

Ecological Assessment

**5 Anderson Rd
Glenning Valley**



Prepared by:



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PEAK LAND MANAGEMENT

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Cover Photos: View of subject site looking south.

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AUTHOR DETAILS

PEAK LAND MANAGEMENT is an independent company specialising in providing quality consulting services in natural resource management, agricultural and bushfire threat assessment. The company is recognised by the Rural Fire Service as a certified Bushfire Assessment business, is a BPAD –A Certified Bushfire Consultant Business and Practitioner with the Fire Protection Association (17671), consultant member of the NSW Ecological Association and abides by their professional code of conduct and ethics, and licenced with Department of Environment, Climate Change and Water for survey and collection of threatened flora (S11395).

Some examples of the type of work **PEAK LAND MANAGEMENT PTY LTD** undertakes includes Statement of Environmental Effects, Flora & Fauna Surveys/ Ecological Assessments, Bushland/Vegetation Management Plans, 7 Part Threatened Species Assessment Tests, Erosion and Sediment Control Plans, Rural Property Plans and Bushfire Threat Assessment reports.

Mr Ted Smith is the Director of **PEAK LAND MANAGEMENT PTY LTD**. Ted has a Bachelor of Science Degree with Honours majoring in Physical Geography from the University of New South Wales, and a Graduate Diploma in Design for Bushfire Prone Areas from the University of Western Sydney. He is a qualified experienced Ecologist, Certified Bushfire Consultant, accredited Biobanking Assessor with Department of Environment and Climate Change (Accreditation No. 0043), Certified Practicing Agriculturist and has a Certificate IV in Assessment and Workplace Training. Ted has over 20 years experience in land management, including 9 years with the Department of Land and Water Conservation (now Department of Environment, Climate Change and Water) and over 11 years managing **PEAK LAND MANAGEMENT**.

EXECUTIVE SUMMARY

The subject site is located in an area which has the following ecological attributes:

- Two Endangered Ecological Communities are present adjacent to this site, but not on it: *Swamp Sclerophyll Forest on Coastal Floodplains* , and *River Flat Eucalypt Forest on coastal floodplains*.
- One threatened flora species was recorded, *Melaleuca biconvexa*.
- 124 flora species were recorded, comprising 80 native flora species, 44 weed species including 5 declared noxious weeds.
- There is habitat present for many threatened fauna species (predominantly mobile fauna including birds, bats and owls).
- Has moderate to high weed invasion over much of the Anderson Road front, but few weeds along Gordon Vaughn Road.
- Vegetation adjoining Gordon Vaughan road is an important wildlife corridor, particularly for arboreal mammals, reptiles and amphibians.

Works are recommended to be attuned to these ecological attributes, and cause the least amount of disturbance feasible. To achieve this, the following actions are recommended:

- Conserve and rehabilitate all native remnant vegetation over the site (except access point). This should be located off Anderson Road, away from *Mel biconvexa*. Develop/rezone land over the cleared areas only.
- Allow for a protective 5-10m buffer zone around all vegetation to allow for natural regeneration and improvement of *Mel. biconvexa* distribution, and wildlife corridor attributes.
- Retain all hollow bearing habitat trees, and provide additional nest boxes where feasible.
- Reduce human disturbance to wildlife corridor.
- Erect silt fencing round all site works in accordance with council erosion and sediment control policy. A detention basin would be beneficial to amphibians if planted out with natives.

A 7 Part Test of significance and assessment of state and nationally listed threatened and migratory species found no effect on any threatened species by the proposed works. It is the consultant's opinion that this application does not need referring to the Department of Environment and Heritage or Department of Environment, Climate Change and Water.

1.0 INTRODUCTION AND BACKGROUND

PEAK LAND MANAGEMENT PTY LTD has been engaged by Andrews Neil on behalf of Pyoand Pty Ltd to prepare a Flora and Fauna or Ecological Assessment for a proposed residential subdivision rezoning over land located at Lot 8 DP 816552/ No. 5 Anderson Road, Glenning Valley.

The land is zoned Scenic Protection 7(c) under Wyong LEP 1991 as amended. The site is 1.91Ha , and is mainly cleared grassland and vacant.

The report follows the guidelines set out under the Flora and Fauna Survey Guidelines prepared by the Lower Hunter Central Coast Regional Environment Strategy (LHCCREMS, 2002), with a variation as discussed later regarding fauna survey.

This report includes all assessments required under the provisions of the *Environmental Planning and Assessment Act 1979*, *EP&BC Act 1999* , and *TSC Act 1995*.

1.2 SCOPE OF WORKS

Wyong Shire Council has requested a Flora and Fauna report before it enters the Gateway rezoning process (30th Sept,2010). This report is needed due to “changes in best practice and various legislative changes” that have occurred since the last Ecological reports in 2001 were prepared.

Given the intensive survey work already completed for this site, this report has built upon their results. A thorough on site flora survey targeting threatened species and identifying existing recorded threatened species and Endangered Ecological Communities has occurred, and a habitat survey for potential threatened species. This includes all threatened species listed since 2001.

2.0 LITERATURE REVIEW

Reports relevant to this study area that have been reviewed include:

- Threatened Species Assessment - October, 2000. Andrews Neil.
- Additional Information – Threatened Species. April 2001. Andrews Neil.
- Wyong Shire Council Directors Report, Feb 4, 1998. Proposed rezoning at Anderson Rd Glenning Valley.
- ACM Landmark date ? – habitat and large tree survey.
- WSC, 30th Sep 2010. Letter from Chris Ferry re planning proposal.

In summary a number of threatened species assessments / surveys have occurred over this property. There also appears to have been studies completed pre 2000, which are referred to in these reports. These assessments have included land to the west across Anderson Road which was once part of the rezoning proposal, and is now no longer part of it.

They have found the following threatened species:

- *Melaleuca biconvexa*

No threatened fauna were recorded at all despite intensive surveying including mammal trapping/hair tubes/spotlighting, Anabat calls, owl call playback, bird surveys, night and day amphibian and reptile surveys.

Vegetation has been assessed in this report with reference to LHCCREMS vegetation mapping, 2000 and 2003.

This report builds on these reports findings for the subject site. Habitat assessment and historical NPWS wildlife Atlas results are used to determine likely presence or absence of threatened fauna.

3.0 LIMITATIONS OF ECOLOGICAL SURVEY

Flora survey

Vegetation was assessed on site by a walking meander transect over and in some cases adjacent to the subject site. No quadrats were taken due to the linear small area of remnant vegetation on the site. This is in conformation with Department of Environment, Climate Change and Water and LHCCREMS (2003) guidelines.

Special attention was paid to any potential threatened species. This has enabled identification and assessment of most species on the site, except those cryptic species which were not flowering such as *Tetratheca juncea* which reportedly had a shorter flowering time this year and may have been (September only) missed.

The survey is limited by:

- Not all parts of site being surveyed;
- Non flowering of cryptic orchid/grass/other species at time of survey as described above making identification impossible/problematic.
- Possible observer error in plant identification;

To help overcome these limitations as much of the site was surveyed as possible given time and budgetary constraints. Any plants that were not readily identifiable in the field were sampled and analysed in the office. If after analysis they were still not identifiable then they were referred to a peer botanist for his assessment, or either described to genera level only, or recorded as unidentified ? (this is only for weed/non threatened species). Threatened species were forwarded to the National Herbarium of NSW for identification / ratification, except *Mel biconvexa* which is already recorded by the herbarium/NPWS for this site.

Fauna Survey

Several factors limit the ability of surveys such as this ecological investigation to fully determine the occurrence of all species of fauna which may utilise the subject site. Surveys undertaken over a short time period, in this case a period of 1 day (plus former survey results) are unlikely to document the full inventory of fauna species which may occur in the study area.

In the case of highly mobile fauna such as birds and bats, many species may utilise the site only temporarily as a component of their larger foraging range, or may occur in the study area or locality during particular periods of the year, such as their seasonal migratory path (which is the case with this site due to winter flowering gums being important for migratory threatened birds).

For these reasons habitat assessment has been used to determine possible occurrence of threatened species, with the 7 Part Test of Assessment based upon this methodology.

4.0 PLANNING INSTRUMENTS

4.1 FEDERAL

Environment Protection and Biodiversity Conservation Act 1999

This Act is related to actions which may have a detrimental impact on matters of National Environmental Significance (NES). This includes:

- Nationally Threatened Species and Ecological Communities,
- Listed Migratory Species which may be relevant to this site
- Declared world heritage sites
- Ramsar Wetlands
- Nuclear actions
- Actions in a Commonwealth marine area.

For the purposes of this Act this report should be used by Council to allow an Assessment of whether the site requires approval from Environment Australia. It is an offence to carry out an action that will or is likely to have a significant impact on one of the above NES matters without first obtaining an approval from the Commonwealth Environment Minister except where an exemption in EPBC Act applies.

A report has not been produced on NES matters from Environment Australia due to their database being down. However it is known that the site is not a listed world heritage site, or RAMSAR wetland. Nationally listed species are generally included under the NSW Threatened Species Wildlife Atlas as shown in Appendix 3, which are considered in the 7 Part Test. There are no Federal Endangered Ecological Communities present.

4.2 STATE

Environmental Planning and Assessment Act 1979

Under the EP&A Act where development is on land that is, or is part of, critical habitat, or where development or an activity is likely to significantly affect Threatened Species, Endangered Populations or Endangered Ecological Communities and their habitat, the applicant for development consent must be accompanied by a species impact statement (SIS). This document is to be prepared in accordance with the Threatened Species Act (2005).

