34 Coasters Retreat Flora and Fauna Report

By Ecological Consultants Australia Pty Ltd

January 2016

About this document

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Statement of Authorship

This study and report was undertaken by Ecological Consultants Australia for the owners of 34 Coasters Retreat via Troppo Architects. The author of the report is James baldy (BSc Ecology) and Geraldene Dalby-Ball whose qualifications are BSc. majoring in Ecology and Botany with over 20 years' experience in this field.

Limitations Statement

Information presented in this report is based on an objective study undertaken in response to the brief provided by the client. Any opinions expressed in this report are the professional, objective opinions of the authors and are not intended to advocate any particular proposal or pre-determined position.

Acknowledgements

We acknowledge the input and on-site detailed information about the design and location and construction requirements from Sue of Troppo Constructions. We also acknowledge the Traditional custodians of the land.

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Signed: Mia Dalby-Ball – Director of Ecological Consultants Australia

Executive Summary

- The site directly adjoins Ku-ring-gai National Park.
- Proposal is for a 3 bedroom home elevated off the ground on poles.
- Site is mostly native vegetation with an area dominated by weeds in the upper-centre.
- The site has mature native trees which include vegetation types that typically of this area of the western foreshore so of Pittwater – in particular Forest Oak and *Angophora floribunda.* Grey Iron Barks are also present on-site and are less common in the National Park. Mature canopy trees are growing on-site and form a significant part of the ecology and visual landscape. While most trees are being retained two are proposed for removal 1 Forest She Oak and one small *Angophora floribunda.*
- The understory vegetation is mainly native grasses and herbs, although weed grasses and herbaceous plants are also present.
- No listed Threatened Flora Species or EEC's on-site.
- Glossy Black Cockatoos (threatened) and Micro-bats (including Fishing Bats) are in the area and though not recorded on-site could be on the site at some time. Forest She-oaks on-site are favored food for Glossy-black Cockatoos and these birds have been recorded within 200m of the site (M Dalby-Ball 2015).
- The site has been assess for bushfire and geo-tec hazards. The proposed development can proceed with both these being managed.
- APZs have been assessed as part of this environmental impact assessment.
- The proposed new dwelling and associated services can be constructed and maintained with minimal impact on the natural features and ecology of the site and surrounds.
- On-going environmental management will include maintaining the fire protection areas and retaining the existing diversity of native vegetation.
- The Arborist Report (K. Hill Jan 2016) has recommendations for tree protection and works in vicinity of tree roots.
- Formal Landscaping is not proposed and a separate Landscape Plan should not be required. The vegetated areas are being maintained and bushland – modified for Bushfire Protection.
- On-site wastewater disposal is proposed. Proposed trenches can be located on-site out of the critical roots zones. The total trench length needed can be split over 3 or 4 trenches to gain the 40-45m required. Nutrients may have to be managed in future or if use becomes excessive.

1.1 Limitations of the Study

The purpose of the flora and fauna work is to have an investigation to determine the sites ecological value, particularly listed species, communities and population. An impact assessment and associated Tests of Significance (7-part tests) have been conducted.

Limitations of the study may arise where certain cryptic species of plants may occur as soil-stored seed or as subterranean vegetative structures. Some species are identifiable above-ground only after particular environmental circumstances related to factors such as periodic fire frequency, intensity or seasonality, soil moisture regime, grazing pressure, biological life-cycle patterns as in the case of small plants such as species of orchids etc. No specific invertebrate surveys were conducted.

Surveys at one time of the year cannot be expected to detect the presence of all species occurring, or likely to occur, in the study area. This is because some species may (a) occur seasonally, (b) utilise different areas periodically (as a component of a more extensive home range), or (c) become dormant during specific periods of the year. Rather, the survey provides the opportunity to sample the area, search specifically for species likely to be encountered within the available time frame, and assess the suitability of habitat for particular species.

The time of year that site surveys took place: December, is ideal for gaining information on fauna in general as this is the time the migratory species are present, Owls are breeding and fledging, micro-bats are active, gliders are active and many plant are in flower including orchids.

Considering the site and habitat availability ECA are confident that this survey is representative of the likely species and vegetation community and that future studies at other times would not change the conclusions in this report.

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2 Introduction

The development proposal relates to the construction of a new sole occupancy dwelling within an existing vacant residential allotment located at 34 Coasters Retreat (Lot 12 DP 25653).

The subject property is a water access only allotment. The subject property is a battle-axe style allotment and abuts private residential allotments to the northeast, northwest and southwest and Kuring-Gai Chase National Park to the southeast.

Pittwater Council's Bushfire Prone Land Map identifies the subject property as containing designated Category 1 Vegetation, therefore the application of Planning for Bush Fire Protection - 2006 (PBP) must apply in this instance.

The vegetation identified as being the hazard is within Kuring-Gai Chase National Park to the southeast of the subject property (McMonnies 2015).

