EPS

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Revelop Building and Developments Pty Ltd

Via email: emily@revelop.com.au

FLORA & FAUNA ASSESSMENT – PROPOSED CHISHOLM PLAZA AT WATERFORD COUNTY, CHISHOLM

This letter contains a Supplementary Flora and Fauna Assessment of the above proposed Chisholm Plaza development works. It has been prepared to identify any likely significant impacts to threatened species, populations or ecological communities that might occur as a result of the proposed works. The need for this supplementary flora and fauna assessment has been prompted due to the rezoning of the site, where its purpose is to support the lodgement of a new Development Application.

This assessment has been undertaken to provide specific additional assessment against the likely impacts of development and construction. Similarly, to the previous assessment undertaken by EPS for the proposed Commercial Centre, it is considered appropriate for a simplified ecological assessment to be undertaken, given the obvious high level of disturbance to the proposed development area and given previous ecological investigations that have already been completed on the site. The following comprehensive Flora and Fauna Impact Assessment has also previously been completed for the greater site in 2007 by Ecotone Ecological Consultants:

- Flora and Fauna Impact Assessment for the proposed rezoning of land at Lot 12 DP 603613 at Thornton North from rural to residential

The previous comprehensive assessment should also be referred to for more detailed information for the greater Waterford County development site.

Stages 1 – 23 at Waterford County have either been fully constructed and occupied, or are currently in the process of construction.

Level 33, 264 George St, Sydney NSW 2000
9 Yacaaba St, Nelson Bay, NSW 2315
Telephone (Sydney): 02 9258 1985
Telephone (Hunter): 02 4981 1600
ABN: 17 143 490 537
Website: www.enviroproperty.com.au

1. Proposed Works

Development of land off Heritage Drive, Tigerhawk Drive and Settlers Boulevard is proposed. Proposed works include a central access road and commercial facilities. Commercial facilities to be provided include a proposed supermarket, medical centre, retail areas, food and drink premises and associated car parking. Figure 1 illustrates the main aspects of the proposal.

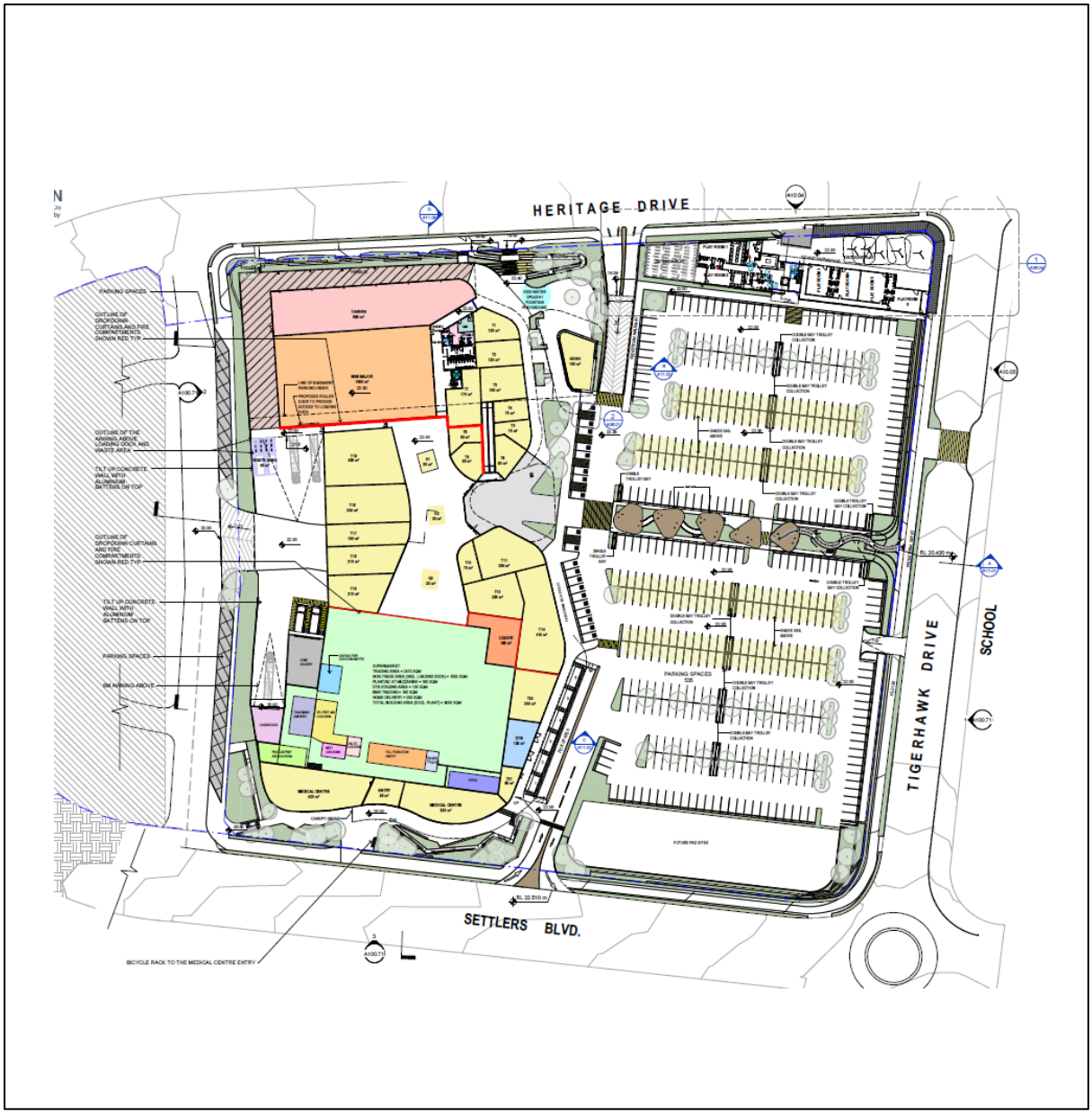

Figure 1: Proposal Overview

It is likely that approximately three (3) remnant trees of various size, including one (1) hollow-bearing tree, will need to be removed from the site to accommodate the proposed development.

2. Site Description

The site is located at Chisholm within an open agricultural landscape. It is situated on elevated areas to the south of the floodplain of Four Mile Creek, a tributary of the Hunter River. The area surrounding the site consist of recent residential and community infrastructure development (i.e. previous stages of Waterford County), open agricultural areas, and remnant forest / woodland. Also located to the north of Four Mile Creek is the Morpeth Wastewater Treatment Works.

The open grassed landscape contains few trees as shown in Plate 1 below.

Plate 1: The open grassed landscape contains few trees.

Figure 2 provides an aerial photo overview of the site location.

Figure 2: Aerial photo overview of approximate site boundary (yellow line), location and the single hollow-bearing tree.

A photo which could be broadly described as being indicative of the characteristics of the site is provided below in Plate 2.

Plate 2: View of site looking south.

3. Legislative Context

EPBC Act 1999

The primary objective of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is to 'provide for the protection of the environment, especially those aspects of the environment that are Matters of National Environmental Significance' (Matters of NES). Environmental approvals under the EPBC Act may be required for an 'action' that is likely to have a significant impact on Matters of NES being:

- World Heritage Areas;
- National Heritage Places;
- Ramsar wetlands of international importance;
- Nationally listed threatened species and ecological communities;
- Listed migratory species;
- Commonwealth marine areas;
- Nuclear actions;
- Great Barrier Reef Marine Park; and
- A water resource in relation to coal seam gas development and large coal mining development.

Of potential relevance to the site are Matters of NES which include nationally listed threatened species, ecological communities and listed migratory species. Where there is the potential for a proposal to have a significant impact on any Matter of NES a Referral under the EPBC Act is submitted to Department of the Environment and Energy (DoEE) for approval.

BC Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) aims to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. The BC Act is integrated with the EP&A Act and requires consideration of whether a development (Part 4 of the EP&A Act) or an activity (Part 5 of the EP&A Act) is likely to significantly affect threatened species, populations and ecological communities or their habitat.