Section 5A of the Act sets out those matters which must be taken into account in deciding whether there is likely to be a significant effect on threatened species, communities or endangered populations and their habitats. This is referred to as the “Seven Part Test of significance”. This is the case with this proposal and will be addressed.

Figure 1: Aerial photo of subject site (from Lands Department , imagery 2006).



Figure 2: Recent aerial photo of subject site (from Nearmap , imagery 2010).



Figure 3: Landscape scale corridor linkages (imagery from Nearmap , 2010).



Threatened Species Conservation Act 1995

The objects of this Act are as follows (from Austlii, 2008):

- (a) to conserve biological diversity and promote ecologically sustainable development, and*
- (b) to prevent the extinction and promote the recovery of threatened species, populations and ecological communities, and*
- (c) to protect the critical habitat of those threatened species, populations and ecological communities that are endangered, and*
- (d) to eliminate or manage certain processes that threaten the survival or evolutionary development of threatened species, populations and ecological communities, and*
- (e) to ensure that the impact of any action affecting threatened species, populations and ecological communities is properly assessed, and*
- (f) to encourage the conservation of threatened species, populations and ecological communities by the adoption of measures involving co-operative management.*

The Act applies to those species listed on both Schedule 1 (Endangered) and Schedule 2 (Vulnerable). If a threatened species, Endangered Ecological Community or critical habitat is found and proposed to be destroyed or impacted upon in any way then a species impact statement should be carried out as stated under the EP&A Act. Additionally Schedule 3 lists threatening processes of which this site has a number occurring (Feral Cats, Foxes, Clearing, etc).

A full search of endangered species, both fauna and flora has been conducted using information presented in the Department of Environment and Conservation Wildlife Service Atlas of NSW Wildlife (2010), and from field survey. The results of the database searches are shown in Appendix 3. It should be noted that the minimum search area is a 10km square area, but is usually larger than this. This therefore picks up many species which are clearly not found on this site, and occasionally may also miss some species. A search of site maps, and habitat requirements, for each of these species, and any others considered as possibly occurring has been examined in more detail in the 7 Part Test of significance.

National Parks and Wildlife Act 1974

This Act provides for protection of all native fauna, and some native flora. A list of protected species is required in assessments as they provide information as to the type of vegetation communities and fauna habitats present within an area (Murray and Bell, 2001). This Act has been addressed through the list of potential local threatened species contained in Appendix 2, along with a full flora and fauna survey, and impacts and ameliorative measures on threatened fauna species recommended.

Water Management Act, 2000 – Riparian Management

This Act is administered by the Department of Water and Energy and controls works along rivers and foreshore areas of streams or drainage lines. No water courses are present. Therefore this Act is not relevant.

SEPP 14: Coastal Wetlands

SEPP 14 wetlands are recognised and mapped significant wetland areas across the state of NSW. No SEPP 14 wetlands occur on site.

SEPP 19

SEPP 19 refers to bushland in urban areas and making provision for its protection and preservation. This SEPP applies to WSC LEP, but only to land affected being greater than 1 hectare in extent. The land affected in this case is approximately 1-2Ha. In this however case clearing is likely to not occur, or if it does be of a very minor nature. . Therefore it i considered that this proposal conforms to this SEPP.

SEPP 44: Koala Habitat Protection

Austlii (2008) state:

“This Policy aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline:

(a) by requiring the preparation of plans of management before development consent can be granted in relation to areas of core koala habitat, and

(b) by encouraging the identification of areas of core koala habitat, and

(c) by encouraging the inclusion of areas of core koala habitat in environment protection zones.

In this Policy:

"core koala habitat" means an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population.

"guidelines" means the guidelines, as in force from time to time, made for the purposes of this Policy by the Director.

"potential koala habitat" means areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component”.

This SEPP applies across NSW to land which is greater than 1 hectare in extent, including adjoining land in the same ownership whether or not the Development Application applies to the whole or only part of the land, and is not a National Park or Forestry Reserve.

The work is >1Ha in area, and contains some koala feed trees (*E.robusta* and *E.saligna*).

Wildlife Atlas records show koala being recorded around 3-5kms to the south , and one record around 2kms to the northwest. It is unlikely they occur on this site due to its limited habitat, but it is possible it may be used as a corridor.

The subject site is not considered to be potential koala habitat, with less than 15% of trees being koala feed trees.

It is considered that the proposal conforms to SEPP 44.

4.3 LOCAL

The relevant local government is Wyong Shire Council. The subject land is currently zoned Scenic Protection 7(c) under Wyong LEP 1991 as amended. The site is 1.91Ha , and is mainly cleared grassland and vacant.

Environmental reporting is required on land where any rezoning is proposed, which this report addresses.

4.3.1 DRAFT LOCAL ENVIRONMENTAL PLANNING INSTRUMENTS

No other draft planning instruments have been identified.

5.0 SITE ASSESSMENT

5.1 DISTURBANCE HISTORY

The site is almost wholly disturbed, being totally cleared and pastured improved and slashed regularly. The only natural areas are thin strips of vegetation along George Vaughan Road and Anderson Roads.

The following disturbance was evident in varying degrees:

- Clearing over most of site;
- Probable loss of some topsoil;
- Weed infestation heavy adjoining Anderson Road, except for northwestern part which has Mel. Biconvexa present;
- Feral animals probably present but not seen— mainly foxes, cats and dogs;
- Noise and light pollution;

- Other nocturnal and diurnal human disturbance of native fauna and flora from nearby residents and cars.

5.2 CONNECTIVITY

An aerial photo landscape connectivity map is shown in Figure 3.

The southern part of the site adjacent to Gordon Vaughan Road has important remnant old growth vegetation which provides a corridor or linkage between remnant vegetation located to the east and west of the site. It is intersected by Anderson Road, which provides a dangerous crossing point for fauna.

This corridor provides cover for many native fauna species , particularly mammals, reptiles and amphibians.

5.3 WATER COURSES

No creeks are located over the subject site.

5.4 SOILS, GEOLOGY AND TOPOGRAPHY

Soil landscapes are mapped as Er (Erina) over the site (Murphy et al , 1993).

Erina soil landscape comprises moderately deep to deep yellow earths, and yellow podzolics. These soils have a high erosion hazard, seasonal waterlogging and are strongly acid soils of low fertility.

6.0 FAUNA AND HABITAT SURVEY

Fauna survey results from Andrews Neil (2000, 2001) recorded:

- 36 bird species, 7 mammal species including one now listed threatened bat species – Grey Headed Flying Fox , 2 frog species were recorded within, or adjacent to the study area. No additional species were recorded during this survey. A possum drey, believed to be a ringtail possum was seen on one of the trees on the SE corner of the site.

From habitat assessment of this site it was observed that there were only three hollow bearing habitat trees (Figure 4). Hollows were small, and not capable of providing nesting hollows for larger forest owls. Mature trees were present, and relatively natural understorey adjoining Gordon Vaughan Road. There were no rock outcrops, overhangs, or any water storage (either ephemeral or permanent) present on the site. From this assessment and Wildlife Atlas records there is potential habitat for:

- Bats
 - Yellow bellied sheath tailed
 - Eastern Freetail
 - Eastern false Pippistrelle
 - Little bentwing
 - Eastern bentwing
 - Greater broad nosed
 - Grey Headed Flying Fox
- Birds
 - Little Eagle
 - Osprey
 - Varied Sitella
 - Flame Robin
 - Little Lorikeet (foraging only)
 - Swift Parrot (foraging only)
 - Barking Owl (foraging only)
 - Powerful Owl (foraging only)
 - Masked Owl (foraging only)
 - Sooty Owl (foraging only)
 - Spotted tailed Quoll (negligible)
 - Yellow bellied glider
 - Squirrel glider (unlikely)
 - Long nosed potoroo (negligible)

Overall, the condition of the fauna habitat within the subject site is good near Gordon Vaughan Road, but very restricted in extent. Old growth forest is present, with large mature trees, some with small hollows. Understorey is relatively natural. Vegetation adjoining Anderson Road is weed infested, lopped by the power authorities, and has no mature remnant trees, but does have some native mid storey trees and some native/weed

understorey providing habitat for small birds and mammals / frogs and perhaps amphibians but they need to travel across the road to breed in the creek. It is also very restricted, and does not provide any linkages although it does provide a possible squirrel or yellow bellied glider cross /fly over point.

Hollow bearing habitat trees

Hollow bearing habitat tree locations are shown in Figure 4.

Table 1 shows new habitat tree details.