Site Location

The site is located at 34 Coasters Retreat, on the border of the Kuring-Gai Chase National Park and comes under the Pittwater Local Government Area, NSW. The site has existing dwellings to the east, north and west. South (south west and south east) is bushland of Ku-ring-gai Chase NP (see Figures 1 and 2).

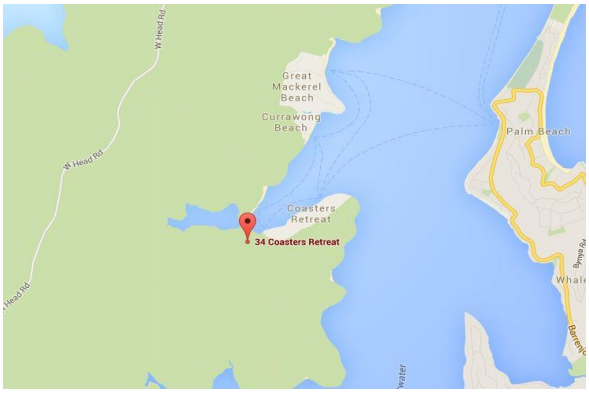


Figure 1. Location of 34 Coasters Retreat (Source: Google Maps)

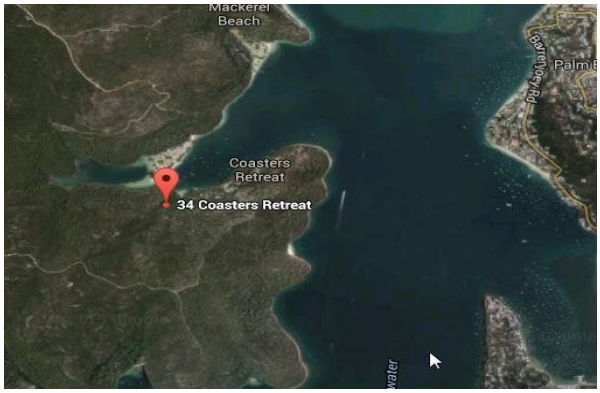


Figure 2. Location of 34 Coasters Retreat showing flora density (Source: Google Maps)

3 Proposed Development

The proposed development refers to the construction of a new residency in a currently vacant lot located at 34 Coasters Retreat. The subject property is a water access only allotment. The subject property is a battle-axe style allotment and abuts private residential allotments to the northeast, northwest and southwest and Kuring-Gai Chase National Park to the southeast.

Pittwater Council's Bushfire Prone Land Map identifies the subject property as containing designated Category 1 Vegetation, therefore the application of Planning for Bush Fire Protection -2006 (PBP) must apply in this instance.

The vacant lot contains a variety of mature tree species, many of which are indigenous to the area. This proposal will impact select trees on the site either through direct removal or indirect impacts due to the presence of the residency.

Figure 3 displays position of the proposed residence as well as the surrounding vegetation.

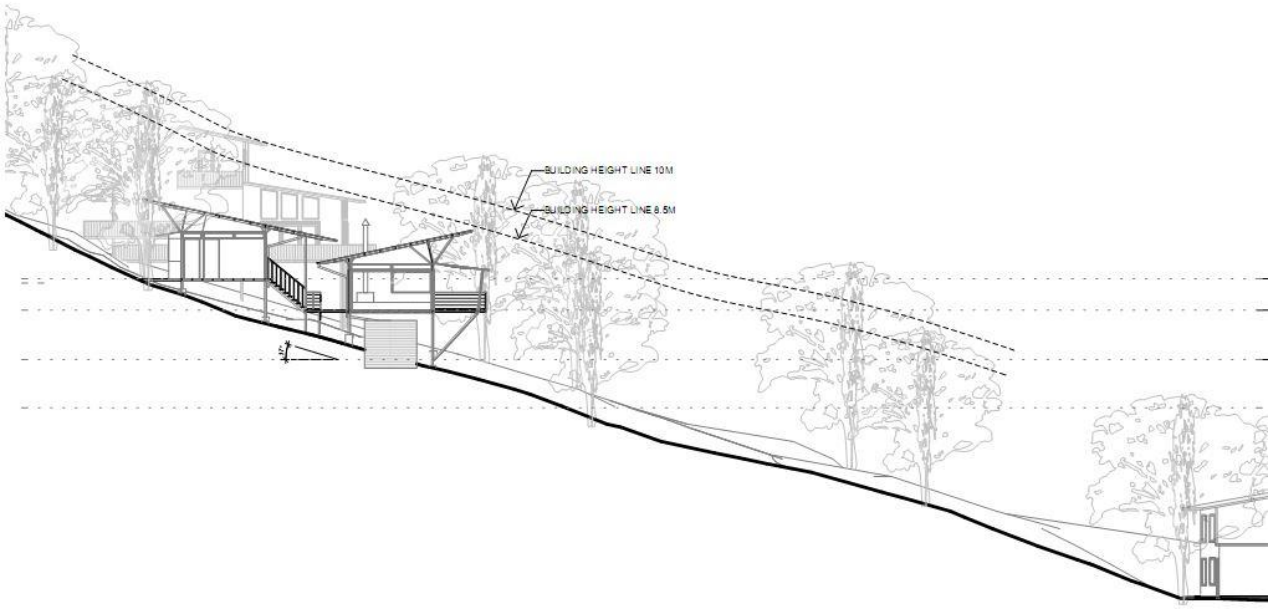


Figure 3. Floorplan of proposed development. Source: Architect (Troppo 2015).

