unlikely* that the proposed activity could have an adverse effect on the life cycle of White-fronted Chat, such that a viable local population is likely to be placed at risk of extinction.

Australasian Bittern

The Australasian Bittern can be found over much of south-eastern Australia in permanent freshwater wetlands with tall, dense vegetation showing a preference for bullrushes (*Typha sp*) and spikerushes (*Eleoacharis sp*) (McKilligan 2005; NPWS 1999a; OEH 2013b). It forages in still shallow water up to 0.3 metres deep, often at the edges of pools or waterways. The Australasian Bittern hides during the day amongst dense reeds or rushes and feeds mainly at night on frogs, fish, yabbies, spiders, insects, and snails (OEH 2013). No Australasian Bittern were recorded during the field survey.

OEH (2013b) identify the following threats to this species:

- Drainage of wetlands and ponds.
- Reduced water quality due to siltation, pollution and salinity.
- Predation by foxes and cats.
- Use of herbicides, pesticides and other chemicals near wetland areas.
- Grazing and associated frequent burning of wetland areas.

Of these threats, the second and forth potentially apply to the proposed activity. The large dam on the subject land contains some bull rushes, but the habitat potential of this dam is very low given that it is a small farm type dam with deep sides (>0.3m), not a freshwater wetland in the true sense and there is an absence of tall aquatic vegetation for the species to roost within.

Given these factors, it is *unlikely* that the proposed activity would have an adverse effect on the life cycle of the Australasian Bittern such that a viable local population is likely to 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,

No endangered populations are relevant to the subject land.

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

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

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,

Swamp Oak Floodplain Forest

Swamp Oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions is found on the coastal floodplains of NSW. It has a dense to sparse tree layer in which *Casuarina glauca* (Swamp oak) is the dominant species northwards from Bermagui (OEH 2013). The community is found in close proximity to rivers and estuaries and is generally found on soils with a saline influence.

Within the study area, Swamp Oak Floodplain Forest occurs about 30 m to the east of the subject site (two patches totally about 1,200 m^2 or 0.12 ha) in a narrow band along the fringe of Smarts Creek estuary (Figure 4-8).

The proposed action would not require the clearing of any of this community. Furthermore, many weed species already exist adjacent to and within it. The dominant species within this EEC (*Casuarina glauca*) is an aggressive species when suitable conditions prevail, i.e. semi- saline and/or or waterlogged soils near estuaries/rivers on coastal floodplains. This is demonstrated in the current case where this species is proliferating despite competition from exotic and other species.

Therefore, proposed action it is unlikely to have an adverse effect on the extent of the ecological community or substantially and adversely modify the composition such that its local occurrence is likely to be placed at risk of extinction.

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

the extent to which habitat is likely to be removed or modified as a result of the action proposed

The proposed activity would disturb up to up to 1.1 ha of native vegetation (0.5 ha of regrowth shrubland and 0.6 ha of weedy derived native grassland, neither of which are EECs).

In relation to the Swamp Oak Floodplain Forest EEC 30 m to the east of the subject site, there is not expected to be any modification or removal of this habitat as a result of the action proposed. The dominant species within this EEC (*Casuarina glauca*) is an aggressive species when suitable conditions prevail, i.e. semi- saline and/or or waterlogged soils near estuaries/rivers on coastal floodplains. This is demonstrated in the current case where this species is proliferating despite competition from exotic and other species.

Safeguards, recommended in Section 6, will assist in mitigating potential impacts on the Swamp Oak Floodplain Forest EEC, e.g. erosion and sedimentation control during construction.

The loss of this habitat is not considered to adversely impact any threatened species found on site or predicted to occur on site.

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

Species: The proposed activity will not isolate or increase fragmentation of areas of habitat given the extent and quality of existing habitats, and that any species that are likely to forage across the subject land, are highly mobile.

EEC: This habitat is already fragmented and isolated from other areas of suitable habitat (due to previous land clearing and the naturally narrow width of suitable habitat on the fringe of estuary limiting the occurrence of the EEC). Therefore, the proposed action will not cause this habitat to become fragmented or isolated form other areas of habitat.