Table 1: Habitat tree details

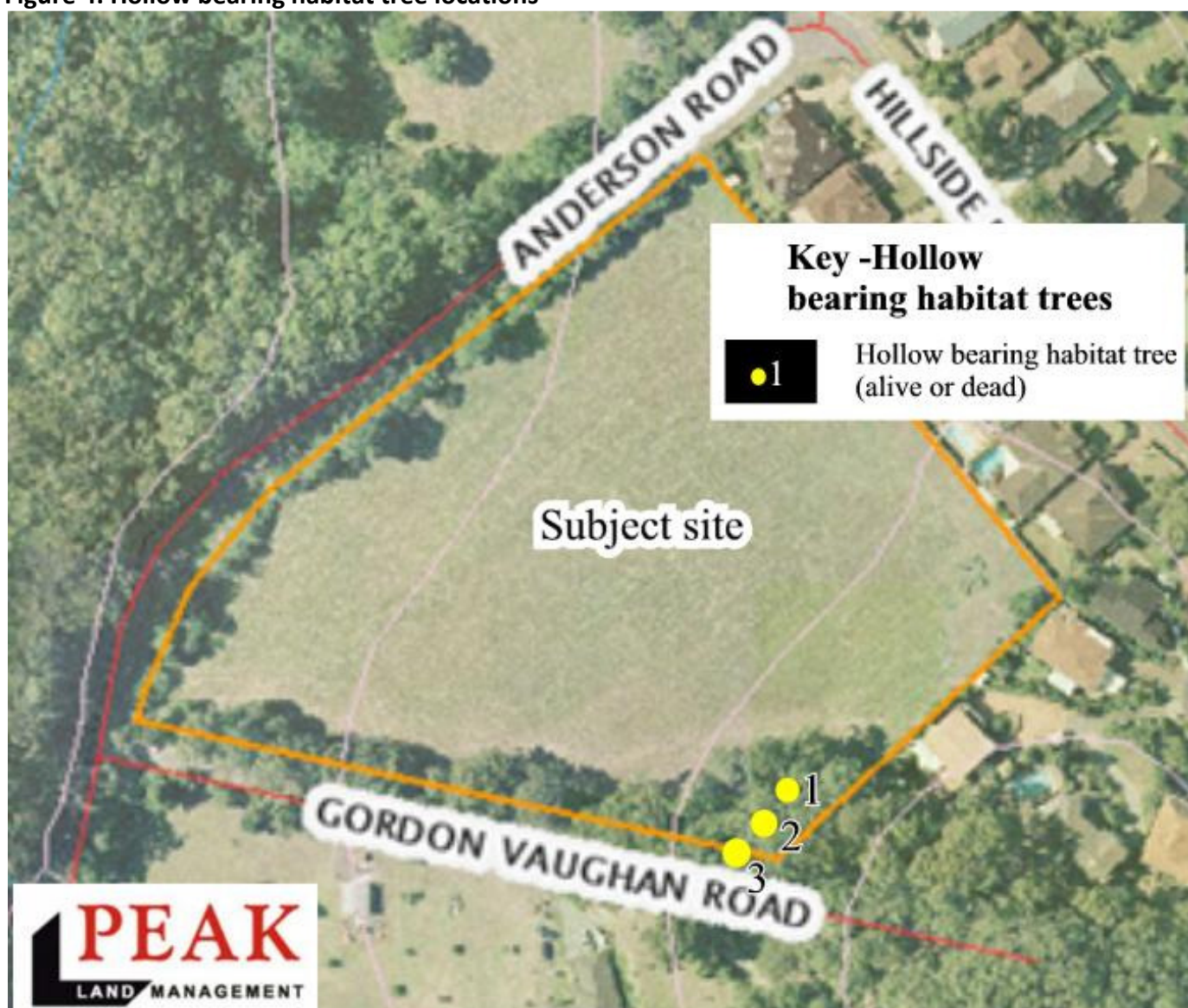
Tree Number	Species	Hollow size (cm)	Notes
1	<i>Corymbia maculata</i> (Spotted Gum)	1 small	
2	<i>Eucalyptus paniculata</i> (Grey Ironbark)	1 small	
3	<i>E. acmenoides</i> (White Mahogany)	3 small	

Small hollow - <15cm diameter

Medium hollow – 15-30cm diameter

Large > 30cm diameter

Figure 4: Hollow bearing habitat tree locations



7.0 FLORA SURVEY RESULTS

The major flora species identified are shown in Appendix 1. 124 flora species were recorded, comprising 80 native flora species, and 44 weed species including 5 declared noxious weeds.

This represents a reasonable diversity of native plants and high exotic plant count. It was noted that many species which were observed in more extensive surveys conducted by Andrews Neil 2000, 2001 over a larger area of land adjacent to this site to the west were not present on this site. More surveys in different seasons/locations over the site would reveal more species. This count reflects the small size of remnant vegetation left on the site, soils, topography and disturbance.

The subject site has been mapped (Figure 4) as Coastal Narrabeen Moist Forest (Map Unit 6) by LHCCREMS 2003, which is correct over the lower portions of the site, but the higher areas to the southeast are more accurately mapped as Coastal Foothills Spotted Gum Ironbark Forest (LHCCREMS Unit 15).

After ground truthing and flora survey the vegetation communities have been mapped by PEAK LAND MANAGEMENT (Figure 5). Vegetation has been mapped as LHCCREMS unit terminology due to its extensive species list available for comparison.

It is noted that Andrews Neil 2001 have classified the Anderson Road linear patch as LHCCREMS map unit 5 – Alluvial tall Moist Forest which is a similar community, and the LHCCREMS Unit 15 patch as Grey Ironbark Open Forest (unsure which mapping terminology this refers to) which also is similar.

Where the vegetation has been completely cleared and exotic understorey dominates it has been classified as **disturbed**.

None of these communities is considered to be an Endangered Ecological Community, although Coastal Narrabeen Moist Forest does compare to *River Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions* where it occurs over a river flat/floodplain. In this case it does not occur on the floodplain.

It is noted that recent work by Stephen Bell (botanist) in conjunction with Wyong Shire Council (pers comm Chris Ferry) has determined that Spotted Gum Forests over the Warnervale area are considered equivalent to an *Endangered Ecological Community – Lower Hunter Spotted Gum-Ironbark Forest*. This small remnant on the property does have some similar characteristics, and although it has not been assessed as equivalent to this community there is a possibility that it may be akin to this Endangered Ecological Community. This will need a determination from Council in conjunction with DECCW.

The Anderson Road linear remnant is moderately disturbed from weed invasion (mainly Small leaved Privet and lantana), is lopped as it lies under a low electricity line, and has edge effects from the road and subject site being cleared. No Eucalypts were present, being mainly Melaleuca and Acacia spp, with some natural understorey in parts.

The Gordon Vaughan Road reserve/subject site remnant was in very good condition, with mature trees and a relatively intact understorey. Trees up to 30m in height were present, with an interconnecting canopy and relatively low weed density. It would function as a wildlife corridor particularly for arboreal mammals, and to a lesser degree ground dwelling fauna. It is constrained however by its narrow width, and clearing of understorey higher up the slope (ie to the east) over gardens and driveways.

Threatened flora species

Melaleuca biconvexa was recorded as shown in Figure 5. Approximately 30 stems/trunks were located over the Anderson Road remnant, with some mature plants present probably sending suckers/shoots around them. Another patch was located off Gordon Vaughan Road over the subject site. Approximately 20-25 trunks/stems were counted, with some mature plants present.

No other threatened flora species were recorded, despite an intensive survey effort. It is considered that there is a low potential for some species such as *Tetratheca juncea* and *Diuris praecox* to be present as examined later in the 7 Part Test.

Figure 4: LHCCREMS map of site (2003).