The potential impact of development of the site on any threatened species, populations or communities is assessed using Assessments of Significance under Section 7.3 of the BC Act (also known as a five-part test). If the impacts are found to be 'significant', the NSW Biodiversity Offset Scheme (BOS) is triggered and the Biodiversity Assessment Methodology must be applied (and offsets must be provided).

The BC Act also nominates native vegetation clearing thresholds over which offsetting is required. Thresholds are outlined in Section 7.2 of the *Biodiversity Conservation Regulation 2017* (BC Regulation). For each development, this involves determining the extent of the native vegetation

clearing in relation to the minimum lot size associated with the property to determine if the threshold has been exceeded.

The BOS is also triggered if the Biodiversity Values Map under Clause 7.3 of the BC Regulation maps the vegetation on the site as having high biodiversity value.

In summary, the BOS and related application of the BAM is triggered when:

- Native vegetation clearing for a project exceeds thresholds nominated in the BC Regulation;
- Clearing of native vegetation on land included on the Biodiversity Values Map is to occur; or
- According to the carrying out of the Assessment of Significance (5 Part Test), a significant impact is likely to occur.

This report identifies whether the BOS should apply to the project via the carrying out of the Assessment of Significance process. This is because (as described in further detail later in this letter) clearing thresholds will not be exceeded and the site is not mapped as having high biodiversity value on the Biodiversity Values Map.

Other relevant Acts

The *Fisheries Management Act 1994* (FM Act) and *Water Management Act 2000* have also been considered as part of this assessment, where relevant. Consideration of SEPP 44 – Koala Habitat Protection has also occurred.

4. Desktop Assessment

Updated searches of the NSW and Commonwealth databases were undertaken and the species and communities are included in Appendix 1. The databases reviewed consisted of:

- NSW BioNet - http://www.bionet.nsw.gov.au
- Commonwealth Department of the Environment and Energy Protected Matters search tool

A review of the Maitland vegetation mapping for the area by Hill revealed that the majority of the site was mapped as being cleared. The eastern edge of the site is mapped as containing Lower Hunter Spotted Gum Ironbark Forest (Part Clearing with regeneration occurring), however, the site visit revealed that this area was no longer treed.

5. Flora and Fauna Survey

The field work component of this report was conducted in accordance with National Parks and Wildlife Act 1974 (NP&W Act) Section 132 (c) Scientific Licence (SL100772). The licence permits the undertaking of biodiversity assessments, Species Impacts Statements, ecological surveys and abiotic sampling as part of flora and fauna survey work.

The primary guideline that guides ecological survey in the Maitland Local Government Area is the Lower Hunter Central Coast Regional Environmental Management Strategy Flora and Survey Guidelines (2012). Review of these guidelines indicates that for an impact that is likely to remove only a small amount of remnant paddock trees, a modified survey methodology is appropriate.

It was determined that an initial site inspection and recording of ecological characteristics would be an appropriate approach to determine whether additional detailed surveys (such as trapping, night work etc.) were warranted. As a previous assessment has been conducted in this area by EPS and an extensive survey had previously also been completed by Ecotone Ecological Consultants in 2007 this approach was also considered to be acceptable for the purposes of a supplementary report.

It was determined following the site inspection that additional surveys were not warranted. This was because the vegetation to be impacted directly by the proposed works was primarily exotic and unlikely to form significant habitat for threatened species and did not comprise an intact threatened ecological community.

The survey was undertaken by Alan Midgley (Ecologist) on 17 October 2017 and included the following:

- Initial inspection of the site and proposed works area;
- Inspection of all trees requiring removal (including re-checking whether any tree hollows are present);
- Inspection of the understorey vegetation to be impacted by the proposed works;
- Recording flora species observed within the proposed works area;
- Observations of any signs indicating the presence of fauna species;
- Recording all fauna observed during the inspection;
- Targeting the presence of all threatened fauna, including Koala habitat; and
- Observation of the existing drainage situation and how the proposed works might impact the Four Mile Creek floodplain.

6. Results

Flora

It was determined that the vegetation within the site was occupied almost entirely by exotic species. The understorey is comprised of regularly mown lawn. No significant remnant native understorey vegetation exists on the site.

Dominant exotic understorey species present within the site included:

- Fireweed (*Senecio madagascariensis*);
- Lamb's Tongues (*Plantago lanceolata*)
- Couch (*Cynodon dactylon*);
- Purpletop (*Verbena bonariensis*);
- Cobblers Pegs (*Bidens pilosa*);
- Kikuyu (*Cencrhus clandestinum*); and
- Bindi (*Soliva sessilis*).

No conditions considered to be suitable for threatened flora exist.

While the majority of the site was completely cleared, two (2) remnant Spotted Gum trees and one (1) Broad-leaved White Mahogany tree was observed. No native understorey was found to exist.

Examples of the cleared area that covers the site and the remaining remnant trees are provided above in Plate 1 and below in Plate 3.

Plate 3: View of a remaining remnant tree (hollow-bearing) on the site with native understorey absent.

Habitat

Little to no habitat for native flora was provided by the site. Some fauna habitat was provided by the small number of remnant trees. Such habitat includes the branches for perching and the cover provided by the vegetation for native fauna. When in flower, the Spotted Gums would also provide foraging habitat for nectarivorous species such as honeyeaters, parrots and flying foxes.

Only one (1) hollow-bearing tree, containing a small hollow (<5cm diameter), was observed (refer to Plate 3) in the north-western extent of the site. Due to the isolation of this tree, this hollow offers only very marginal potential roosting and nesting habitat to microbats and other small mammals. Suitable habitat for Koala was not recorded. No indications of Koala presence were observed. The structural diversity of the habitat was considered to be low.

The Four Mile Creek floodplain and associated waterbodies are located over 500m to the northernmost point of the site and are separated by agricultural paddocks, recently constructed roadways and mown environments. While the Four Mile Creek floodplain would provide habitat for a range of native flora and fauna, any runoff from the proposed development is to be treated appropriately in accordance with Council requirements and is not expected to be negatively impacted by the project either directly or indirectly.

Fauna

Opportunistic observations were made of the following common species, either by direct observation on-site or calling in the vicinity of the site:

- Rainbow Lorikeet;
- Australian Magpie-lark;
- Australian Raven;
- Welcome Swallow;
- Indian Myna;
- Straw-necked Ibis; and
- Kookaburra.

No reptiles, amphibians or other mammals were recorded. No threatened species were recorded. No Grey-crowned Babblers or nests were recorded.

This bird list is indicative of the highly disturbed nature of the site. These common species are likely to use the site as part of their broader habitat ranges.

7. Discussion and Impact Assessment

As outlined previously, it was determined due to the disturbed nature of the site, that additional site investigations were not necessary. The total maximum direct impact on native vegetation equates to a total of three isolated native paddock trees.

No threatened species, populations or ecological communities were considered likely to rely on the habitats provided by the site. The single hollow-bearing tree observed on the site was isolated from nearby treed areas and is unlikely to provide significant habitat to fauna species. Intact treed areas to the east of the site are likely to provide preferred habitat for fauna species.

Consideration of whether further detailed impact assessment was necessary was undertaken. Appendix 1 provides an analysis of species. No detailed EPBC Act assessment is considered warranted due to the limited nature of impacts and the primarily exotic nature of the vegetation.

A 5-part test has however been provided in Appendix 2 to assess the impacts of the project upon threatened species and ecological communities, at a State level.

8. Conclusions and Recommendations

It is considered that the proposed development is unlikely to significantly impact any threatened species or ecological communities as listed under the EPBC Act, BC Act or FM Act.

The site has been historically disturbed for agricultural activities and contains occasional remnant trees, with only a single small hollow recorded. The site is considered likely primarily to provide habitat for common species of fauna that also have extensive and better habitat in the local remnant forests.