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

A number of threatened fauna are considered to have the potential to utilise the site, primarily for foraging, although only one (Southern Myotis) was recorded on the site. This species was detected on the southern periphery of the subject land as individuals forage on Smarts Creek. No Southern Myotis were recorded using the single farm dam that is present.

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

There is no critical habitat as listed by the TSC Act found within the Eurobodalla LGA.

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

At the time of writing, there was only one recovery plan available for entities that are the subject of this assessment (Grey-headed Flying Fox).

A draft National Recovery Plan for the Grey-headed Flying Fox has been prepared (DECCW 2009) and a number of specific objectives have been listed as part of the recovery of the species. These objectives include:

- To identify and protect foraging habitat critical to the survival of Grey-headed Flying Foxes throughout their range
- To protect and increase the extent of key winter and spring foraging habitat of Grey-headed Flying Foxes
- To identify roosting habitat critical to the survival of Grey-headed Flying Foxes
- To protect and enhance roosting habitat critical to the survival of Grey-headed Flying Foxes
- To substantially reduce deliberate destruction of Grey-headed Flying Foxes in fruit crops
- To reduce negative public attitudes toward Grey-headed Flying Foxes and reduce conflict with humans
- To increase public awareness and understanding of Grey-headed Flying Foxes and the recovery program, and to involve the community in recovery actions, where appropriate, to reduce the threat of negative public attitudes and conflict with humans
- To monitor population trends in Grey-headed Flying Foxes so as to monitor the species' national distribution and status
- To assess and reduce the impact on Grey-headed Flying Foxes of electrocution on power lines and entanglement in netting and on barbed-wire
- To improve knowledge of the demographics and population structure of Grey-headed Flying Foxes in order to increase understanding of the ecological requirements of the species
- To increase the effectiveness and efficiency of recovery initiatives for Grey-headed Flying Foxes by working cooperatively with conservation and management programs with overlapping objectives to remove or reduce the impact of threatening processes on the species
- To maintain an effective Grey-headed Flying Fox National Recovery Team to oversee the implementation of the Grey-headed Flying Fox National Recovery Plan to remove or reduce the impact of threatening processes on the species.
- To provide long-term economic benefits associated with the protection of ecosystem services, promotion of sustainable forest management, improved crop protection regimes, promotion of sustainable agricultural practices and increased viability of some commercial fruit industries.

The development is considered to be consistent with the above objectives as the proposal will affect up to 1.1 ha of potential foraging habitat (0.5 ha of regrowth shrubland and 0.6 ha of weedy derived native grassland) and not impact on high quality habitats.

For the remainder of the entities the subject of this assessment, the extent and nature of the proposal and the quality of the habitats that would be affected indicate that the proposed activity is likely to be consistent with recovery plans for these species, should any exist.

At the time of writing, there were no recovery plans or threat abatement plans published for either of the EECs assessed here.

(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.

Under Schedule 3 of the TSC Act (1995), the following applicable Key Threatening Processes are listed:

Clearing of native vegetation.

The 'clearing of native vegetation' is recognised as a major factor contributing to the loss of biodiversity. Clearing of any area of native vegetation, may lead to impacts on biological diversity such as habitat fragmentation limiting gene flow between small isolated populations, which may result in a reduction in the potential for biodiversity to adapt to environmental change. The proposal will result in the modification of up to 1.1 ha of native vegetation (0.5 ha of regrowth shrubland and 0.6 ha of weedy derived native grassland , neither of which are EECs), which is considered to represent a marginal cumulative contribution to this Key Threatening Process but not of a significant magnitude to impact the species of concern.

Invasion of native plant communities by exotic perennial grasses.

This KTP is already in operation within the study which has been used as grazing land over a long period. This applies to both the habitat within the subject site and the Swamp Oak Floodplain Forest EEC remnant 30 m east of the site. Currently, a number of exotic perennial grass species exist within and around the edges of EEC patch. Despite this, the EEC is continuing to function (albeit with a somewhat weedy groundcover layer).