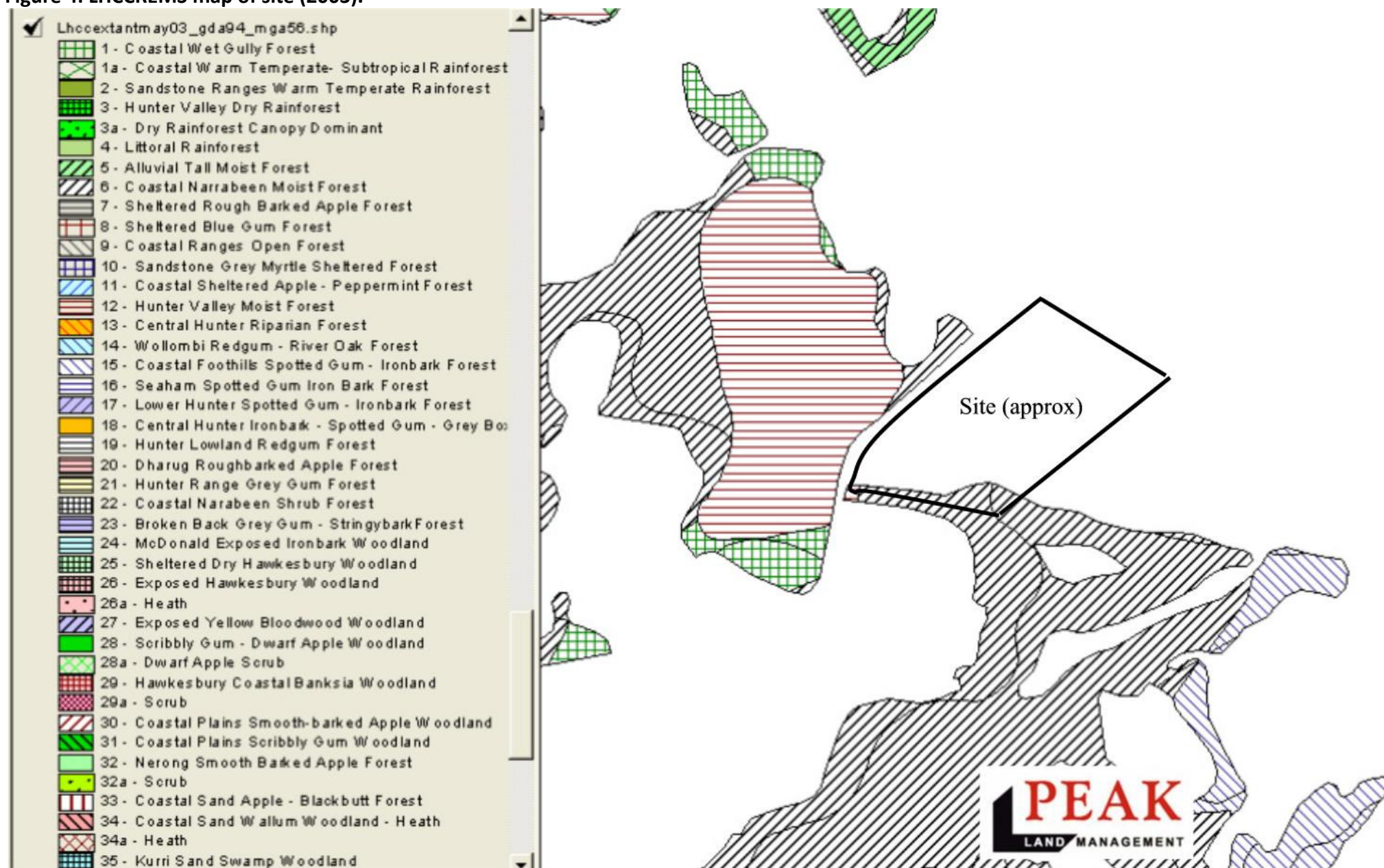


Figure 5: Vegetation communities as mapped by PEAK LAND MANAGEMENT

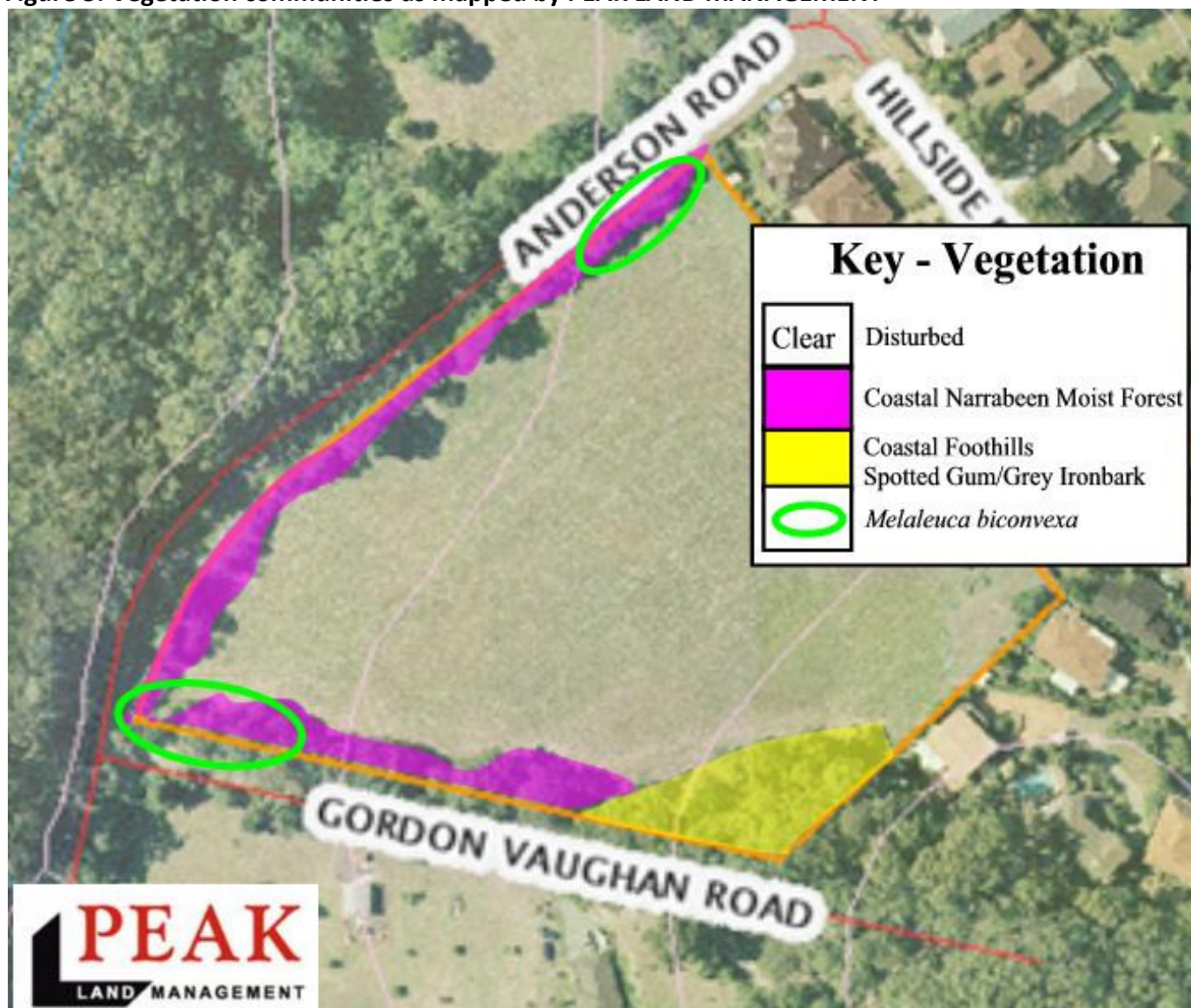
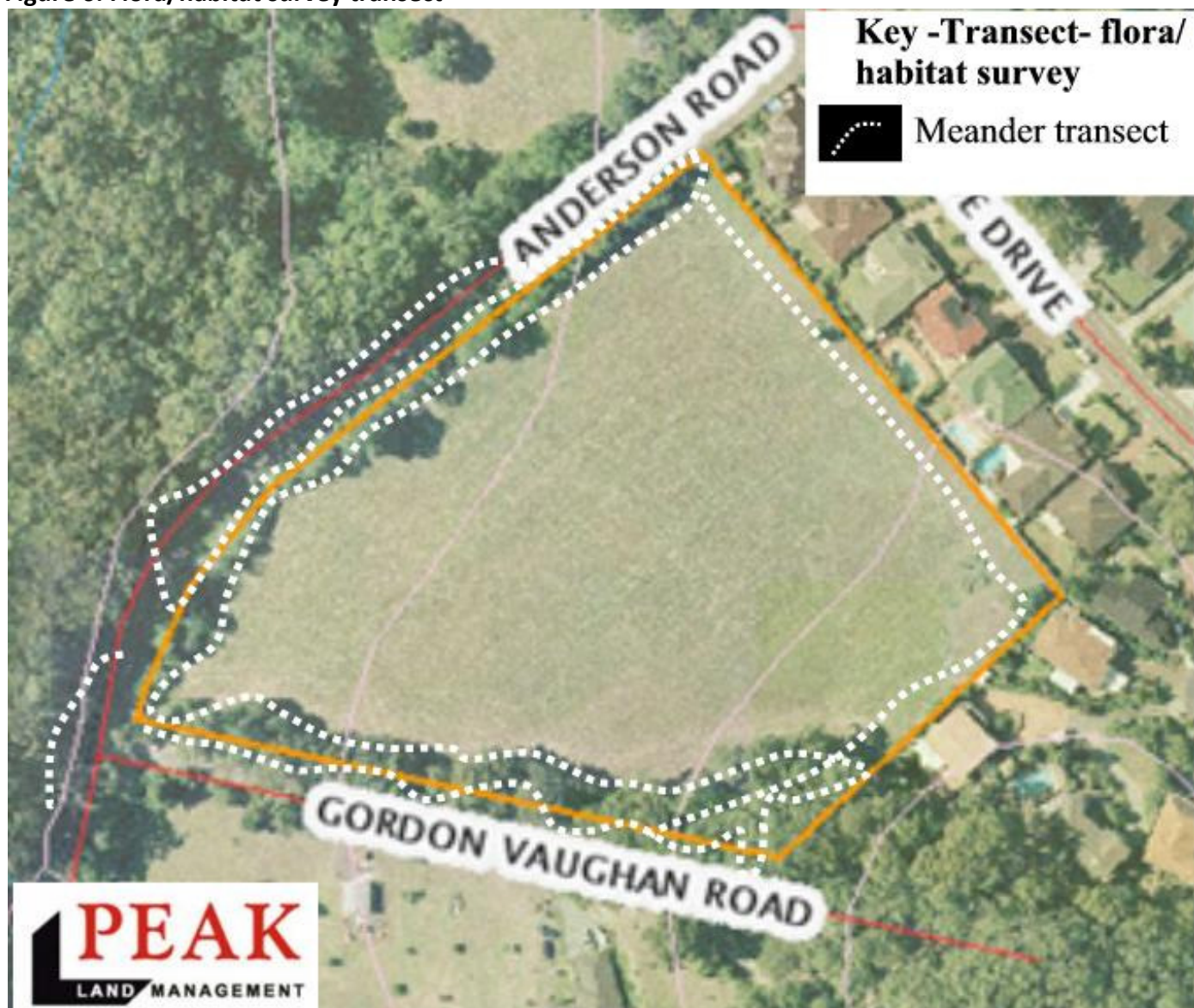


Figure 6: Flora/habitat survey transect



8.0 SEVEN PART TEST OF SIGNIFICANCE

A consideration of threatened flora species potentially occurring on this site which have been gazetted within the *TSC Act* was conducted by a search of the NPWS atlas (10km² area) which is shown in Appendix 2.

Each flora species/ population/ ecological community is considered for its potential to occur upon the site and the likely level of impact as a result of the proposal. Table 2 shows likely impact for each fauna and flora species. All species have been subject to a collective 7 part test of significance. Species which would obviously not occur on the site due to incorrect habitat requirements, or be impacted by any works, have not been listed below, or tested.

Additionally a literature review of potentially occurring threatened species was conducted. Once each species particular habitat requirements were identified a field inspection occurred of the site to verify the likely impact. This was done by direct species observation during traverses around the site, assessment of likely habitat, and the suitability of the site for threatened species identified. If suitable habitat is present, and Wildlife Atlas records of that species occur in the local area, an assumption has been made that they may occur.