No additional specific issues have been identified that require additional consideration when compared to the original Ecotone Ecological Consultants report that was prepared for the area in 2007 and the more recent flora and fauna assessment conducted by EPS in 2016.

It is considered that a Referral to the DoEE under the EPBC Act is not required.

It is considered under the BC Act that offsets are not required as part of the project. To trigger offsets, the minimum threshold for native vegetation clearing is > 0.25ha. As the impact footprint on native vegetation is below this threshold, the site is not mapped as being of high biodiversity value on the Biodiversity Value Map, and the 5 part test has concluded a non-significant impact, the proposal does not trigger the need for offsetting via the NSW Biodiversity Offset Scheme.

The following recommendations should be considered for implementation:

- Appropriate erosion and sediment erosion control mechanisms should be implemented during construction, particularly to avoid impacts to the receiving waters of the Four Mile Creek floodplain and nearby drainage areas; and
- Where possible, landscaping should preferably occur using species native to the local area, which could actually lead to a net gain in native vegetation on the development area when compared to the current habitat condition;
- Retention of existing paddock trees should be considered, where safe and appropriate; and
- Where removal of the hollow-bearing tree is required, an ecologist should be present during tree removal to monitor and manage any potential resident fauna.

If you require any further information, please contact the undersigned on 4981 1600.

Yours sincerely,

Toby Lambert
Director - Ecology

Appendix 1

Threatened Species Assessment

Species, populations and communities with a likelihood of occurrence of greater than Moderate have had potential impacts formally assessed using a 5-part test under the *Environmental Planning and Assessment Act 1979* (see Appendix 8).

E1 - Endangered; E2 - Endangered Population; E3 - Endangered ecological community; E4 Critically endangered; P - Protected; K - Known occurrence; PR - Predicted occurrence; V - Vulnerable