Based on the minimal impact that existing weeds in the vicinity are having on the condition of core area of the EEC patch, it is unlikely that any future importation of weeds that may emanate from the development would alter this condition. Therefore, it is deemed that the action proposed is unlikely to increase the impact of this existing key threatening process.

Conclusion of 7-part test

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on the Eastern Bentwing Bat, Eastern Freetail Bat, Southern Myotis, Yellow-bellied Sheathtail Bat, Grey-headed Flying Fox, White-fronted Chat, Australasian Bittern, Square-tailed Kite and Swamp Oak Floodplain Forest provided that the recommendations outlined in Section 6 are fully adopted.

In this case, *the proposed activity will not require a Species Impact Statement.*

EPBC Act significance assessment

The EPBC Act Administrative Guidelines on Significance set out **'Significant Impact Criteria'** that are to be used to assist in determining whether a proposed action is likely to have a significant impact on matters of national environmental significance. Matters listed under the EPBC Act as being of national environmental significance include:

- Listed threatened species and ecological communities
- Listed migratory species
- Wetlands of international importance
- The Commonwealth marine environment
- World heritage properties
- National heritage places
- Nuclear actions
- Great Barrier Reef Marine Park.
- A water resource, in relation to coal seam gas development and large coal mining development.

Specific **'Significant Impact Criteria'** are provided for each matter of national environmental significance except for threatened species and ecological communities in which case separate criteria are provided for species listed as endangered and vulnerable under the EPBC Act. Appendix 3 contains a copy of the desktop search results covering threatened and migratory species listed under the EPBC Act which are considered to potentially occur within the locality. The relevant Significant Impact Criteria have been applied to these species to determine the significance of impact of the project.

Matters to be addressed	**IMPACT (COMMONWEALTH LEGISLATION)**
a. any impact on Commonwealth Listed Critically Endangered or Endangered Species;	Three Commonwealth listed endangered species are considered potential or likely to occur in the property: • Australasian Bittern The significant impact criteria in terms of endangered species are discussed below: *a. lead to a long-term decrease in the size of a population* A small farm dam, likely not be unsuitable for permanent occupation, is likely to be impacted by the proposed action. Population size in the area would not be negatively impacted should a population occur in the locality, as higher quality habitats are likely to occur off site. *b. reduce the area of occupancy of the species* Australasian Bittern are highly mobile and have a wide distribution in south east Australia, and not surprisingly based on habitats present, the species was not recorded during surveys of the site. As the action will only result in the loss or modification of general habitat for the Australian Bittern a, the action will not result in the reduction in the area of occupancy of this species. *c. fragment an existing population into two or more populations* The proposal will only remove or modify a small amount of vegetation and will not impact on connectivity across the site. *d. adversely affect habitat critical to the survival of a species*

Matters to be addressed	IMPACT (COMMONWEALTH LEGISLATION)
	No habitat on site is considered to be critical to the survival of this species. *e. disrupt the breeding cycle of a population* There are no records of breeding by the Australasian Bittern in the area nor were they recorded during surveys. The impact of the proposal is also not considered to be of a magnitude to disrupt breeding in the locality. *f. modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline* The proposal requires the modification of 0.1ha of general habitat and it is not expected to cause a decline in these species in this area. *g. result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat* The proposal will not increase the risk from invasive species. *h. introduce disease that may cause the species to decline; or* The proposal will not lead to the introduction of a disease that may cause this species to decline at the site. *i. interfere with the recovery of the species.* As the proposal is not considered to decrease or fragment existing populations nor impede the breeding cycle of this species, the recovery of the species will not be substantially impacted
b. any impact on Commonwealth Listed Vulnerable Species;	One Commonwealth listed vulnerable species are considered potential or likely to occur in the property: • Grey-headed Flying-fox The significant impact criteria in terms of the vulnerable species are discussed below: *a. lead to a long-term decrease in the size of an important population of a species,* The habitat on the site does not represent an area critical for the long-term survival of the Grey-headed Flying-fox. At best, the subject land could be overflown by this species, or provide a foraging resource when the Shrubland is in flower. The modification of 0.3ha of potential foraging habitat for the Grey-headed Flying-fox is not considered to lead to a long-term decrease in any population size in the area given the extent of foraging habitat across the locality. No evidence of past or current roost camps is present. *b. reduce the area of occupancy of an important population* There is no past or current roost camp present. Nor any potential for one to become established given the lack of overstorey tree. The proposal will not reduce the area of occupancy for an important population of this species. *c. fragment an existing important population into two or more populations* The proposed clearing will not further increase the fragmentation of any populations given the nature and extent of the proposed action and the mobility of this species. *d. adversely affect habitat critical to the survival of a species* No habitat on site is considered to be critical to the survival of the species. *e. disrupt the breeding cycle of an important population* The site does not contain breeding habitat for the Grey-headed Flying-fox. As the site is not considered to contain any important populations, this proposal will not cause any disruption to the breeding cycle of an important population.