Note: all recorded locations of threatened species are sourced from Department of Environment and Climate Change Wildlife Atlas, 2010.

Please note that often flora & fauna records and research are not complete, flora/fauna sampling/survey may not have occurred in all seasons, or over all parts of site, and therefore these are subjective ratings only and may change over time. They are put here as guide only for regulatory authorities, and the proponent to consider.

Table 2: Threatened species considered as possibly occurring for the site and assessment of potential impact.

Species	Comments	Likely level of impact	Legal status
FAUNA			
Listed frog spps - Wallum Froglet (<i>Crinia tinnula</i>), Green and Golden Bell Frog (<i>Litoria aurea</i>), Green Thighed Frog (<i>Litoria brevipalmata</i>) and Red Crowned Froglet (<i>Pseudophryne australis</i>)	No wet areas are located over the property. There is also a road separating the subject site from potential frog habitat to the west. Despite frog surveys by Andrews Neil 2000 and 2001 no threatened frog species were located in this bushland, or the subject site. No calls were heard during this survey of any frog. It is highly unlikely that any listed threatened frog species occurs on this site due to lack of suitable habitat, and lack of records in this area within a 2km radius. Retention of bushland on the property is desirable to minimize potential impact to frogs crossing through the area, or possible future use of the site.	Negligible to Very Low if all native vegetation retained	V
Birds and owls – listed potential species include Little Eagle, Osprey, Varied Sittella, Flame Robin, Little Lorikeet (foraging only), Swift Parrot (foraging only), Barking Owl (foraging only), Powerful Owl (foraging only), Masked Owl (foraging only), and Sooty Owl (foraging only).	Most birds have broad foraging ranges and habitat requirements which require open areas, forest, lakes/water, trees, for foraging and hollow trees/caves/bridges or other suitable structures to roost/nest. There are foraging resources available, and limited small nesting tree hollows. No <i>Allocasuarina</i> spps were recorded, meaning Glossy Black Cockatoo would not occur here due to the lack of foraging resources, and lack of nesting hollows. The site has no large tree hollows present, meaning although foraging resources are available for forest owls, no nesting is available. Powerful Owl, Sooty Owl, Barking Owl and Masked Owl have been recorded within 3kms of this site and may therefore forage on/over this site occasionally. A Powerful Owl record exists within 300m of the site to the northwest. A variety of forest/migratory birds which feed off nectar and/or insects, including Flame Robin, Varied Sittella, Little Lorikeet, Swift Parrot, Regent Honeyeater have been recorded locally, and may occur in the nearby Swamp Sclerophyll Forest, including this site from time to time. The majority of these birds would utilize the Swamp Mahogany Forest, and the one or two <i>E. robusta</i> and <i>Corymbia maculata</i> trees on site for winter flowering resources, which should all be retained. Osprey and Little Eagle raptors have large home ranges. No raptor nests were seen on site, and they may infrequently use this area as part of their hunting range. Osprey generally nest near water, and not as far inland as this site.	Negligible to Very Low if all native vegetation retained	All V except Regent honeyeater which is now Critically Endangered and Swift Parrot which are E1

Bats – Listed species include Yellow bellied Sheathtail bat, Eastern Freetail bat, Yellow bellied sheathtailed, Eastern false Pippistrelle, Little bentwing, Eastern bentwing, Greater broad nosed, Grey Headed Flying Fox.	Most bats have broad foraging ranges and habitat requirements which require open areas, forest, lakes/water, trees, for foraging and hollow trees/caves/bridges or other suitable structures to roost/nest. There are foraging resources available, with insects available over open paddock, open forest and roads (flyways) present, and some tree nectar. All of these species of threatened bats have been recorded within 10kms of this site with the following bats having occurred on or near this site:- , Eastern and Little bentwing Bats, Greater broad nosed bat and Grey Headed Flying Fox. Suitable nesting hollows are present (but are very limited – small hollows/crevices in three trees), and foraging resources which are recommended to be retained. Proposed rezoning works are not expected to have any significant impact		
Squirrel Glider (<i>Petaurus norfolcensis</i>)	Department of Environment and Climate Change 2009 state “The species is widely though sparsely distributed in eastern Australia. It inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. It Prefers mixed species stands with a shrub or Acacia midstorey, lives in family groups of a single adult male one or more adult females and offspring. It requires abundant tree hollows for refuge and nest sites. Its diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein. This site offers very limited habitat, with no suitable hollows present, no bloodwoods, some Acacias, and some Ironbark/Blackbutt. Squirrel gliders were not recorded during the fauna survey conducted by Andrews Neil 2000, and no records exist in the local area within 5kms of this site. They are not considered to be present.	Negligible to Very Low if all native vegetation retained	V
Yellow bellied glider (<i>Petaurus australis</i>)	This species occurs in tall mature Eucalypt forest. They nest in large tree hollows, in family groups of two or more. They feed from a range of sources, including winter flowering eucalypts which provide nectar and pollen, and sap trees which they chew v shaped incisions to collect sap. These include grey gums (<i>E. punctata</i>) and Tallow wood (<i>E. microcorys</i>), with none of these species present on site. This site may be part of their foraging range. No incisions were noted on any trees on the site.. This site offers marginal foraging habitat, but the Swamp Sclerophyll Forest to the west is better habitat and they could disperse from that forest to this site from time to time, or use this site as a corridor to bushland further east and southeast. They have been recorded within 2km of this site to the west.	Negligible to Very Low if all native vegetation retained	V

Spotted tailed quoll (<i>Dasyurus maculatus</i>)	Found in a variety of habitat types including dry and moist eucalypt forests and rainforests. They tend to move along drainage lines and make dens in fallen logs or among large rocky outcrops. They like dense understorey. This site offers marginal habitat, with little understorey not remaining, however it offers a wildlife corridor for quoll to move between suitable remnant patches of bushland. Has been recorded 3kms to the west, and south around Holgate. Unlikely to be present, but retention of corridor important. Fallen hollow logs should be retained where feasible and left on the ground.	Very Low	V
Long nosed potoroo	DECC 2010 state “inhabits coastal heaths and dry and wet sclerophyll forests. Dense understory with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature. The fruit-bodies of hypogeous (underground-fruited) fungi are a large component of the diet of the Long-nosed Potoroo. They also eat roots, tubers, insects and their larvae and other soft-bodied animals in the soil. Often digs small holes in the ground in a similar way to bandicoots. Mainly nocturnal, hiding by day in dense vegetation – however, during the winter months animals may forage during daylight hours. No distinctive holes were present, soils were not sandy loams, and dense understory habitat is very limited. Recorded 3-4kms to the south. Unlikely to occur here. This proposal is expected to have a marginal impact.	Negligible to very low.	V
Koala (<i>Phascolarctos cinerus</i>)	Koalas are found in Eucalypt forests throughout eastern Australia. They occur where appropriate feed trees occur. Primary feed trees did occur on site (<i>E. saligna</i> and <i>E. robusta</i>). No scats were seen or any koalas sighted in survey traverses in habitat trees remaining on site. The site is marginal potential koala habitat with less than 15% of trees being feed trees. They could however utilise the Swamp Sclerophyll forest to the west of this site and occasionally disperse to this site, or use it as a corridor. They have been recorded within 2kms of this site to the west.	Negligible to Very Low if all native vegetation retained	V
FLORA			
	All plants listed in Appendix 3 as identified by Wildlife Atlas records were assessed during the flora survey. One threatened species was found occurring on this site – <i>M. Biconvexa</i> , and another two species – <i>Tetratheca juncea</i> and <i>Diuris praecox</i> have a very low chance of being present due to survey being conducted outside of their flowering seasons.		
<i>Tetratheca juncea</i> (Black	This species is quite widespread in the Lake Macquarie City Council area, but cryptic and generally	Very low- no	V

eyed Susan)	only recorded during flowering. It is typically found in sandy, occasionally swampy heath and dry sclerophyll forest. It was not located on site, but survey occurred in early December, and it apparently had a shorter flowering season this year (flowering period - late Aug-early Nov). Despite this the site is marginal, with no swampy heath and very limited dry sclerophyll forest to top of site only which has been disturbed in the past. Unlikely to occur here.	plants recorded	
<i>Diuris praecox</i> (Rough double tail)	DECCW (2005) state “Grows on hills and slopes of near-coastal districts in open forests which have a grassy to fairly dense understorey. Exists as subterranean tubers most of the year. It produces leaves and flowering stems in winter. Recorded from Ourimbah to Nelson Bay. Flowering period is from July to early September”. Was not recorded, but survey did not occurring in flowering period. Habitat requirements for this orchid are broad so there is a small possibility it could be present. Nearest recorded locations are coastal, over 5kms away. Highly unlikely to be present.	Very Low – no plants recorded	V
Other listed threatened plant species.	Not recorded, despite a survey of this land, and including previous surveys by Andrews Neil 2000, 2001.	Nil– no plants recorded over proposed works area	
Endangered ecological communities/populations	Nil	Nil	
Threatening Processes	• Clearing of native vegetation/ land clearance (possible) • Ecological consequences of high frequency fires • Predation, habitat degradation and competition by fox, feral cats, honey bees, pigs, rabbits, plague minnow. • Anthropogenic climate change • Loss and degradation of native plant and animal habitat by invasion of escaped garden plants (including lantana), including aquatic plants. • Removal of dead wood and dead trees	See 7 Part Test	