3.1 Services & Access

3.1.1 Access Way

The property is only accessible by boat. The site is a battle-axe block and the access handle contains three mature trees and a variety of native grasses. Access will be by foot, with the exception of during construction 9see details in construction below). A low-key track, requiring no construction, and being sympathetic to surrounding vegetation will be used in this area.

3.1.2 Services

Underground services will be water pipes and waste pipes to Hydraulic Engineers design between the two water tanks and the connections to the house - slightly underground and of material to meet fire

regulations. Installation can occur without impacting trees or other native vegetation. Power and hot water is via solar electricity (15 - 20 MHZ). Panels will be located on the bed pavilion north facing roof.

3.1.3 Water Tank

The residence will contain three separate water tanks, two for everyday use located under the deck and another located at the highest point on the lot for storage. Ideally all will be on piers or small formed platforms. The outcome is to mitigate the impact on tree roots. All tanks can be located without significantly impacting tree roots.

3.1.4 On-site Waste Water Management

An on-site waste water system will be installed. The key stats are included below.

The system

1. 'Fujiclean' CE-1500 EX on-site waste water treatment system and 45m² of discharge control trenching.

The Disposal Area

The disposal area consists of 45m² total of discharge control trenching with a width of 500mm distributed between 2 trenches 1000mm apart.

Sizing

L	=	Length in m
Q	=	Design daily flow in L/day
DLR	=	Design loading rate in mm/day
W	=	Width in m

L = 600 / (30x0.5)

L = 40 metres required

Potential impacts on the environment are related to excavation in the zone of tree roots. It has been confirmed that the proposed trenches can be located on-site out of the critical roots zones. The total trench length needed can be split over 3 or 4 trenches.

The system will still result in an increased level of Nitrogen and Phosphorous to the immediate environment. During prolonged rain this could reach Pittwater. As the property is expected to only be occasionally used the frequency for exceeding the capacity of the trenches is expected to be infrequent.

3.1.5 Bushfire Considerations

A Bushfire assessment by (S. McMonies Oct 2015 of Building Code & Bushfire Hazard Solutions Pty Limited). Pittwater Council's Bushfire Prone Land Map identifies the subject property as containing designated Category 1 Vegetation, therefore the application of Planning for Bush Fire Protection - 2006 (PBP) must apply in this instance.

7.05 Asset Protection Zones

The Asset Protection Zone (APZ) was measured onsite and verified from plans provided to be >10 metres from the southern pavilion and >8.4 metres from the deck and eave. The APZ consists of maintained land entirely within the subject site.

All grounds within the subject property are required to be maintained in accordance with an Asset Protection Zone as detailed in the NSW Rural Fire Service's document 'Standards for Asset Protection Zones'.

Extract from Bushfire report (Mc Monies 2015)

Currently native grasses and herbs comprise the bulk of the ground vegetation. This complies with the bushfire requirements. Shrubs are not present around the trees or on-site in the proposed development area or immediate surrounds.

Grounds within the site must continue to be maintained as an Asset Protection Zone as detailed in the NSW Rural Fire Service's document 'Standards for Asset Protection Zones' and Appendix 2 of Planning for Bush Fire Protection 2006. This can be achieved while retaining the native vegetation and diversity of ground species. Tree pruning may be required periodically and applications can be made to council should that be the case in future. See Appendix ! for landscape management guidelines.

3.1.6 Geotechnical Considerations

A geo-tec assessment was carried out by Peter Thompson of Jack Hodgson Consulting (Dec 2015) who concludes in the risk analysis that a geo-tec issue is 'unlikely' and that risk to property is low.
Please see full report for details and conditions.
No environmental impacts will occur as a result of managing geo-tec issues.

HAZARDS	Hazard One
TYPE	The slope that rises across and extends above the property is considered a potential risk.
LIKELIHOOD	'Unlikely' (10^{-4})
CONSEQUENCES TO PROPERTY	Minor (5%)
RISK TO PROPERTY	'Low'(5×10^{-6})
RISK TO LIFE	1.66×10^{-7}/annum
COMMENTS	This is an **'Acceptable'** level of risk provided the recommendations in **Section 10** are followed.

3.1.7 During Development – Construction

Delivery of materials: Materials will be delivered by Helicopter drop and barge to the main jetty then transferred by powered wheelbarrow (current form of transport at Coasters) to site. This would be along the formed path not in National Parks buffer zone.

Machinery: A small digger and crane will be on site for construction. Both can access the site without the need to remove trees, native vegetation or features such as natural sandstone. Areas disturbed by machinery will be rehabilitated with locally native species regenerated from surrounding undisturbed areas.