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Amphibians						
Litoria aurea	Green and Golden Bell Frog	E1, P	V	Distributed from NSW north coast near Brunswick Heads, southwards along NSW coast to Victoria where it extends into east Gippsland. Inhabits marshes, dams and stream-sides, particularly those containing bulrushes or spikerushes. Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas.	Low. No suitable habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Birds						
Anseranas semipalmata	Magpie Goose	V	-	Mainly found in shallow wetlands (less than 1m deep) with dense growth of rushes or sedges. Often seen grazing on land; feeds on grasses, bulbs and rhizomes. Most breeding now occurs in monsoonal areas; nests are formed in trees over deep water; breeding is unlikely in south-eastern NSW. Often seen in trios or flocks on shallow wetlands, dry ephemeral swamps, wet grasslands and floodplains; roosts in tall vegetation.	Low. No suitable habitat.	Low.
Oxyura australis	Blue-billed Duck	V, P	-	This species is endemic to south-eastern and south-western Australia. It prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. They feed on the bottom of swamps.	Low. No suitable habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Stictonetta naevosa	Freckled Duck	V, P	-	Found primarily in south-eastern and south-western Australia. Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds.	Low. No suitable habitat.	Low.
Ephippiorhynchus asiaticus	Black-necked Stork, Jabiru	E1, P	-	Widespread in coastal and subcoastal northern and eastern Australia, south to central-eastern NSW. Mainly found on shallow, permanent, freshwater terrestrial wetlands, and surrounding marginal vegetation, including swamps, floodplains, watercourses and billabongs, freshwater meadows, wet heathland, farm dams and shallow floodwaters, as well as extending into adjacent grasslands, paddocks and open savannah woodlands.	Low. No suitable habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Haliaeetus leucogaster	White-bellied Sea-Eagle	V,P	C	Distributed along the coastline of Australia, also extending inland along some larger waterways. Habitat includes large areas of open water. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland and forest. Breeding territories are close to water, mainly in tall open forest or woodland, although nests are sometimes located in other habitats such as dense forest, closed scrub or in remnant trees on cleared land.	Low. No suitable habitat.	Low.
Hamirostra melanosternon	Black-breasted Buzzard	V, P, 3	-	The Black-breasted Buzzard is found sparsely in areas of less than 500mm rainfall. Lives in a range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat. Also hunts over grasslands and sparsely timbered woodlands.	Low. No suitable habitat.	Low.
Pandion cristatus	Eastern Osprey	V, P, 3	-	Eastern Ospreys are found right around the Australian coast line, except for Victoria and Tasmania. Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.	Low. No suitable habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Erythrotriorchis radiatus	Red Goshawk	E4	V	Occurs sparsely through northern and eastern Australia from Western Australian Kimberley division to north eastern Queensland and south to far north-eastern NSW with scattered records in central Australia. Inhabit open woodland and forest preferring mosaic of vegetation types. Often found in riparian habitats along or near watercourses or wetlands.	Low. No suitable habitat.	Low.
Callocephalon fimbriatum	Gang-gang Cockatoo	V	-	Distributed from southern Victoria through south and central-eastern New South Wales. In summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas.	Low. No suitable habitat.	Low.
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	Feeds almost exclusively on the seeds of *Casuarina sp*. and *Allocasuarina sp.* Open forest and woodlands up to 1000m with feed trees present.	Low. No suitable habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Glossopsitta pusilla	Little Lorikeet	V, P		Forages in flowering eucalypts and Melaleuca sp. Riparian habitats are particularly used, due to higher soil fertility and greater productivity. Nests in tree hollows.	Moderate. Some foraging habitat in Eucalypt paddock trees.	Low.
Grantiella picta	Painted Honeyeater	V	V	Nomadic species and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus *Amyema*.	Low. No suitable habitat.	Low.
Lathamus discolor	Swift Parrot	E1, P, 3	E	Migrates to south-eastern mainland Mar-Oct. Winter-flowering trees such as *Eucalyptus robusta*, *Corymbia maculata*, *C. gummifera*, *E. sideroxylon* and *E. albens* are important. Breeds in Tasmania.	Moderate. Some foraging habitat in Spotted Gum paddock trees.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Neophema pulchella	Turquoise Parrot	V	-	Range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland.	Low. Minor habitat present.	Low.
Ninox connivens	Barking Owl	V, P, 3	-	Woodland and open forest including fragmented remnants and partly cleared farmland. Preferentially hunts small arboreal mammals such as squirrel gliders and ringtail possums. But as prey decreases becomes reliant on birds, invertebrates and terrestrial mammals such as rodents and rabbits. Large tree hollows are used for nesting.	Low. Minor foraging habitat.	Low.
Ninox strenua	Powerful Owl	V, P, 3	-	Endemic to eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range. Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest.	Low. Minor foraging habitat.	Low.
Tyto novaehollandiae	Masked Owl	V, P, 3		Extends from the coast where it is most abundant to the western plains. Lives in dry eucalypt forests and woodlands from sea level to 1100m.	Low. Minor foraging habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V	-	Occupies in mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*) and Forest Red Gum (*E. tereticornis*). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees.	Low. Minor foraging habitat.	Low.
Pomatostomus temporalis temporalis	Grey-crowned Babbler (Eastern subspecies)	V, P	-	Inhabits open Box-Gum Woodlands on the slopes and Box-Cypress pine and open Box Woodlands on alluvial plains. Live in family groups that consist of a breeding pair and young from previous breeding seasons. Have broad white eyebrow and a pale grey crown-stripe are other distinguishing characters.	Moderate. Some marginal foraging and nesting habitat around Eucalypt paddock trees. Previously recorded in immediate locality.	Low.
Daphoenositta chrysoptera	Varied Sittella	V	-	Eucalypt forests and woodlands, particularly those with rough-barked species, mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Low. Minor foraging habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	This species habitat is within woodlands and dry sclerophyll forests dominated by Eucalypts and Mallee associations. This species feeds on insects and other invertebrates captured on the wing. Occasionally feeds on nectar, fruit and seeds. Distribution of this species is widespread in NSW from the coast to inland including the western slopes and plains.	Low. Minor foraging habitat.	Low.
Petroica boodang	Scarlet Robin	V	-	Dry eucalypt forests and woodland with open grassy understorey with few scattered shrubs. Occurs in both mature and regrowth forests and occasionally occurs in mallee, wet forests, wetlands and tea-tree swamps.	Low. Minor foraging habitat.	Low.
Anthochaera phrygia	Regent Honeyeater	CE	CE	Dry open forest and woodland. Particularly box-ironbark woodland and riparian forests of river sheoak. Feeds on the nectar from a wide range of eucalypts and mistletoes.	Moderate. Some foraging habitat in Spotted Gum paddock trees.	Low.
Botaurus poiciloptilus	Australasian Bittern	E1	E	Inhabits terrestrial and estuarine wetlands, generally where there is permanent water. The species prefers wetlands with dense vegetation, including sedges, rushes and reeds.	Low. No suitable habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Rostratula australis	Australian Painted Snipe	E1	E	Restricted to Australia. Most records are from the south east, particularly the Murray Darling Basin. In NSW many records are from the Murray-Darling Basin. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	Low. No suitable habitat.	Low.
Mammals						
Phascogale tapoatafa	Brush-tail Phascogale	V, P	-	Mostly found in dry sclerophyll open forest with sparse groundcover, east of the Great Dividing Range. However, has been recorded in heath, swamps, rainforest and wet sclerophyll forest. Nest and shelter in tree hollows with small entrances (2.5 - 4cm).	Low. Site consists of few isolated paddock trees, with only one isolated tree containing a small hollow. Species is not generally known to occur in the locality.	Low.
Dasyurus maculatus maculatus	Spotted-tail Quoll, Tiger Quoll	V, P	E	A variety of vegetation such as rainforest, open forest, woodland, coastal heath, inland riparian forest. Have home ranges 750 - 3500 ha. Den sites may be located in hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky cliffs.	Low. No suitable habitat and not likely to occur due to disturbed nature of the site.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Phascolarctos cinereus	Koala	V, P	V	Found in eucalypt woodlands and forest foraging on preferred food trees.	Low. No pockmarks on trees or scats recorded. No suitable habitat. No recent local records in the locality.	Low.
Potorus tridactylus tridactylus	Long-nosed Potoroo	V, P	V	Very limited distribution and extremely rare. A small population has been found in far S.E NSW. Typically inhabits moist forest types from montane wet sclerophyll forests over 1000m altitude to lowland forests at 150m. Primary food source is the fruit-bodies of hypogeous (underground fruiting) fungi. Fruit and some small invertebrates are also eaten. During the day it shelters in a crude nest under dense understorey vegetation.	Low. Negligible suitable habitat.	Low.
Petaurus norfolcensis	Squirrel Glider	V, P	-	Inhabits mature or old growth box, box-ironbark woodlands and river red gum forest west of the Great Dividing Range. Prefers mixed species stands with a shrub or Acacia midstorey. Uses tree hollows as den sites.	Low-moderate. Although previously recorded in the area, the site contains few isolated paddock trees, with only one isolated tree containing a small hollow.	Low.
Petauroides volans	Greater Glider	-	V	The Greater Glider occurs in eucalypt forests and woodlands along the east coast of Australia. Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelters during the day in tree hollows.	Low. Site consists of few isolated paddock trees, with only one isolated tree containing a small hollow. Species is not generally known to occur in the locality.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Pseudomys novaehollandiae	New Holland Mouse	-	V	The New Holland Mouse has a fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes.	Low. No suitable habitat.	Low.
Pteropus poliocephalus	Grey-headed Flying Fox	V, P	V	This species is generally found within 200 km of Australia's eastern coast. Generally occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are commonly found in gullies, close to water, in vegetation with a dense canopy.	Moderate. Some potential foraging habitat in isolated Spotted Gum paddock trees. Previously recorded in immediate locality.	Low.
Chalinobolus dwyeri	Large-eared Pied Bat	V, P	V	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin, frequenting low to mid-elevation dry open forest and woodland close to these features. Also found in well-timbered areas containing gullies.	Moderate. Marginal foraging habitat only.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Saccolaimus falviventris	Yellow-bellied Sheathtail Bat	V, P	-	Wide-ranging species found across northern and eastern Australia. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows	Moderate. Marginal foraging habitat with only one isolated tree containing a small hollow.	Low.
Mormopterus norfolkensis	Eastern Freetail-bat	V, P	-	The Eastern Freetail-bat is found along the east coast from south QLD to southern NSW. Occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark.	Moderate. Marginal foraging habitat with only one isolated tree containing a small hollow.	Low.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V, P	-	Found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania. Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.	Moderate. Marginal foraging habitat with only one isolated tree containing a small hollow.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Miniopterus australis	Little Bentwing-bat	V, P	-	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, *Melaleuca* swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.	Moderate. Marginal foraging habitat with only one isolated tree containing a small hollow.	Low.
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V, P	-	Forages in a range of habitat types. Roosts in caves, derelict mines, culverts and other man-made structures. Form maternity colonies that are faithful to particular caves.	Moderate. Marginal foraging habitat only.	Low.
Myotis macropus	Southern Myotis	V, P	-	Forages over streams and pools catching insects and small fish by raking their feet across the water surface. Roost close to water in caves, mine shafts, tree hollows and man-made structures.	Low. Aquatic habitat absent.	Low.
Scoteanax rueppellii	Greater Broad-nosed Bat	V, P	-	Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. This species usually roosts in tree hollows.	Moderate. Marginal foraging habitat with only one isolated tree containing a small hollow.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Vespadelus troughtoni	Eastern Cave Bat	V, P	-	A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals. Occasionally found along cliff-lines in wet eucalypt forest and rainforest.	Low. No suitable habitat.	Low.
Flora						
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by Scribbly Gum, Silvertop Ash, Red Bloodwood and Black Sheoak; appears to prefer open areas in the understorey and is often found in association with the Large Tongue Orchid and the Tartan Tongue Orchid.	Low. No suitable habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Grevillia parviflora subsp. parviflora	Small-flower Grevillia	V	V	Low spreading to erect shrub, usually less than a metre high. Narrow erect leaves that are 2-3.5mm long and less than 1.3mm wide with silky hairs on the underside and a sharp pointed tip. Sporadically distributed throughout the Sydney Basin with sizeable populations around Picton, Appin and Bargo. Separate populations are also known from Putty to Wyong and Lake Macquarie. Grows in sandy or light clay soils usually over thin shales, often with lateritic ironstone gravels and nodules.	Low. No suitable habitat.	Low.
Prasophyllum sp. Wybong	a leek-orchid	-	CE	Endemic to NSW, it is known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. Most populations are small, although the Wybong population contains by far the largest number of individuals. Known to occur in open eucalypt woodland and grassland.	Low. No suitable habitat.	Low.
Rutidosis heterogama	Heath Wrinklewort	V	V	Grows in heath on sandy soils and moist areas in open forest, and has been recorded along disturbed roadsides.	Low. No suitable habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Syzygium paniculatum	Magenta Lilly Pilly	E1	V	On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.	Low. No suitable habitat.	Low.
Tetratheca juncea	Black-eyed Susan	V	V	Confined to the northern portion of the Sydney Basin bioregion and the southern portion of the North Coast bioregion in the LGAs of Newcastle, Wyong, Lake Macquarie, Port Stephens, Great Lakes and Cessnock. Occurs in low open forest/woodland with a mixed shrub understorey and grassy groundcover. However it has also been recorded in heathland and moist forest. Associated to Awaba Soil landscape which has low nutrient soils. Low shrub that grows in clumps of single or multiple stems. Flowers face downwards and usually have four petals which range from white to pink to dark purple in colour.	Low. No suitable habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Maundia triglochinoides	-	V	-	Restricted to coastal NSW and extending to southern QLD, grows in swamps, lagoons, dams, channels, creeks or shallow freshwater 30-60cm deep on heavy clay soils with low nutrients. Flowering occurs during the warmer months (Nov – Jan). Associated with wetland species.	Low. No suitable habitat.	Low.
Callistemon linearifolius	Netted Bottle Brush	V	-	Recorded from the Georges River to Hawkesbury River in the Sydney area to north of Nelson Bay area of NSW, also recorded in Yengo National Park. Grows in dry Sclerophyll forests on the coast and adjacent ranges. Flowers spring-summer.	Low. No suitable habitat.	Low.
Thesium australe	Austral Toadflax	V	V	Found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Grows in association with *Themeda triandra*.	Low. No suitable habitat.	Low.