Key - ** Legal status (from Department of Environment and Conservation, 2008):	
V	Vulnerable (Threatened Species Conservation Act, 1995)
E1	Endangered (Threatened Species Conservation Act, 1995)
E2	Endangered (Threatened Species Conservation Act, 1995)
E4	Presumed Extinct (Threatened Species Conservation Act, 1995)
P	Protected (National Parks and Wildlife Act, 1974)
P13	Protected Plants (National Parks and Wildlife Act, 1974)
U	Unprotected

Key- Likely level of impact
This is a subjective qualitative measure used by the consultant. It is determined by the relative impact on a species (ie whether a species will be put in danger of extinction, numbers of individuals likely to be affected directly or indirectly, current status of species) and takes into account factors such as amount of clearing proposed, and surrounding amount of suitable habitat for that species.
Ratings:
Nil (plant only): Not present as site conditions (ie soil/geology, climate, elevation etc) and on site survey verify it was not present.
Negligible: No impact can be discerned, but is included as there is a minor chance of that species possibly using the site (using the precautionary principle). In some cases there may also be positive impacts such as more foraging feed available from clearing some understorey and promoting native grass growth, or establishment of more vegetation.
Very Low: Individuals unlikely to be affected, and if they are in a very minor way with no major effect likely on any individual.
Low: Recognises that individuals may be present on site (either permanently or infrequently) and affected in a small way such as some minor loss of habitat, such as foraging resources. Does not include loss of nesting habitat or shelter. Suitable surrounding habitat is available to offset direct impact, but it is acknowledged that this may place an individual under more stress, and lead to possible death of an individual.
Moderate: Individuals will be affected, with impact likely to cause stress and possible death to a local individual or group of individuals. Loss of habitat may lead to the significant impact on a small local population, with its possible demise.
High: Will cause the death directly of local individuals, and lead to the loss of habitat for that species to re-establish permanently. Will lead to the death or reduction of a local population/family group, and increase the chance of extinction of the species.

8.1 COLLECTIVE SEVEN PART TEST FOR FLORA UNDER SECTION 5A OF THE EP&A ACT 1979

- 1) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.***

The species considered as being possibly affected are all the fauna species listed in Table 1 which have an assessment rating of very low to moderate. They will be affected to varying degrees dependant on what occurs with the site. If it is totally cleared then a loss of connectivity, and habitat will occur meaning a greater impact particularly on arboreal mammals such as koala and yellow bellied glider. If no clearing occurs then impact is expected to be very low, with only indirect impacts such as increased noise, night time lighting, and edge effects (weeds, nutrient runoff, changed water runoff) apparent on the remnant vegetation.

Proposed rezoning will not put any viable local populations of these species at risk, as no local population of any threatened fauna species has been recorded. In regards to *Mel. biconvexa* this would appear to be a local population, and it should be retained. It is also partly located on a road reserve, where it should be preserved. If it is retained then no impact should occur, apart from some indirect impacts listed above, to the local population. Proper stormwater, nutrient and sediment control works should be in place, and a protective buffer of at least 10m put around all *Mel. biconvexa* plants to allow for their protection and allow some regeneration and genetic diversity.

- 2) 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 the viability of the species is likely to be placed at risk of extinction.***

No endangered populations of species have been recognised for this site. *Mel. Biconvexa* occurs within 1km to the south and east and west, and is a relatively common threatened species. This community could be considered an endangered population. If all vegetation including *Mel. biconvexa* is retained on site as recommended there should be no risk of local extinction.

- 3) In the case of a critically endangered or endangered ecological community, whether the action proposed:***
- (i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be place 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 Communities are considered present on the subject site. It is noted that recent work by Stephen Bell (botanist) in conjunction with Wyong Shire Council (pers comm Chris Ferry) has determined that Spotted Gum Forests over the Warnervale area are considered equivalent to an *Endangered Ecological Community – Lower Hunter Spotted Gum-Ironbark Forest*. This small remnant on the property irrespective of its status should be retained, and therefore no impact on any Endangered Ecological Community will occur.

4) *In relation to the habitat of a threatened species, population or ecological community:*

- (i) *the extent to which habitat is likely to be removed or modified as a result of the action proposed, and***
- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and***
- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long term survival of the species, population or ecological community in the locality.***

- (i) If recommendations made in this report are followed there should be no loss of vegetation over the site, except perhaps an access road from Anderson Road which may involve around 30m² of clearing (not located near *Mel. Biconvexa*), a very small amount. If buffer zones are implemented as recommended then there should be a net vegetation gain in the long term.
- (ii) As above. If clearing of trees occurs along George Vaughan Road then yes there will be habitat fragmentation on a landscape scale level which would impact on many threatened species, as well as other species.
- (iii) The land proposed to be developed is of low ecological importance, but remnant vegetation does contain *Mel biconvexa*, a listed threatened species, and does form part of an important wildlife corridor. This corridor contains mature old growth forest which if removed will impact in the long term on all threatened species utilising those trees for foraging resources, shelter and nesting hollows (these should continue to form in these trees as time goes on).

5) *Whether the action proposed is likely to have an effect on critical habitat (either directly or indirectly)*

No there is no listed critical habitat for this site.

6) *Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.*

There are many actions for the preservation of the listed threatened species as listed by Department of Environment and Climate Change. In summary most actions are concerned with the strategies of habitat retention, education of landholders and surrounding people, research, mapping of habitat areas, implementing protocols and guidelines, and habitat

rehabilitation/restoration/regeneration (Department of Environment and Conservation, 2008).

There are threat abatement plans or recovery plan for some of these listed species which essentially require habitat to be retained.

7) 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.

Key threatening processes are listed on Schedule 3 of the TSC Act 1995, and the federal EPBC schedule. . Of relevance to this proposal are:

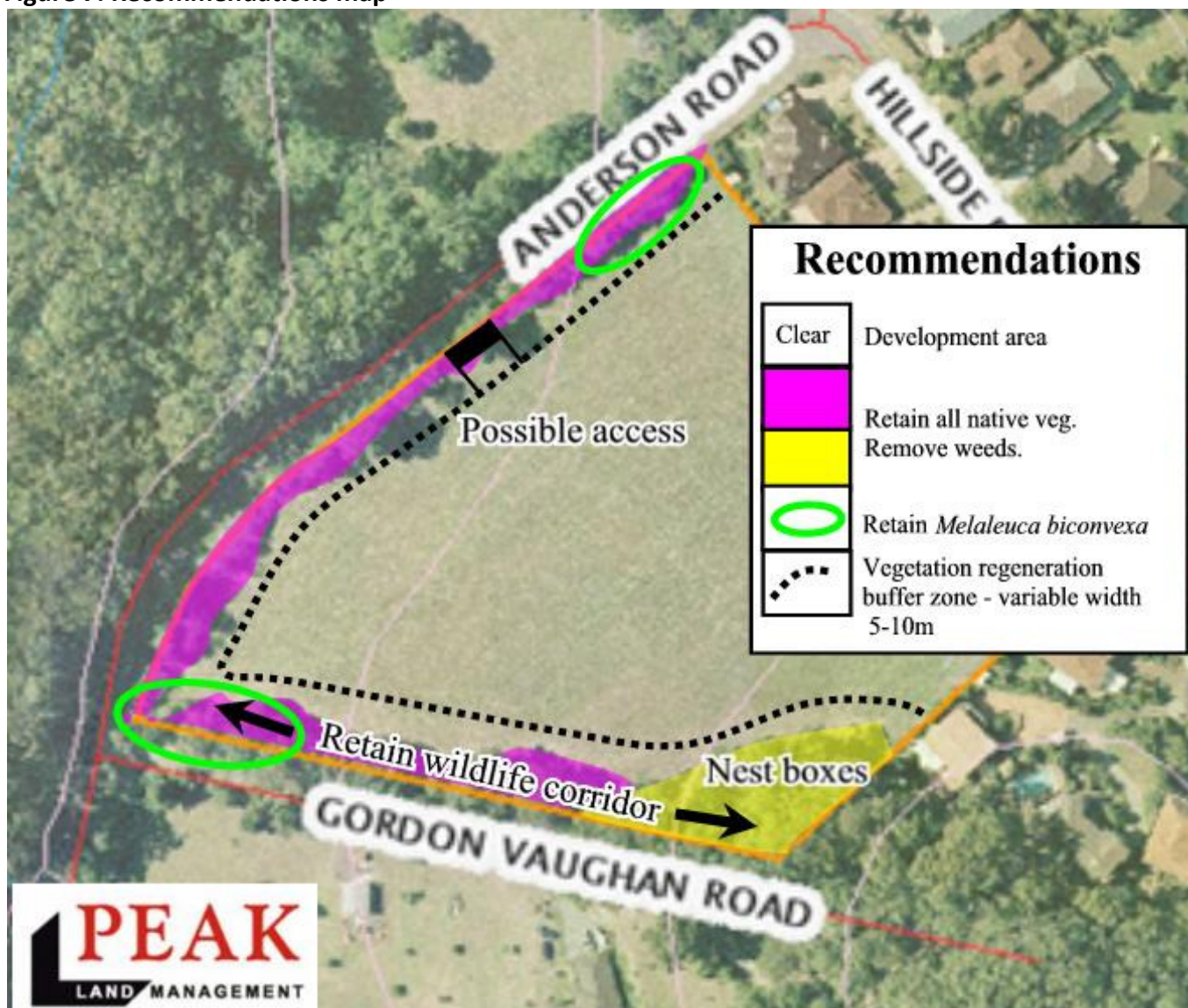
- Clearing of native vegetation/ land clearance (possible)
- Ecological consequences of high frequency fires
- Predation, habitat degradation and competition by fox, feral cats, honey bees, pigs, rabbits, plague minnow.
- Anthropogenic climate change
- Loss and degradation of native plant and animal habitat by invasion of escaped garden plants (including lantana), including aquatic plants.
- Removal of dead wood and dead trees

The subject site is currently, or has had in the past, many of these threatening processes operating. The proposed rezoning in itself does not present a KTP , but a residential subdivision may dependant on if clearing occurs or not. If clearing occurs then this will constitute a key threatening process (clearing, removal of dead wood and dead trees, and possible invasion by exotic grasses).