Excavation: Excavation is minimal with the development on piers. Structures on ground include 22 piers currently shown in plans. In general they will be 300 diameter but may vary to conform to Structural Engineer requirements. Location of holes for piers have be identified in general and assess for impact. Exact position of piers near trees (2 trees) will be determined on-site at the time of construction.

3.1.8 Post Development – Rehabilitation

Post development it is recommended that people with proven experience and qualifications in bush regeneration assist to maximize natural regeneration of native grasses and herbaceous species in disturbed areas. Periodic weed management may be required to identify and remove invasive species such as *Ehrharta erecta* grass before it overtakes native species.

Good link for ID the weed from the native grasses. http://www.iewf.org/weedid/ehrharta_erecta.htm
In general Ehrharta grass can be confused with native grasses *Entolasia marginata* and *Microlaena stipoides* as they have very similar seed heads.

On closer examination the plants are quite different, Entolasia is courser and has leaves at right angle to the stem. The seed heads of Entolasia are denser, slightly larger and a stronger colour of green.

Microlaena has weeping seed heads and the seeds are long and pointed (2 awns). The leaves of Microlaena are generally thinner, rougher and slightly darker green. The ligule between the leaf and stem is much less prominent on Microlaena - both have hairs.

Microlaena (Left) Native,
Ehrharta (Right) Weed

Ehrharta left, Entolasia right

Ehrharta (Left) Weed,
Entolasia (Right) Native

Ehrharta (Left Weed,
Entolasia (Right) Native

4 Flora and Fauna Assessment Methods

4.1 Site Inspections

Mia Dalby-Ball and Kyle Hill assessed the site on 9th of December 2015. During the site visit, the development plans were used in order to determine its overall impact on the vegetation present . This involved the identification and analysis of major trees, vegetation diversity and fauna habitat.

4.2 Previous studies

Bionet and previous studies, and the authors knowledge of the local area, were used to determine what endangered ecological communities and threatened plant species are possible on-site. The Bionet records accessed were within 10km of the site and since 1980. Pittwater Council documents and mapping were also consulted including the:

- Pittwater Development Control Plan 21
- Wildlife Corridor Plan and Maps
- Vegetation Management Plan
- Fauna Survey and Management Plan

As were plans relating directly to the proposed development:

- S. Harper (2015) Architectural Plans and associated Site Survey.
- S. McMonnies (2015) Bushfire Hazard Assessment Report. Proposed: New Sole Occupancy Dwelling At: 34 Coasters Retreat Reference Number: 150924
- P. Thompson (Dec 2015) Risk Analysis and Management for Proposed new residence at 34 Coasters Retreat, Coasters Retreat.
- K. Hill (Jan 2016) Arborist Report for Proposed new residence at 34 Coasters Retreat, Coasters Retreat.

5 Flora

The purpose of the flora work was an investigation to determine the sites flora, particularly vulnerable and endangered species. It also included an assessment of the flora as habitat. It also included an assessment of potential impact with a determination of native ground and shrub species that may be impacted and an assessment of the tree report in relation to actual and potential impacts on trees.

5.1 Flora findings from site investigation

A list of native flora was made for plants in the proposed development area and immediate surrounds. General notes on vegetation well outside the development zone (10m plus) was also made. See Table 1 for species in and close to the development zone. See Arboriculture assessment for species that would be impacted by the proposed development.

Table 1 Flora recorded on site

Common Name	Species Name	Abundance
Native Plants		
Basket Grass	*Oplismenus imbecillis*	###
Black She-oak	*Allocasuarina littoralis*	##
Blady Grass	*Imperata cylindria*	##
Blue Flax	*Dianella caerula*	##
Bordered Panic Grass	*Entolasia marginata*	#
Bracken Fern	*Pteridium esculentum*	##
Burrawang Palm	*Macrozamia communis*	#
Cheese Tree	*Glochidion ferninandi*	##
Commelina	*Commelina cerulea*	##
Echidna Grass	*Echinopogon caespitosus*	#
Everlasting Daisy spp.	-	#
Forest She-oak	*Allocasuarina torulosa*	###
Glycine	*Glycine spp.*	#
Grey Ironbark	*Eucalyptus paniculata*	##
Kidney Weed	*Dichondra repens*	##

Common Name	Species Name	Abundance
Kidney Weed	*Dichondra repens*	##
Lilly Pilly	*Syzgium smithii*	##
Little Lomandra	*Lomandra filiformis*	##
Lomandra	*Lomandra longifolia*	##
Maidenhair Fern	*Adiantum aethiopicum*	#
Mint Bush	*Prostanthera* sp.	#
Native Grape	*Cayratia clematidea*	##
Penny Wart	*Centella asiatica*	##
Port Jackson Fig	*Ficus rubiginosa*	#
Pratia	*Pratia purparescens*	#
Rough-Barked Apple	*Angophora floribunda*	##
Sandpaper Fig	*Ficus coronata*	#
Saw Sedge	*Gahnia aspera*	##
Sprawling Bluebell	*Wahlenbergia gracilis*	#
Synoum	*Synoum glandulosum*	##
Twining guinea Flower	*Hibbertia dentata*	#
Weeping Meadow Grass	*Microlaena stipoides*	###
Weed Species		
Crofton Weed	*Ageratina adenophora*	##
Lantana	*Lantana camara*	#
Milk Weed	*Gomphocarpus physocarpus*	###
Panic Veldtgrass	*Ehrharta erectus*	##
Trad	*Tradescantia fluminensis*	#

= Uncommon (only one or 2 plants), ## = Common (seen often), ### = Abundant (seen very often)

Following are images from the site. Vegetation: Shale Slopes Forest

An upward facing view of the vacant lot. One of the largest tress on the site – a Grey Ironbark, is pictured in the background. This particular tree is proposed for removal.