Matters to be addressed	IMPACT (COMMONWEALTH LEGISLATION)
	f. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline The removal of potential foraging habitat for the Grey-headed Flying -fox is not expected to cause a decline in the species in this area given the extent of habitat in the adjacent areas and locality. *g. result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat* The proposal will not increase the risk from invasive species. *h. introduce disease that may cause the species to decline* The proposal will not lead to the introduction of a disease that may cause these species to decline at the site (should it even occur there in the future). *i. interferes substantially with the recovery of the species.* As the proposal is not considered to decrease or fragment existing populations, the recovery of the species will not be substantially impacted
c. any environmental impact on Commonwealth Listed Migratory Species;	Four Commonwealth listed migratory species were considered likely to occur at the property: • **White-throated Needletail** • **Fork-tailed Swift** • **Great Egret** • **Cattle Egret** • **Latham's Snipe** The guidelines in terms of the migratory species are discussed below: *a. substantially modify (including fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat of the migratory species* The proposal will not substantially modify, destroy or isolate an area of important habitat for these species as: • The proposal involves modification only to 0.1ha of foraging habitat for these species. • The proposal occurs adjacent to known foraging habitat, as does other similar developments. • All of these species are capable of flying large distances and thus the impact will not isolate habitat for these species. *b. result in invasive species that is harmful to the migratory species becoming established in an area of important habitat of the migratory species* The proposal will not introduce or facilitate an invasive species that is harmful to these species in an area of important habitat or otherwise. *c. seriously disrupt the lifecycle (breeding, feeding, migration or nesting behaviour) of an ecologically significant proportion of the population of the species.* The proposal is unlikely to disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species for the following reasons: • The proposal is being undertaken adjacent to existing development of a similar nature. • The proposal is being undertaken on previously cleared land. • Similar and higher quality habitats occur elsewhere in the locality. • The potential impact to any of these species would only be to a very small number of individuals if at all, not considered an ecologically significant portion of the species

Matters to be addressed	IMPACT (COMMONWEALTH LEGISLATION)
d. any environmental impact on Wetlands of International Importance;	The proposal will not affect any part of RAMSAR wetland.
e. any environmental impact on a Commonwealth Marine Area;	No. There are no Commonwealth Marine Areas within the property.
f. any environmental impact on a World Heritage Property;	No. The proposed activity does not impact on a World Heritage Property
g. any environmental impact on a National Heritage Place	No. The proposed activity does not impact on a National Heritage Place
h. does any part of the Proposal involve a Nuclear Action;	No. The proposed activity does not include a Nuclear Action.
i. any environmental impact on the Great Barrier Reef Marine Park	No. The proposed activity does not directly or indirectly affect the Great Barrier Reef Marine Park.
j. Does any part of the Proposal involve coal mining or coal seam gas extraction.	No. The proposed activity does not involve coal mining or coal seam gas development.

Conclusion of EPBC Act assessment

It is unlikely that the development will significantly impact on these threatened or migratory species. The subject land provides only a small amount of foraging habitat for the assessed species and the level of habitat removal will be negligible in the context of the available habitat in the locality. Referral to the Commonwealth under the EPBC Act is not warranted.