The proposal in the consultant's opinion conforms to the TSC Act (2005) and EP&BC Act (1999) due to the minor nature of works and does not need referring to Department of Environment and Climate Change.

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Figure 7: Recommendations map



9.0 CONCLUSION AND RECOMMENDATIONS

The Seven Part Test of significance and other ecological investigations has found that there is negligible impact on threatened species by the proposed works. Therefore it is considered a Species Impact Statement (SIS) is not required.

Figure 7 shows a map of recommendations for the site. The following recommendations (in no order of importance) if adopted will reduce environmental impact and improve the biodiversity of the site:

- Conserve and rehabilitate all native remnant vegetation over the site (except access point which should be located off Anderson Road, away from *Mel biconvexa*). Of particular importance is the preservation of the wildlife corridor adjacent to Gordon Vaughan Road. Develop/rezone land over existing cleared areas only.
- Remove weeds including noxious and environmental weeds including exotic grasses from bushland areas,
- Allow for a protective 5-10m buffer zone around all vegetation to allow for natural regeneration, including *Mel. biconvexa*, and to enhance wildlife corridor.
- Retain all hollow bearing habitat trees, and provide additional nest boxes where feasible. There is a lack of hollow bearing habitat trees on site, or hollow logs on the ground. Place nest boxes of varying sizes in a variety of trees over the site. The hollows should be of varying sizes. They should be of sturdy construction material that won't easily rot/degenerate (ie not pine wood) and aim to provide replacement habitat.
- Reduce human disturbance to wildlife corridors.
- Erect silt fencing round all site works in accordance with council erosion and sediment control policy. A detention basin would be beneficial to amphibians. If one is constructed it should be located on existing cleared land, and have an amphibian friendly design (ie: planted out with natives, rocks/logs habitat around edges).

If these recommendations are carried out then environmental impact should be reduced.

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PEAK LAND MANAGEMENT

DISCLAIMER: Whilst every effort is made to present clear and factual information based on current scientific data, on site field survey, and council guidelines no guarantee is made that all species have been identified on the site, or that all information is presented to councils satisfaction, or that the development will be approved as this is in the hands of the approving statutory authorities. Consequently no liability is accepted for losses, expenses or damages occurring as a result of information presented in this document.

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APPENDIX 1: FLORA DATA FOR SITE

Scientific Name	Common Name
Overstorey:	
<i>Corymbia maculata</i>	Spotted Gum
<i>Eucalyptus saligna</i>	Blue Gum
<i>Eucalyptus paniculata</i>	Grey Ironbark
<i>Eucalyptus pilularis</i>	Blackbutt
<i>Eucalyptus acmenoides</i>	White Mahogany
<i>Eucalyptus robusta</i>	Swamp mahogany
<i>Glochidion ferdinandi</i>	Cheese tree
<i>Syncarpia glomulifera</i>	Turpentine
<i>Livistona australis</i>	Cabbage Tree Palm (note - all seedlings on site)
Midstorey:	
<i>Acmena smithii</i>	Lilly Pilly
<i>Acacia irrorata</i>	Wattle
<i>Acacia maidenii</i>	Maidens wattle
<i>Acacia schinoides</i>	Wattle
<i>Backhousia myrtifolia</i>	Grey myrtle
<i>Callistemon salignus</i>	Willow leafed bottlebrush
<i>Eleocarpus reticulatus</i>	Blueberry Ash
<i>Clerodendrum tomentosum</i>	Hairy Clerodendrum
<i>Cryptocarya microneura</i>	Murrogun, Brown Jack
<i># Melaleuca biconvexa</i>	Biconvex paperbark
<i>Melia azedarach</i>	White Cedar
<i>Pratia purpurascens</i>	Pratia
<i>Pittosporum revolutum</i>	Rough fruit pittosporum
<i>Pittosporum undulatum</i>	Sweet Pittosporum
<i>Pomaderris intermedia</i>	
<i>Rapanea variabilis</i>	Muttonwood
<i>Rhodamnia rubescens</i>	Scrub Turpentine
Shrubs and understorey:	
<i>Alpinia caerulea</i>	Native Ginger
<i>Breynia oblongifolia</i>	Coffee Bush
<i>Carex inversa</i>	Knob sedge
<i>Daviesia ulicifolia</i>	Gorse bitter pea
<i>Dianella caerulea var producta</i>	Flax lilly
<i>Dichondra repens</i>	Kidney weed
<i>Gahnia clarkei</i>	Rough Saw Sedge

<i>Leucopogon juniperinus</i>	Beared Heath
<i>Lomandra longifolia</i>	Spiny Headed Mat Rush
<i>Pimelea linifolia</i>	Rice Flower
<i>Podolbium ilicifolium</i>	Native Holly
<i>Pratia purpurascens</i>	Pratia
<i>Pseuderanthemum variable</i>	Pastel Flower
<i>Sambucus australasica</i>	Yellow Elderberry
<i>Schoenoplectus mucronatus</i>	Club Rush
<i>Senecio spp</i>	Native fireweed
<i>Swainsonia galegifolia</i>	Smooth darling pea
Grasses	
* <i>Andropogon virginicus</i>	Whisky grass
* <i>Axonopus affinis</i>	Narrow leaf carpet grass
* <i>Bromus spp</i>	Bromus
* <i>Chloris gayana</i>	Rhodes Grass
<i>Cynodon dactylon</i>	Couch
<i>Dichelachne crinita</i>	Long Hair Plume Grass
<i>Echinopogon caespitosus var caespitosus</i>	Tufted Hedgehog grass
* <i>Ehrharta erecta</i>	Panic or African Veldt grass
<i>Entolasia stricta</i>	Wire grass
<i>Entolasia marginata</i>	Margined Panic Grass, Bordered Panic
* <i>Festuca rubra subsp rubra</i>	Red Fescue
<i>Imperata cylindrica</i>	Blady Grass
<i>Oplimenus imbecillis</i>	Long leaf basket grass
<i>Poa affinis</i>	A tussock grass
<i>Poa labillardierei</i>	Tussock Grass
* <i>Paspalum dilatatum</i>	Paspalum
* <i>Pennisetum clandestinum</i>	Kikuyu
<i>Oplimenus imbecillis</i>	Long leaf basket grass
<i>Poa affinis</i>	A tussock grass
<i>Poa labillardierei</i>	Tussock Grass
<i>Microlaena stipoides</i>	Weeping grass
* <i>Setaria verticillata</i>	Whorled Pigeon Grass
* <i>Sporobolus africanus</i>	Parramatta Grass
<i>Themeda australis</i>	Kangaroo grass
Ferns:	
<i>Adiantum formosum</i>	Giant maidenhair fern
<i>Calochlaena dubia</i>	Soft Bracken
<i>Pellaea falcata</i>	Sickle fern
<i>Pteridium esculentum</i>	Bracken

Vines and scramblers:	
<i>Billardiera scandens</i>	Appleberry dumplings
<i>Cayratia clematidea</i>	Native Grape
<i>Cassytha paniculata</i>	Devils twine
<i>Clematis aristata</i>	Old Mans Beard
<i>Commelina cyanea</i>	Scurvy weed
<i>Desmodium varians</i>	
<i>Eustrephus latifolius</i>	Wombat berry
<i>Geitonoplesium cymosum</i>	Scrambling lilly
<i>Glycine clandestina</i>	Purple twining Pea
<i>Hardenbergia violacea</i>	False Sarsaparilla
<i>Kennedia rubicunda</i>	Running Postman
<i>Parsonsia straminea</i>	Monkey vine
<i>Rubus parvifolius</i>	Native Raspberry
<i>Smilax australis</i>	Lawyer Vine
<i>Stephania japonica var discolor</i>	Snake Vine
Orchids/epiphytes:	
<i>Platcerium bifurcatum</i>	Elkhorn
Weeds	
* (4) <i>Ageratina riparia</i>	Crofton weed
* <i>Anagallis arvensis</i>	Scarlet pimpernel
* <i>Asparagus aethiopicus</i>	Asparagus fern
* <i>Bidens pilosa</i>	Cobblers Pegs
* <i>Briza minor</i>	Shivery grass
* <i>Briza maxima</i>	Blowfly grass
* <i>Bromus catharticus</i>	Prairie grass
* <i>Cerastium glomeratum</i>	Mouse- ear chickweed
* (4) <i>Cirsium vulgare</i>	Scotch thistle
* <i>Conyza albida</i>	Tall fleabane
* <i>Crepis capillaris</i>	Smooth Hawkesbeard
* <i>Crocasmia x crocosmiiflora</i>	Crocasmia
* <i>Cyclospermum leptophyllum</i>	Slender Celery
* <i>Euphorbia peplus</i>	Petty spurge
* <i>Foeniculum vulgare</i>	Aniseed/Fennel
* <i>Gnaphalium sphaericum</i>	Common cudweed
* <i>Gomphocarpus fruticosus</i>	Narrow leaf cotton bush
* <i>Hypochoeris radicata</i>	Flatweed
** (5) <i>Lantana camara</i>	Lantana
* <i>Lonicera japonica</i>	Japanese honeysuckle
* <i>Ochna serrulata</i>	Ochna
* <i>Plantago lanceolata</i>	Lambs tongue
* <i>Polycarpon tetraphyllum</i>	Four Leaf Allsort
** (4) <i>Rubus anglocandicans</i>	Blackberry

* <i>Senecio madagascariensis</i>	Fireweed
* <i>Sida rhombifolia</i>	Paddy's lucerne
* <i>Solanum mauritianum</i>	Tobacco bush
* <i>Solanum nigrum</i>	Deadly/Blackberry nightshade
* <i>Sonchus oleraceus</i>	Common sowthistle
* <i>Trifolium repens</i>	White clover
* <i>Verbena bonariensis</i>	Purple top
* <i>Vicia sativa</i>	Common vetch
* Unid. Weed - climber	
*Garden daisy	
# Threatened species	
** Noxious weed - Wyong	

APPENDIX 2: THREATENED FLORA SPECIES SEARCH RESULT (Over a 10 square kilometre area – NSW Wildlife Atlas).