The largest tree on the site – A Grey Ironbark tree that is proposed to be removed.

A cluster of Milk Weed (*Gomphocarpus physocarpus)* in the centre of the site, providing habitat for Monarch Butterflies.

Lomandra and Saw Sedge Plants on the less disturbed upper portion of the site.

A native species of Everlasting Daisy plant on site.

Native Bordered Panic Grass

A scratched Roughed-Bark Apple tree on site.

Scat that is likely from one of the many wallabies present.

5.2 Endangered Ecological Communities

The proposed development zone does no consist of any endangered ecological communities (EEC). The vegetation community within the lot is characteristic of a Tall Open Forest on a shale dominated slope. Its canopy is dominated by Rough-Barked Apple and the Forest She Oak.

5.3 Threatened Plant Species

There were 1,336 listed plant species on Bionet within 10km of the area. The vulnerable and endangered species to focus on-site searches for can be seen in Table 2 below. The site has no naturally occurring threatened plant species so no seven part tests were required. The development would cause no impact on these species.

Table 2. Threatened Plant Species (Source: Bionet)

Scientific Name	Common Name	NSW status	Comm. status
Asterolasia elegans	Asterolasia	E1,P	E
Chamaesyce psammogeton	Sand Spurge	E1,P	
Microtis angusii	Angus's Onion Orchid	E1,P,2	E
Persoonia hirsuta	Hairy Geebung	E1,P,3	E
Syzygium paniculatum	Magenta Lilly Pilly	E1,P	V

5.3.1 Asterolasia elegans

Whilst the vegetation community matches that for *Asterolasia elegans,* the soil type on site which is shale in origin is unlike that typical of where this species if found (Hawkesbury or Gymea erosional soil landscapes). The site does contain sandstone outcrops which may increase the suitability of the lot for *Asterolasia elegans* as it is usually recorded growing amongst boulders. Despite this, no plants were found during the survey. Flowing occurs throughout November and December so now is the prime time to survey.

5.3.2 Syzygium paniculatum

Habitat is suitable for *Syzygium paniculatum* however none were observed growing on the site.

5.3.3 Other listed plant species

Habitat is not suitable for the remaining species.

5.4 Flora Impacts

5.4.1 Tree and vegetation removal

The Site has a dual layer canopy. The upper stratum is dominated by Grey Ironbarks and a mid-canopy of Forest She Oak and Rough-Barked Apple.

The trees were assessed by Kyle Hill (December 2015) see Arborist report (Jan 2016) submitted with this application for details. See Section 6 recommendations as well as recommendations for specific trees in that report.

The proposal requires the removal of two living trees, indicated by the full red circles in Figure 4. The dotted red circle is representative of the largest tree on site - a Grey Ironbark. This tree is being retained with special consideration taken during pier placement to avoid the damage of the trees root system.

A dead tree on site is proposed for removal (appears to be a She Oak). This was checked for hollow and other habitat features and deemed to be of low value. Despite this it could be used by fauna and precautions are to be taken during its removal. See Appendix 1 – Tree Works and Fauna Management.

The shrub layer is primary absent from the site and has been replaced by small low-lying grasses.

6 Landscaping

Formal Landscaping is not proposed and a separate Landscape Plan should not be required. The vegetated areas are being maintained and bushland – modified for Bushfire Protection.

Landscaping for screening from Pittwater is not required given the presence of large trees in front of the proposed dwelling. These trees are to be retained.

Screening for the neighbors can be enhanced through planting and locally native species currently growing on site that are suitable for screening include Lily Pily, Sand-paper Fig and Cheese Trees.