Appendix 2 – EPBC Act desktop search results

EPBC search. Turlinjah 10km, 2013-10-30

Name	Status	Type of Presence
Birds		
Diomedea exulans gibsoni		
Gibson's Albatross [82271]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato)		
Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Erythrotriorchis radiatus		
Red Goshawk [942]	Vulnerable	Species or species habitat may occur within area
Fregetta grallaria grallaria		
White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor		
Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Macronectes giganteus		
Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli		
Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Neophema chrysogaster		
Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area
Pterodroma neglecta neglecta		
Kermadec Petrel (western) [64450]	Vulnerable	Species or species habitat may occur within area
Rostratula australis		
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Sternula nereis nereis		
Australian Fairy Tern [82950]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche bulleri		
Buller's Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta		
Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta salvini		
Salvin's Albatross [82343]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi		
White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita		
Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris impavida		
Campbell Albatross [82449]	Vulnerable	Species or species habitat may occur within area
Fish		
Name	Status	Type of Presence
Epinephelus daemelii		
Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Prototroctes maraena		
Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area
Frogs		
Heleioporus australiacus		
Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat may occur within area
Litoria littlejohni		
Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat may occur within area
Mixophyes balbus		
Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Eubalaena australis		
Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area

Isoodon obesulus obesulus		
Southern Brown Bandicoot (Eastern) [68050]	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae		
Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Caladenia tessellata		
Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area
Correa baeuerlenii		
Chef's Cap [17007]	Vulnerable	Species or species habitat likely to occur within area
Cryptostylis hunteriana		
Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur
Name	Status	Type of Presence
Genoplesium vernale		
East Lynne Midge-orchid [68379]	Vulnerable	Species or species habitat likely to occur within area
Persicaria elatior		
Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area
Streblus pendulinus		
Siah's Backbone, Sia's Backbone, Isaac Wood [21618]	Endangered	Species or species habitat likely to occur within area
Thesium australe		
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Zieria tuberculata		
Warty Zieria [56736]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Eretmochelys imbricata		
Hawksbill Turtle [1766]	Vulnerable	Breeding likely to occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable [Resource	Species or species habitat known to occur within area
Listed Migratory Species	Information]	
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Diomedea antipodensis		
Antipodean Albatross [64458]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena		
Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto)		
Southern Royal Albatross [1072]	Vulnerable*	Foraging, feeding or related behaviour likely
Diomedea exulans (sensu lato)		
Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni		
Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi		
Northern Royal Albatross [64456]	Endangered*	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus		

Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli		
Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Puffinus carneipes		
Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Sterna albifrons		
Little Tern [813]		Breeding likely to occur within area
Thalassarche bulleri		
Buller's Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto)		
Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita		
Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida		
Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat known to occur within area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus		
Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat known to occur within area
Neophema chrysogaster		
Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur
Xanthomyza phrygia		
Regent Honeyeater [430]	Endangered*	Species or species habitat known to occur within area
Migratory Wetlands Species		
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Foraging, feeding or related behaviour may occur within area
Numenius minutus		
Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Listed Marine Species	[Resource Information]	

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Birds

Apus pacificus		
Fork-tailed Swift [678]	Threatened	Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat likely to occur within area
Catharacta skua		
Great Skua [59472]		Species or species habitat may occur within area
Diomedea antipodensis		

Antipodean Albatross [64458]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena		
Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto)		
Southern Royal Albatross [1072]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato)		
Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni		
Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi		
Northern Royal Albatross [64456]	Endangered*	Foraging, feeding or related behaviour likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Foraging, feeding or related behaviour may occur within area
Gallinago megala		
Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area
Gallinago stenura		
Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor		
Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Macronectes giganteus		
Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli		
Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus		
Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat known to occur within area
Neophema chrysogaster		
Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area
Numenius minutus		
Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat known to occur within area
Puffinus carneipes		
Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Sterna albifrons		
Little Tern [813]		Breeding likely to occur within area
Thalassarche bulleri		
Buller's Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto)		
Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita		
Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida		
Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis rubricollis		
Hooded Plover (eastern) [66726]		Species or species habitat known to occur within area