Ecological Community Assessment

Species, populations and communities with a likelihood of occurrence of greater than Moderate have had potential impacts formally assessed using a 5-part test under the *Environmental Planning and Assessment Act 1979* (see Appendix 8).

E1 - Endangered; E2 - Endangered Population; E3 - Endangered ecological community; E4 Critically endangered; P - Protected; K - Known occurrence; PR - Predicted occurrence; V - Vulnerable

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Central Hunter Grey Box-Ironbark Woodland in the NSW North Coast and Sydney Bioregions	E3	CE	Found in the Central Hunter Valley between Singleton and Muswellbrook occurring in area of relatively low rainfall and high temperatures. Associated with Permian lithology and situated on gently undulating hills, slopes and valleys and occasionally on rocky knolls. Characterised by the presence of Narrow-leaved Ironbark (*Eucalyptus crebra*), Kurrajong (*Brachychiton populneus subsp. populneus*) and Grey Box (*Eucalyptus moluccana*). Other tree species such as Rough-barked Apple (*Angophora floribunda*) and Black Cypress Pine (*Callitris endlicheri*) may be present and occasionally dominate or co-dominate. The understorey in intact sites is often present and common shrub species include Velvet Mock Olive (*Notelaea microcarpa var. microcarpa*), Coffee Bush (*Breynia oblongifolia*), Blackthorn (*Bursaria spinosa subsp. spinosa*), *Cassinia quinquefar*ia and Sticky Hop-bush (*Dodonaea viscosa*). Subshrubs may also be common and include Narrawa Burr (*Solanum cinereum*), *Phyllanthus virgatus* and Small-leaf Bluebush (*Maireana microphylla*).	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Central Hunter Ironbark-Spotted Gum-Grey Box Forest in the NSW North Coast and Sydney Bioregions	E3	CE	Found in the Central Hunter Valley mainly between Maitland and Muswellbrook, occurring in areas of undulating country including low rises and slopes on all aspects. Mostly occurs on clayey soils on Permian sediments, may also occur on alluvial and colluvial soils in valleys. Characterised by Narrow-leaved Ironbark (*Eucalyptus crebra*), Spotted Gum (*Corymbia maculata*) and Grey Box (*Eucalyptus moluccana*) forming an open forest. Other tree species such as Red Ironbark (*Eucalyptus fibrosa*) and Forest Red Gum (*Eucalyptus tereticornis*) may be present, and occasionally dominate or co-dominate. A sparse layer of small trees including Bulloak (*Allocasuarina luehmannii*) or Silver-stemmed Wattle (*Acacia parvipinnula*) may be present in some areas. The shrub layer varies from sparse to moderately dense. Common shrub species include Gorse Bitter Pea (*Daviesia ulicifolia subsp. ulicifolia*), Grey Bush-pea (*Pultenaea spinosa*), Coffee Bush (*Breynia oblongifolia*), Needlebush (Hakea sericea) and Blackthorn (Bursaria spinosa subsp. spinosa). Ground cover can be sparse to moderately dense and consists of numerous forbs, a few grass species and occasional ferns and sedges. Common species include Poison Rock Fern (*Cheilanthes sieberi subsp. sieberi*), Barbed Wire Grass (*Cymbopogon refractus*), Whiteroot (*Pratia purpurascens),* Many-flowered Mat-rush (*Lomandra multiflora subsp. multiflora*), Pomax umbellata, Glycine tabacina, Blue Flax-lily (*Dianella revoluta*), Slender Wire Lily (*Laxmannia gracilis*), Vernonia cinerea var. cinerea, Slender Tick-trefoil (*Desmodium varians*) and Kidney Weed (*Dichondra repens*).	Low. No suitable habitat.	Low.
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	V	Coastal Saltmarsh occurs in the intertidal zone on the shores of estuaries and lagoons that are permanently or intermittently open to the sea. Characteristic plants include *Baumea juncea*, Sea Rush (*Juncus krausii subsp. australiensis*), Samphire (*Sarcocornia quinqueflora subsp. quinqueflora*), Marine Couch (*Sporobolus virginicus*), Streaked Arrowgrass (*Triglochin striata*), Knobby Club-rush (*Ficinia nodosa*), Creeping Brookweed (*Samolus repens*), Swamp Weed (*Selliera radicans*), Seablite (*Suaeda australis*) and Prickly Couch (*Zoysia macrantha*).	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Freshwater Wetlands on Coastal floodpplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3	-	Found along the majority of the NSW coast, however distinct from the Sydney Freshwater Wetlands. Associated with coastal areas subject to periodic flooding. Standing water persists for at least part of the year in most years. Typically occurs on silts, muds or humic loams in low-lying parts of the floodplains, alluvial flats, depressions, drainage lines, backswamps, lagoons and lakes. May also occur in backbarrier landforms where floodplains adjoin coastal sandplains. Dominated by herbaceous plants and have very few woody species. Those that lack standing water most of the time are usually dominated by dense grassland or sedgeland vegetation, often forming a turf less than 0.5 metre tall and dominated by amphibious plants including *Paspalum distichum* (water couch), *Leersia hexandra* (swamp rice-grass), *Pseudoraphis spinescens* (mud grass) and *Carex appressa* (tussock sedge). Where they are subject to regular inundation and drying the vegetation may include large emergent sedges over 1 metre tall, such as *Baumea articulata, Eleocharis equisetina* and *Lepironia articulata*, as well as emergent or floating herbs such as *Hydrocharis dubia* (frogbit), *Philydrum lanuginosum* (frogsmouth), *Ludwigia peploides subsp. montevidensis* (water primrose), *Marsilea mutica* (nardoo) and *Myriophyllum spp*. (milfoils). As standing water becomes deeper or more permanent, amphibious and emergent plants become less abundant, while floating and submerged aquatic herbs become more abundant. These latter species include *Azolla filiculoides var. rubra, Ceratophyllum demersum* (hornwort), *Hydrilla verticillata* (water thyme), *Lemna spp.* (duckweeds), *Nymphaea gigantea* (giant waterlily), Nymphoides indica (water snowflake), *Ottelia ovalifolia* (swamp lily) and *Potamageton spp*. (pondweeds). The threatened aquatic plants, *Aldrovanda vesiculosa* and *Najas marina*, also occur within this community.	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions	E3	-	Found within the Central Hunter Valley geographic distribution, occurring on floodplains and floodplain rises. This community is known to contain the endangered River Red Gum population. Characterised by very tall woodland, occurring on floodplain and associated rises along the Hunter River and tributaries. Generally dominated by *Eucalyptus camaldulensis* (River Red Gum) in combinations with *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus melliodora* (Yellow Box) and *Angophora floribunda* (Rough-barked Apple). Within the community stands of *Casuarina cunninghamiana* subsp. *cunninghamiana* (River Oak) and *Casuarina glauca* (Swamp Oak) can form a part of this community. Dominant groundcovers include *Cynodon dactylon* (Couch), *Alternanthera denticulata* (Lesser Joyweed), *Austrostipa verticillata* (Slender Bamboo Grass), *Dichondra repens* (Kidney Weed), *Lepidium pseudohyssopifolium* (Peppercress), *Pratia concolor* (Poison Pratia), *Urtica incisa* (Stinging Nettle), *Einadia hastata* (Berry Saltbush), *Amaranthus macrocarpus* var. *macrocarpus* (Dwarf Amaranth), *Cyperus fulvus* (Sticky Sedge), *Cynoglossum australe* (Australian Hound's Tongue), *Cyperus gracilis* (Slender Flat-sedge), *Glycine tabacina* (Variable Glycine), *Geranium solanderi* (Native Geranium) and *Microlaena stipoides* var. *stipoides* (Weeping Rice Grass).	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Hunter Lowland Red Gum Forest in the Sydney Basin and NSW North Coast Bioregions	E3	-	Found between Muswellbrook, Beresfield, Mulbring and Cessnock in the Lower Hunter, occurring on the Permian sediments of the Hunter Valley on gentle slopes of depressions and drainage flats. Characterised by the open forest of *Eucalyptus tereticornis* (Forest Red Gum) and *E. punctata* (Grey Gum). Other frequently occurring canopy species are *Angophora floribunda* (Rough-barked Apple), *E. crebra* (Narrow-leaved Ironbark), *E. moluccana* (Grey Box) and *Corymbia maculata* (Spotted Gum). The understorey is open and consists of the common shrub species include *Breynia oblongifolia* (Coffee Bush), *Leucopogon juniperinus* (Prickly Beard-heath), *Daviesia ulicifolia* (Gorse Bitter Pea) and *Jacksonia scoparia* (Dogwood). The ground cover typically comprises grasses and herbs with common species being *Microlaena stipoides* var. *stipoides* Forest Weeping Grass, *Pratia purpurascens* (Whiteroot), *Lomandra multiflora* (Many-flowered Mat-rush), *Cymbopogon refractus* (Barbed Wire Grass), *Cheilanthes sieberi* (Poison Rock Fern) and *Dichondra repens* (Kidney Weed).	