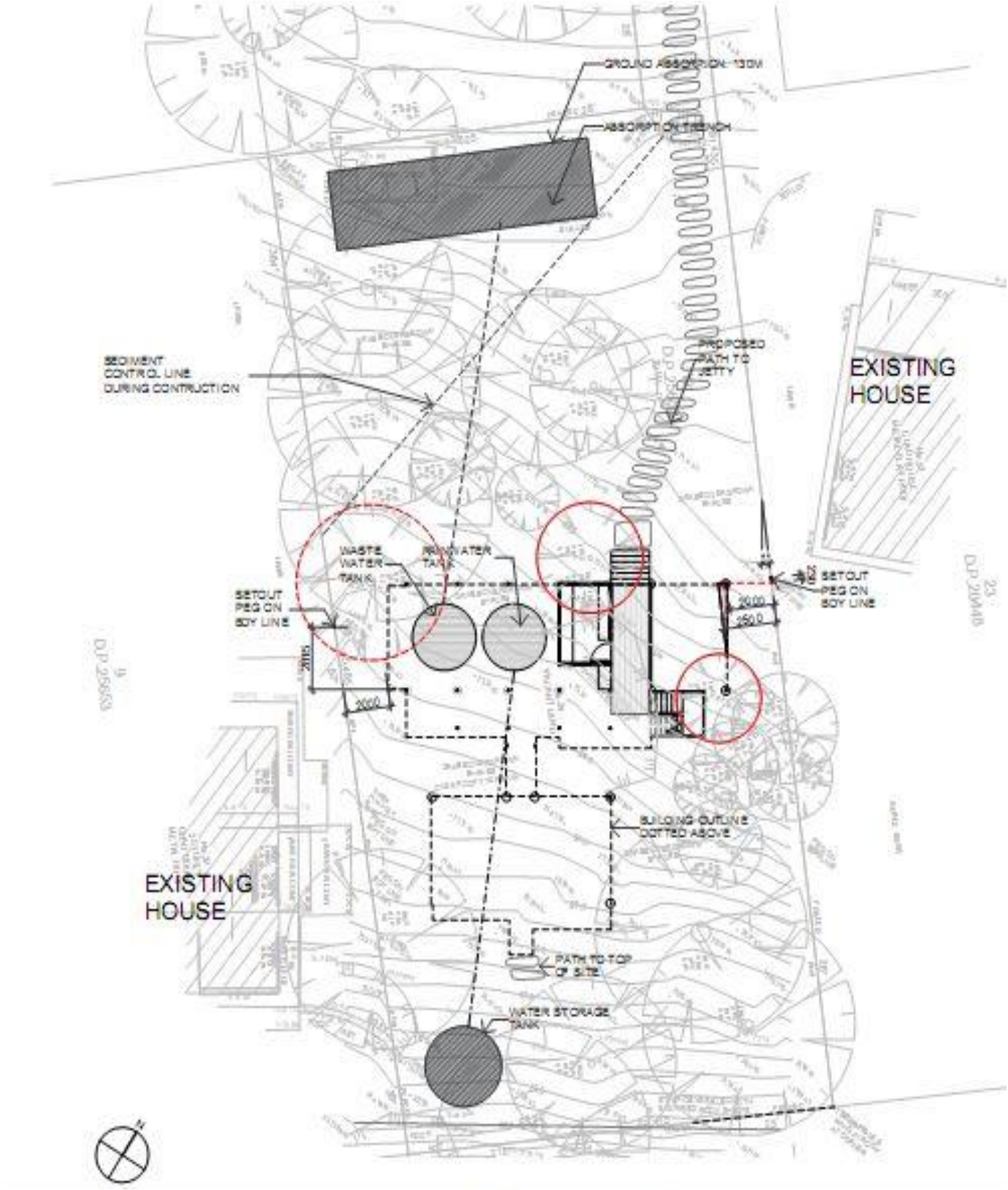


Figure 4. The position of the proposed development in relation to the vegetation that is currently present as well as existing residences. Source: Tropp - Architects

6.1 Flora Conclusion and Recommendations

6.1.1 Impacts on Listed Species

No impact on threatened species or EECs or local rare flora.

6.1.2 Tree removal and ecology

Two trees are proposed for removal:

One medium sized **Forest Oak** (*Allocasuarina torulosa*) is proposed to be removed. There are no visible hollows on the tree, however this species is a primary constituent of the diet for the endangered Glossy Black Cockatoo (*Calyptorhynchus lathami*). For this reason, the replanting of this species both on and around the site is recommended.

If available, seed will be collected from the tree prior to its removal and 20 plants grown on-site. Seed should also be provided to nurseries growing locally native plants Furthermore, some of the seed should be provided to nurseries that grow indigenous plant species as well as the Pittwater council. At least 20 tube stock seedlings will be propagated planted back into the area surrounding the residence assuming 10 will survive to maturity.

A medium sized **Cheese Tree** (*Glochidion ferninandi*) is also proposed to be removed as it is placed directly in the area the residence will reside. No further conservation actions have to be carried out for this particular species as it is widely abundant in the national park.

Both trees were assessed for their ecological values and found no significant hollows or other habitat features. Proposed replanting of the Forest Oak trees is recommended.

6.1.3 Potential impacts on trees

There are 10 other trees within 10 metres of the proposed building including a cluster of Forest She Oaks. From the Arborist report, the development is expected to be managed with little adverse impact on the majority of existing trees.

The **Grey Ironbark** is one of the largest trees on-site and doesn't appear to have hollows. It is currently proposed to be retained. Pier placement will done to minimize impact on this and other trees.

Seed from on-site trees should be collected anytime it is available (pruning or removals or natural branch fall) is to be collected (provide to Pittwater Council or local nursery for future western foreshore plantings).