Note this does not necessarily mean these species are found on the site.

NPWS - Atlas of NSW Wildlife

<http://wildlifeatlas.nationalparks.nsw.gov.au/wildlifeatlas/watlasSpecie...>



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Search Results

Your selection: Flora, threatened species, Selected Area - 151.37000,-33.41000,151.57000,-33.31000 returned a total of 112 records of 8 species.

Report generated on 25/11/10 - 15:10 (Data valid to 25/04/2010)

[view map](#)

[search again](#)

[clear selection](#)

Choose up to 3 species to map.

** Exotic (non-native) species*

Plants	Map	Scientific Name	Common Name	Legal Status	Count	Info
Elaeocarpaceae	☒	Tetradlea juncea	Black-eyed Susan	V	1	
Juncaginaceae	☒	Maundia triglochoides		V	2	
Lamiaceae	☒	Prostanthera askania	Tranquility Mintbush	E1	7	
Myrtaceae	☐	Eucalyptus camfieldii	Heart-leaved Stringybark	V	2	
	☐	Eucalyptus oblonga	Eucalyptus oblonga population at Bateau Bay in the Wyong local government area	E2	2	
	☐	Melaleuca biconvexa	Biconvex Paperbark	V	82	
	☐	Syzygium paniculatum	Magenta Lilly Pilly	E1	10	
Orchidaceae	☐	Diuris praecox	Rough Double Tail	V	6	

** Exotic (non-native) species*

Choose up to 3 species to map.

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NSW National Parks & Wildlife Service atlas of nsw wildlife


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Search Results

Your selection: Fauna, threatened species, Selected Area - 151.37000,-33.41000,151.57000,-33.28000
returned a total of 2720 records of 64 species.

Report generated on 25/11/110 - 15:07 (Data valid to 25/04/2010)



Choose up to 3 species to map.

* Exotic (non-native) species

Amphibia	Map	Scientific Name	Common Name	Legal Status	Count	Info
Hylidae						
	☒	Litoria aurea	Green and Golden Bell Frog	E1	8	
	☒	Litoria brevipalmata	Green-thighed Frog	V	1	
Myobatrachidae						
	☒	Crinia tinnula	Wallum Froglet	V	3	
	☐	Pseudophryne australis	Red-crowned Toadlet	V	4	
Aves	Map	Scientific Name	Common Name	Legal Status	Count	Info
Acanthizidae						
	☐	Pyrrholaemus sagittatus	Speckled Warbler	V	1	
Accipitridae						
	☐	Hieraaetus morphnoides	Little Eagle	V	3	
	☐	Pandion haliaetus	Osprey	V	7	
Ardeidae						
	☐	Botaurus poiciloptilus	Australasian Bittern	V	5	
	☐	Ixobrychus flavicollis	Black Bittern	V	14	
Burhinidae						
	☐	Burhinus grallarius	Bush Stone-curlew	E1	1	
Cacatuidae						
	☐	Calyptorhynchus lathami	Glossy Black-Cockatoo	V	21	
Charadriidae						
	☐	Charadrius leschenaultii	Greater Sand-plover	V	1	
	☐	Charadrius mongolus	Lesser Sand-plover	V	5	
Ciconiidae						
	☐	Ephippiorhynchus asiaticus	Black-necked Stork	E1	24	
Columbidae						
	☐	Ptilinopus magnificus	Wompoo Fruit-Dove	V	1	
	☐	Ptilinopus superbus	Superb Fruit-Dove	V	3	
Diomedidae						
	☐	Diomedea exulans	Wandering Albatross	E1	2	
	☐	Thalassarche melanophris	Black-browed Albatross	V	4	
Haematopodidae						

	☐	<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	V	37	
	☐	<i>Haematopus longirostris</i>	Pied Oystercatcher	E1	32	
Jacaniidae	☐	<i>Irediparra gallinacea</i>	Comb-crested Jacana	V	3	
Laridae	☐	<i>Sterna albifrons</i>	Little Tern	E1	105	
Meliphagidae	☐	<i>Grantiella picta</i>	Painted Honeyeater	V	1	
	☐	<i>Xanthomyza phrygia</i>	Regent Honeyeater	E1	12	
Neosittidae	☐	<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	6	
Petroicidae	☐	<i>Petroica phoenicea</i>	Flame Robin	V	1	
Procellariidae	☐	<i>Macronectes giganteus</i>	Southern Giant Petrel	E1	1	
	☐	<i>Pterodroma leucoptera leucoptera</i>	Gould's Petrel	V	1	
	☐	<i>Pterodroma neglecta neglecta</i>	Kermadec Petrel (west Pacific subspecies)	V	2	
	☐	<i>Puffinus carneipes</i>	Flesh-footed Shearwater	V	2	
Psittacidae	☐	<i>Glossopsitta pusilla</i>	Little Lorikeet	V	20	
	☐	<i>Lathamus discolor</i>	Swift Parrot	E1	54	
Scolopacidae	☐	<i>Calidris tenuirostris</i>	Great Knot	V	11	
	☐	<i>Limicola falcinellus</i>	Broad-billed Sandpiper	V	2	
	☐	<i>Limosa limosa</i>	Black-tailed Godwit	V	1	
	☐	<i>Xenus cinereus</i>	Terek Sandpiper	V	6	
Strigidae	☐	<i>Ninox connivens</i>	Barking Owl	V	5	
	☐	<i>Ninox strenua</i>	Powerful Owl	V	35	
Tytonidae	☐	<i>Tyto novaehollandiae</i>	Masked Owl	V	14	
	☐	<i>Tyto tenebricosa</i>	Sooty Owl	V	36	
Insecta	Map	Scientific Name	Common Name	Legal Status	Count	Info
Petaluridae	☐	<i>Petalura gigantea</i>	Giant Dragonfly	E1	1	
Mammalia	Map	Scientific Name	Common Name	Legal Status	Count	Info
Balaenidae	☐	<i>Eubalaena australis</i>	Southern Right Whale	V	6	
Balaenopteridae	☐	<i>Megaptera novaeangliae</i>	Humpback Whale	V	4	
Burramyidae	☐	<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V	1	
Dasyuridae						

☐	Dasyurus maculatus	Spotted-tailed Quoll	V	14	
Emballonuridae					
☐	Saccolaimus flaviventris	Yellow-bellied Sheath-tail-bat	V	1	
Molossidae					
☐	Mormopterus norfolkensis	Eastern Freetail-bat	V	7	
Otariidae					
☐	Arctocephalus forsteri	New Zealand Fur-seal	V	2	
☐	Arctocephalus pusillus doriferus	Australian Fur-seal	V	1	
Peramelidae					
☐	Isodon obesulus obesulus	Southern Brown Bandicoot (eastern)	E1	1	
Petauridae					
☐	Petaurus australis	Yellow-bellied Glider	V	46	
☐	Petaurus norfolcensis	Squirrel Glider	V	27	
Phascolarctidae					
☐	Phascolarctos cinereus	Koala	V	8	
Physeteridae					
☐	Physeter macrocephalus	Sperm Whale	V	2	
Potoroidae					
☐	Potorous tridactylus	Long-nosed Potoroo	V	3	
Pteropodidae					
☐	Pteropus poliocephalus	Grey-headed Flying-fox	V	2002	
Vespertilionidae					
☐	Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	9	
☐	Miniopterus australis	Little Bentwing-bat	V	21	
☐	Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V	36	
☐	Myotis macropus	Southern Myotis	V	10	
☐	Scoteanax rueppellii	Greater Broad-nosed Bat	V	17	
Reptilia					
	Map	Scientific Name	Common Name	Legal Status	Count Info
Cheloniidae					
☐	Caretta caretta	Loggerhead Turtle	E1	1	
☐	Chelonia mydas	Green Turtle	V	4	
Varanidae					
☐	Varanus rosenbergi	Rosenberg's Goanna	V	1	

* Exotic (non-native) species

Choose up to 3 species to map.

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APPENDIX 3: SELECTED PHOTOS OF SITE

Melaleuca biconvexa along Anderson Rd.



Mel. biconvexa suckers sprouting alongside Anderson Road



Endangered Ecological Community veg adjacent to site across Anderson Road



Subject site/ George Vaughan Road reserve– important wildlife corridor.



Development part of subject site – cleared..



Spotted Gum/Grey Ironbark forest over site to SE corner.



Habitat tree in this area with hollow.