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Hunter Valley Footslopes Slaty Gum Woodland in the Sydney Basin Bioregion	E3	CE	Found in the Hunter Valley from Bulga to Bylong/Goulburn River National Park and known to occur in Singleton, Muswellbrook and the Upper Hunter local government areas. Occurring on colluvial soils on exposed footslopes associated with the interface between Triassic Narrabeen sandstones and Permian sediments. Characterised by the typically dominated by *Eucalyptus dawsonii* (Slaty Gum) and/or *Eucalyptus moluccana* (Grey Box). *Acacia salicina* (Cooba) and *Allocasuarina luehmannii* (Bulloak). Other trees which may be present include *Brachychiton populneus* subsp. *populneus* (Kurrajong), *Callitris endlicheri* (Black Cypress Pine), *Eucalyptus crebra* (Narrow-leaved Ironbark) and *Eucalyptus punctata* (Grey Gum). The understorey includes species such as *Olearia elliptica* (Sticky Daisy Bush), *Acacia cultriformis* (Knife-leaved Wattle), *Canthium odoratum* (Shiny-leaved Canthium), *Notelaea microcarpa* var. *microcarpa* (Native Olive), *Dodonaea viscosa* subsp. *cuneata* (Wedge-leaf Hopbush), *Acacia decora* (Western Golden Wattle) and *Solanum brownii* (Violet Nightshade). The groundcover is typically sparse to very sparse and is relatively species poor. The most frequently occurring species include *Dichondra repens* (Kidney Weed), *Lomandra multiflora* subsp. *multiflora* (Many-flowered Mat-rush), *Aristida ramosa* (Wire Grass), *Brunoniella australis* (Blue Trumpet), *Cymbopogon refractus* (Barbed Wire Grass), *Desmodium brachypodum* (Large Tick-trefoil), *Fimbristylis dichotoma* (Common Fringe-rush) and *Sida corrugata* (Corrugated Sida).	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Hunter Valley Vine Thicket in the New South Wales North Coast and Sydney Basin Bioregion	E3	-	Hunter Valley Vine Thicket has a highly restricted geographic distribution in the central Hunter Valley. The community occurs mostly as patches of less than 10ha, with a few larger patches exceeding 100 ha. The largest occurrence is at Brushy Hill adjacent to Glenbawn Dam, north east of Scone. The only stand known to occur in a conservation reserve is at Mt Dangar within the Goulburn River National Park. Hunter Valley Vine Thicket has been recorded from the local government areas of Muswellbrook, Singleton, and Upper Hunter but may occur elsewhere within the Sydney Basin Bioregion and NSW North Coast Bioregion. The canopy may include *Elaeodendron australe* (Red Olive Plum), *Geijera parviflora* (Wilga), *Notelaea microcarpa* var. *microcarpa* (Native Olive), *Alectryon oleifolius* subsp. *elongatus* (Western Rosewood), *Melia azedarach* (White Cedar) and *Brachychiton populneus* subsp. *populneus* (Kurrajong). Emergent eucalypts are common and include *Eucalyptus albens* (White Box), *E. dawsonii* (Slaty Box) and *E. crebra* (Narrow-leaved Ironbark). A shrub stratum is usually present and includes *Olearia elliptica* subsp. *elliptica* (Sticky Daisy Bush) and *Rhagodia parabolica* (Mealy Saltbush). Vines are common and include *Cissus opaca* (Small-leaved Water Vine), *Marsdenia flavescens* (Hairy Milk Vine), *Parsonsia eucalyptophylla* (Gargaloo) and *Pandorea pandorana* subsp. *pandorana* (Wonga Vine). Ground cover is generally sparse and includes *Urtica incisa* (Stinging Nettle) and *Austrostipa verticillata* (Slender Bamboo Grass).	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Hunter Valley Weeping Myall Woodland of the Sydney Basin Bioregion	E3	CE	Found in the Hunter Valley associated with heavy clay soils on depositional landforms in the south-western part of the Hunter River valley floor. Characterised by the dense open tree canopy about 15 m tall and with the most common tree being *Acacia pendula* (Weeping Myall), which may occur with *Eucalyptus crebra* (Narrow-leaved Ironbark), *A. salicina* (Cooba) and/or trees within the *A. homalophylla - A. melvillei* complex. Understorey shrubs may include *Canthium buxifolium* (Stiff Canthium), *Dodonaea viscosa* (Sticky Hopbush), *Geijera parviflora* (Wilga), *Notelaea microphylla* var. *microphylla* (Native Olive) and *Senna zygophylla* (Silver Cassia). However, the shrub stratum is absent from some stands. The groundcover varies from dense to sparse, and is comprised of grasses such as *Austrodanthonia fulva* (a wallaby grass) and *Themeda australis* (Kangaroo Grass), and low shrubs and herbs such as *Chrysocephalum apiculatum* (Common Everlasting), *Einadia nutans* subsp. *nutans* (Climbing Saltbush), *Enchylaena tomentosa* (Ruby Saltbush), *Maireana microphylla* (Eastern Cotton Bush) and *Ptilotus semilanatus*.	Low. No suitable habitat.	Low.
Kurri Sand Swamp Woodland in the Sydney Basin	E3	-	Known to occur in the Kurri Kurri–Cessnock area of the Cessnock LGA in the lower Hunter Valley. Kurri Sand Swamp Woodland is a low woodland or heathland, generally with a low open canopy rarely exceeding 15 m in height and a shrubby understorey. The overstorey is usually dominated by *Eucalyptus parramattensis* subsp. *decadens* (Parramatta Red Gum) and *Angophora bakeri* (Narrow-leaved Apple) while other tree species that occur less frequently include *E. racemosa* (Narrow-leaved Scribbly Gum), *E. fibrosa* (Red Ironbark), *E.* sp. aff. *agglomerata* and *Corymbia gummifera* (Red Bloodwood). The shrub layer is typified by *Banksia spinulosa* (Hairpin Banksia), *Dillwynia retorta*, *Jacksonia scoparia* (Dogwood), *Hakea dactyloides* (Finger Hakea), *Acacia ulicifolia* (Prickly Moses), *Grevillea parviflora* subsp. *parviflora*, *Melaleuca nodosa* (Prickly-leaved Paperbark), *A. elongata* (Swamp Wattle) and *Lambertia formosa* (Mountain Devil). The common ground species include *Entolasia stricta* (Wiry Panic), *Ptilothris deusta*, *Pimelea linifolia* (Slender Rice Flower), *Aristida warburgii*, *Lomandra cylindrica* (Needle Mat-rush), *Lomandra glauca* (Pale Mat-rush) and *Anisopogon avenaceus* (Oat Speargrass).	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	CE	Found along the NSW east coast, this EEC is considered very rare and occurs in many small stands. Predominantly rainforest species, where the canopy is dominated by scattered emergent individuals of sclerophyll species, such as *Angophora costata, Banksia intergrifolia, Eucalyptus botryoides and Eucalyptus tetricornis*. Several floristic variations between strands and in particular areas localised variants may be recognised.	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Lower Hunter Spotted Gum-Ironbark Forest in the Sydney Basin Bioregion	E3	-	Occurs principally on Permian geology in the central to lower Hunter Valley. The Permian substrates most commonly supporting the community belong to the Dalwood Group, the Maitland Group and the Greta and Tomago Coal Measures, although smaller areas of the community may also occur on the Permian Singleton and Newcastle Coal Measures and the Triassic Narrabeen Group. Characterised by the dominant Spotted Gum (*Corymbia maculata*) and Broad-leaved Ironbark (*Eucalyptus fibrosa*), while Grey Gum (*E. punctate*) and Grey Ironbark (*E. crebra*) occur occasionally. A number of other eucalypt species occur at low frequency, but may be locally common in the community. One of these species, *E. canaliculata*, intergrades extensively in the area with *E. punctata*. The understorey is marked by the tall shrub, *Acacia parvipinnula*, and by the prickly shrubs, *Daviesia ulicifolia, Bursaria spinosa, Melaleuca nodosa* and *Lissanthe strigosa*. Other shrubs include *Persoonia linearis, Maytenus silvestris* and *Breynia oblongifolia*. The ground layer is diverse; frequent species include *Cheilanthes sieberi, Cymbopogon refractus, Dianella revoluta, Entolasia stricta, Glycine clandestina, Lepidosperma laterale, Lomandra multiflora, Microlaena stipoides, Pomax umbellata, Pratia purpurascens, Themeda australis* and *Phyllanthus hirtellus*.	Low. This area contains few isolated paddock trees, which are consistent with this community. It is likely that this area formerly existed as this community, however, in its current state it is disturbed exotic grassland with few native trees and an absent native understorey.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Lower Hunter Valley Dry Rainforest in the Sydney Basin and NSW North Coast Bioregions	V2	-	Found in the Lower Hunter Valley, mainly occurring on the Barrington footslopes but is known to occur or have occurred in the Muswellbrook, Singleton, Dungog and Upper hunter local government areas. This community occurs on the Carboniferous sediments in gullies and on steep hillslopes with south facing aspects. Characterised by the common canopy trees, *Elaeocarpus obovatus* (Hard Quandong), *Baloghia inophylla* (Brush Bloodwood), *Streblus brunonianus* (Whalebone Tree), *Mallotus philippensis* (Red Kamala), *Capparis arborea* (Brush Caper Berry), *Olea paniculata* (Native Olive) and *Dendrocnide excelsa* (Giant Stinging Tree). Emergent trees 20 to 30m tall such as *Brachychiton populneus* subsp. *populneus* (Kurrajong), *Corymbia maculata* (Spotted Gum), *Brachychiton discolor* (Lacebark) and *Ficus rubiginosa* (Port Jackson Fig) are often present. Other tree and tall shrub species that are often present include *Guioa semiglauca* (Guioa), *Alectryon tomentosus* (Hairy Alectryon), *Alectryon subcinereus* (Wild Quince), *Melia azedarach* (White Cedar), *Melicope micrococca* (Hairy-leaved Doughwood), *Scolopia braunii* (Flintwood), *Claoxylon australe* (Brittlewood), *Elaeodendron australe* var. *australe* (Red Olive Plum), *Diospyros australis* (Black Plum) and *Pararchidendron pruinosum* var. *pruinosum* (Snow Wood). The understorey is dense with common species including *Notelaea longifolia* (Large Mock Olive), *Breynia oblongifolia* (Coffee Bush), *Clerodendrum tomentosum* (Hairy Clerodendrum) and *Pittosporum revolutum* (Hairy Pittosporum). Vines are abundant and include *Pandorea pandorana* subsp. *pandorana* (Wonga Vine), *Geitonoplesium cymosum* (Scrambling Lily), *Cayratia clematidea* (Native Grape), *Jasminum volubile* (Stiff Jasmine) and *Maclura cochinchinensis* (Cockspur Thorn). The ground cover is variable and is comprised of forbs, grasses and ferns. The common species include *Commelina cyanea* (Scurvy Weed), *Dichondra repens* (Kidney Weed), *Oplismenus aemulus* (Basket Grass) and *Adiantum aethiopicum* (Common Maidenhair).	