6.1.4 Impacts on native vegetation

Bush regeneration in the bushland to the rear of the proposed studio will assist in maintaining and expanding areas of native ground and mid-story species.

The Asset Protection Zone (APZ) was measured onsite and verified from plans provided to be >10 metres. The APZ consists of maintained land entirely within the subject site and therefore, there is no need for the removal of national park vegetation.

The canopy on the site is already less than 15% cover, there are no flammable shrubs under trees or the proposed dwelling and the trees on site are greater than 2m above the proposed roof.

7 Fauna findings

7.1 Methods

The site was assessed by Mia Dalby-Ball and Kyle Hill. During the site visit, notes and photos were taken of the important fauna and fauna habitat present. Bionet was also used to determine the threatened fauna and endangered populations, which have been recorded within 10km of the site since 1980.

7.2 Fauna findings from site investigation

Results of the fauna survey include the following findings

7.2.1 Birds

Many bird species were seen on site. A Bush Turkey wandered directly through the lot during the survey. Furthermore, a Glossy Black Cockatoo flew overhead.

Habitat for small birds is being retained on site through the retention of most of the existing trees. There are no requirements for clearing further into the bushland. Planting of both shrub and tree species indigenous to the Kuring-Gai Chase National Park will increase its habitat value for birds.

This can be achieved while achieving the requirements for the bushfire asset protection zone.

7.2.2 Reptiles

One species of reptile seen on site (Garden Skink). Additional species that could be presence on site at some time are the harmless Green and Brown Tree Snakes and Golden Crown Snakes all three are small nocturnal species. Lace Monitors may also be present as they are common throughout the national park.

7.2.3 Arboreal (tree dwelling) mammals

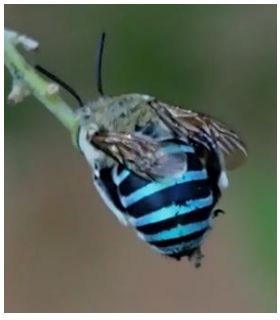
Evidence of arboreal species such as Ring-tail and Brush-tail Possums is present on site. Their presence should not be affected by the development as long as the canopy is maintained.

7.2.4 Ground Mammals

Swamp Wallabies are common in Coasters Retreat as they come down from the Kuring-Gai Chase National Park to feed on the native grasses that are abundant along the shoreline. In order to maintain their presence on the lot, it is essential that the native grasses along the access point be retained.

7.2.5 Invertebrates

Blue-Banded Bees are common around the Kuring-Gai Chase National Park. Whilst they have not been observed on the proposal site, creating habitat for them may increase their abundance.



7.3 Threatened fauna

There were 300 listed fauna species which have been recorded from within 10km of the site. The vulnerable and endangered species to focus on-site searches for can be seen in Table 4 below. NB: species whose habitat doesn't occur on site have been omitted from this list – those with marginal habitat have been retained on the list. NB: Marine animals have been removed from the list. Species in bold have habitat on-site and have been recorded in the area (2km) in the past 5 years.

Table 4. Threatened fauna (Source: Bionet)

Scientific Name	Common Name	NSW status	Comm. status
Burhinus grallarius	Bush Stone-curlew	E1,P	
^^Lathamus discolor	Swift Parrot	E1,P,3	E
Anthochaera phrygia	Regent Honeyeater	E4A,P	CE
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	E1,P	E

7.4 Endangered populations

There are two endangered populations found within 10km of the site (see Table 5) both apply to the Barrenjoey peninsula and not this site.

Table 5. Endangered populations (Source: Bionet)

Common name	Scientific name	NSW status	Comth status	No. of records
Koala in the Pittwater Local Government Area	*Phascolarctos cinereus*	E2, V, P	V	73
Squirrel Glider on Barrenjoey Peninsula, north of Bushrangers Hill	*Petauras norfolcensis*	E2, V, P		1

7.5 Fauna habitat

Habitat on site exists for a variety of locally native fauna species including listed species of Owls and Micro-bats. Bushland on the rear of the site is core habitat and part of the NP.

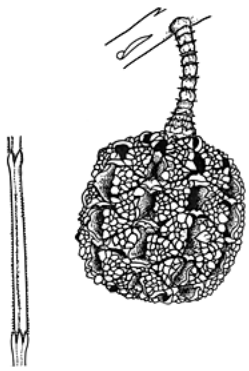
7.6 Test of Significance

Seven part test was only conducted for 1 species, Glossy-Black Cockatoos, as it has a food tree being removed.

7.6.1 Glossy Black-Cockatoo

Glossy-Black Cockatoos were observed whilst on site and are known to inhabit the Western Foreshore of Ku-Ring-Gai Chase national park.