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Lowland Rainforest in the New South Wales north Coast and Sydney Basin Bioregions	E3	CE	The Hawkesbury River notionally marks the southern limit of this EEC in the NSW North Coast and Sydney Basin Bioregions. This EEC is a community of subtropical rainforest and some related, structurally complex forms of dry rainforest. Lowland Rainforest in a relatively undisturbed state has a closed canopy, characterised by a high diversity of trees whose leaves may be mesophyllous and encompass a wide variety of shapes and sizes. Includes palms, vines, and vascular epiphytes. In disturbed strands of this community the canopy may be broken or the canopy be smothered by exotic vines.	Low. No suitable habitat.	Low.
River-flat Eucalypt Forest of Coastal Floodplains of the NSW North Coast, Sydney Basin and South East corner Bioregions	E3	-	Found in many local government areas in NSW, including Singleton, Maitland and Cessnock, this community is associated with silts, clay-loams and sandy loams on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. Characterised by an open tree layer of *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. A layer of small trees may be present, including *Melaleuca decora, M. styphelioides* (prickly-leaved teatree), *Backhousia myrtifolia* (grey myrtle), *Melia azaderach* (white cedar), *Casuarina cunninghamiana* (river oak) and *C. glauca* (swamp oak). Scattered shrubs include *Bursaria spinosa*, *Solanum prinophyllum, Rubus parvifolius, Breynia oblongifolia, Ozothamnus diosmifolius, Hymenanthera dentata, Acacia floribunda* and *Phyllanthus gunnii*. The groundcover is composed of abundant forbs, scramblers and grasses including *Microlaena stipoides, Dichondra repens, Glycine clandestina, Oplismenus aemulus, Desmodium gunnii, Pratia purpurascens, Entolasia marginata, Oxalis perennans* and *Veronica plebeia.*	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East corner Bioregions	E3	-	Found on the coastal floodplains of NSW occurring on the fringes of coastal estuaries on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains. Associated with grey-black clay-loams and sandy loams where the groundwater is saline or sub-saline. Characterised by a sparse layer of *Casuarina glauca* (swamp oak) is the dominant species northwards from Bermagui. Other trees including *Acmena smithii* (lilly pilly), *Glochidion* spp. (cheese trees) and *Melaleuca* spp. (paperbarks) may be present as subordinate species, and are found most frequently in stands of the community northwards from Gosford. Tree diversity decreases with latitude, and *Melaleuca ericifolia* is the only abundant tree in this community south of Bermagui. The understorey is characterised by frequent occurrences of vines, *Parsonsia straminea, Geitonoplesium cymosum* and *Stephania japonica* var. *discolor*, a sparse cover of shrubs, and a continuous groundcover of forbs, sedges, grasses and leaf litter. The composition of the ground stratum varies depending on levels of salinity in the groundwater. Under less saline conditions prominent ground layer plants include forbs such *Centella asiatica, Commelina cyanea, Persicaria decipiens* and *Viola banksii*; graminoids such as *Carex appressa, Gahnia clarkei, Lomandra longifolia, Oplismenus imbecillis*; and the fern *Hypolepis muelleri*.	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East corner Bioregions	E3	-	Found on humic clay loams and sandy loams on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains. Characterised by the open to dense tree layer of *Eucalyptus robusta* (swamp mahogany), *Melaleuca quinquenervia* (paperbark) and, south from Sydney, *Eucalyptus botryoides* (bangalay) and *Eucalyptus longifolia* (woollybutt). Other trees may be scattered throughout at low abundance or may be locally common at few sites, including *Callistemon salignus* (sweet willow bottlebrush), *Casuarina glauca* (swamp oak) and *Eucalyptus resinifera* subsp. *hemilampra* (red mahogany), *Livistona australis* (cabbage palm) and *Lophostemon suaveolens* (swamp turpentine). A layer of small trees may be present, including *Acacia irrorata* (green wattle), *Acmena smithii* (lilly pilly), *Elaeocarpus reticulatus* (blueberry ash), *Glochidion ferdinandi* (cheese tree), *Melaleuca linariifolia* and *M. styphelioides* (paperbarks). Shrubs include *Acacia longifolia, Dodonaea triquetra, Ficus coronata, Leptospermum polygalifolium* subsp. *polygalifolium* and *Melaleuca* spp. The groundcover is composed of abundant sedges, ferns, forbs, and grasses including *Gahnia clarkei, Pteridium esculentum, Hypolepis muelleri, Calochlaena dubia, Dianella caerulea, Viola hederacea, Lomandra longifolia, Entolasia marginata* and *Imperata cylindrica*. On sites downslope of lithic substrates or with soils of clay-loam texture, species such as *Allocasuarina littoralis, Banksia oblongifolia, B. spinulosa, Ptilothrix deusta* and *Themeda australis*, may also be present in the understorey.	Low. No suitable habitat.	Low.
Sydney Freshwater Wetlands in the Sydney Basin Bioregion	E3	-	Found on the Warriewood and Tuggerah soil landscapes, this community is largely restricted to freshwater swamps in swales and depressions on sand dunes and low nutrient sandplains. Characterised by the lack of saline influence and complex vegetation types restricted of freshwater swamps in coastal areas. Species include sedges and aquatic plants such as *Baumea* species, *Eleocharis sphacelata*, *Gahnia* species, *Ludwigia peploides* subsp. *montevidensis* and *Persicaria* species. Areas of open water may occur where drainage conditions have been altered and there may also be patches of emergent trees and shrubs.	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Warkworth Sands Woodland in the Sydney Basin Bioregion	E3	CE	Confined to a small area near Warkworth occurring on Aeolian sand deposits south of Singleton. Characterised by the low woodland dominated by *Angophora floribunda* (Rough-barked Apple) and *Banksia integrifolia* subsp. *integrifolia* (Coast Banksia). Other tree species may be present such as *Eucalyptus tereticornis* (Forest Red Gum) and *E. glaucina* (Slaty Red Gum). The understorey consists of shrub and ground layer species, including *Acacia filicifolia* (Fern-leaved Wattle), *Melaleuca thymifolia* (Thyme Honey-myrtle), *Brachyloma daphnoides* (Daphne Heath), *Pteridium esculentum* (Bracken), *Pimelea linifolia* (Slender Rice Flower), *Imperata cylindrica* var. *major* (Blady Grass), *Chrysocephalum apiculatum* (Common Everlasting) and *Glycine clandestina*. Small drainage lines within the area occupied by this community may support the presence or higher abundance of certain species (such as *Melaleuca thymifolia*) and the absence or lower abundance of others (such as *Banksia integrifolia* subsp. *integrifolia*)	Low. No suitable habitat.	Low.
White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland	E3	CE	Found from the Queensland border in the north, to the Victorian border in the south. It occurs in the tablelands and western slopes of NSW. Characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakely's Red Gum. Commonly co-occurring eucalypts include Apple Box (*E. bridgesiana*), Red Box (*E. polyanthemos*), Candlebark (*E. rubida*), Snow Gum (*E. pauciflora*), Argyle Apple (*E. cinerea*), Brittle Gum (*E. mannifera*), Red Stringybark (*E. macrorhyncha*), Grey Box (*E. microcarpa*), Cabbage Gum (*E. amplifolia*) and others. The understorey in intact sites is characterised by native grasses and a high diversity of herbs; the most commonly encountered include Kangaroo Grass (*Themeda australis*), Poa Tussock (*Poa sieberiana*), wallaby grasses (*Austrodanthonia* spp.), spear-grasses (*Austrostipa* spp.), Common Everlasting (*Chrysocephalum apiculatum*), Scrambled Eggs (*Goodenia pinnatifida*), Small St John's Wort (*Hypericum gramineum*), Narrow-leafed New Holland Daisy (*Vittadinia muelleri*) and blue-bells (*Wahlenbergia* spp.).	Low. No suitable habitat.	Low.

Appendix 2

5 Part Test

Considerations of the effects of the proposed development under Part 7.3 of the BC Act for threatened species or ecological communities considered to have a greater than or equal to moderate likelihood of occurrence (see Appendices 1 for likelihood of occurrence assessment) are given below. These are as follows:

- Little Lorikeet *Glossopsitta pusilla*
- Swift Parrot *Lathamus discolor*
- Grey-crowned Babbler *Pomatostomus temporalis temporalis*
- Regent Honeyeater *Anthochaera phrygia*
- Grey-headed Flying Fox *Pteropus poliocephalus*
- Large-eared Pied Bat *Chalinobolus dwyeri*
- Yellow-bellied Sheathtail Bat *Saccolaimus falviventris*
- Eastern Freetail-bat *Mormopterus norfolkensis*
- Eastern False Pipistrelle *Falsistrellus tasmaniensis*
- Little Bentwing-bat *Miniopterus australis*
- Eastern Bentwing-bat *Miniopterus schreibersii oceanensis*
- Greater Broad-nosed Bat *Scoteanax rueppellii*

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

The potential habitat to be impacted by the proposal is very small, comprising only three (3) isolated paddock trees. The structural layers of habitat are not present within this area due to historical agricultural and grazing use. Compared to the intact areas of high quality Lower Hunter Spotted Gum Ironbark forest in the locality, the importance of the area on site as habitat for any of the assessed threatened species is considered to be low. Only one (1) hollow-bearing tree, containing a small hollow (<5cm diameter), was observed (refer to Plate 3) in the north-western extent of the site. Due to this trees isolation, this hollow offers only very marginal potential roosting and nesting habitat to microbats and other small mammals. It is considered that the proposal is unlikely to have an adverse effect on the life cycle of any species such that a viable local population of these species is likely to be placed at risk of extinction.

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

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

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

No endangered ecological community likely to occur within the subject site.

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

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

The proposal will remove or modify mostly exotic vegetation with few isolated native paddock trees, with only a single hollow-bearing tree requiring removal.

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

The vegetation is already primarily cleared and the proposed development is unlikely to disrupt any habitat connectivity as the paddock trees are isolated from a much larger patch of better quality habitat to the east.

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

The proposal will require the clearing of only a few native isolated paddock trees. It is not considered to be important habitat for threatened species or for any ecological community.

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

Areas of Outstanding Biodiversity Value (AOBV) declared in accordance with the BC Act were not identified within the investigation area.

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

Relevant key threatened processes could be considered to be:

- Clearing of native vegetation;
- Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants;

- Loss of Hollow-bearing Trees;
- Predation and hybridisation by Feral Dogs, *Canis lupus familiaris*;
- Predation by the European Red Fox *Vulpes vulpes*; and
- Predation by the Feral Cat *Felis catus*.

Due to the already highly disturbed nature of the site, these key threatening processes are not likely to be significantly exacerbated by the proposed development.