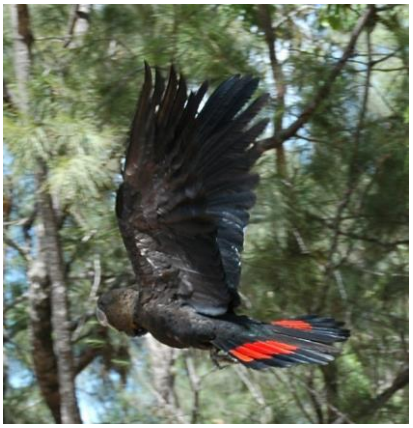
a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,



The proposed building will result in the removal of three trees and thus potential habitat for this species.

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

Glossy-Black Cockatoos in Pittwater are not part of an endangered population.



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

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

(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,

C i) and ii) No Glossy-Black Cockatoos in Pittwater are not part of an endangered population.

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

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

(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) Glossy Black Cockatoos feed almost exclusively on the seeds of several species of she-oak (particularly *Allocasuarina littoralis* and *A. torulosa*), shredding the cones with the massive bill. *Allocasuarina torulosa, Forest Oak,* is growing on the site and 1 is proposed for removal.

Food habitat would be removed temporarily however others are being retained in the immediate area and an addition 10+ will be planted on-site.

Nesting locations would have to be kept and they are dependent on large hollow-bearing eucalypts for nest sites.

(ii) no areas of habitat will become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) food habitat is being removed and when considering cumulative impact of removal of this key food source

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

Critical habitat has not yet been defined for this species in this area.

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

Priority Action Statements have been written for Glossy-Black Cockatoos. The proposed development does not inhibit any of the recovery actions occurring. The recommendations will result in more planted Forest She-oaks than are currently growing on site.

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

The proposed development does not bring into play any of the key threatening processes for this species.

Compensation

An additional 10 Sheoak Trees (Forest Oak - *Allocasuarina torulosa*). Tube-stock sourced from the tree being removed on site. They should be planted in bare areas outside of APZs elsewhere on the site or nearby appropriate public land. Plants will need maintenance to ensure a sufficient number (10) reach maturity.

8 Summary of Recommendations

8.1 Bushland management

The bushland on the rear of the site leads into the Kuring-Gai Chase National Park. This bush land is not expected to be influenced by the proposed residency.

8.2 Tree and Bushland Management – Recommended Conditions

Tree management requirements as per the Arborist Report Urban Tree (Jan 2016) are all supported. In addition to these the following is recommended:

1) Seed is to be collected from She-Oaks, especially the one proposed for removal, and provided to local nurseries that grow native plants including Indigo Native Plant Nursery at Elanora.
2) At least 10 Forest She-oaks are to be replanted to provide future habitat for Glossy Black Cockatoos.
3) Removal of the dead tree is to occur with a wildlife care in-mind. Measures are to be put in place, prior to tree removal, to manage any fauna displaced by the tree removal.
4) The large Grey Ironbark is to be carefully managed with particular emphasis on avoiding root damage.

8.3 Landscaping

The following species are recommended for planting should it be desired. All are fire retardant (difficult to burn).

Common Name	Species Name	Example
Mint bush Delicate shrub / herb to 60cm For second tier of planting interspersed with Goodenia.	*Prostanthera denticulata*	
Native hop bush Robust shrub / herb 80cm For second tier of planting interspersed with Mint Bush.	*Goodenia ovata*	

Native Flax Lily Herb to 80cm usually 60cm. For outer edge of planting. Plant a linear meter with 5 plants per m.	*Dianella caerula*	
Cheese Tree A small tree. Usually around 8 metres.	*Glochidion fedinandi*	

9 References

S. Harper (2015) Architectural Plans and associated Site Survey.

S. McMonnies (2015) Bushfire Hazard Assessment Report. Proposed: New Sole Occupancy Dwelling At: 34 Coasters Retreat Reference Number: 150924

P. Thompson (Dec 2015) Risk Analysis and Management for Proposed new residence at 34 Coasters Retreat, Coasters Retreat.

K. Hill (Jan 2016) Arborist Report for Proposed new residence at 34 Coasters Retreat, Coasters Retreat.

Site Survey (April 2015) by C.M.S surveyors Pty Limited

10 Expertise of authors

10.1 James Baldry

Qualifications

Bachelor of environmental science Macquarie University,.

Specialist Skills

- Urban Ecology – and habitat rehabilitation and re-creation.

10.2 Mia Dalby-Ball, ECA Director

Qualifications

Bachelor of Science (Hons I), Sydney University, 1995.

Majoring in Zoology, Ecology and Botany.

Specialist Skills

- Urban Ecology – and habitat rehabilitation and re-creation.
- Urban waterway management – assessing, designing and supervising rehabilitation works
- Saltmarsh and Wetland re-creation and restoration – assessment, design and monitoring
- Engaging others in the area of environmental care and connection
- Technical Advisor – environmental design, guidelines and policies
- Sound knowledge and practical application of experimental design and statistics
- Project management and supervision
- Grant writing and grant assessment
- Budget estimates and tender selection
- Expert witness in the Land and Environment Court

Professional Experience

2014-current	Director and Ecologist - **Ecological Consultants Australia**.
1998–2014	**Dragonfly Environmental,** Principal Urban Waterways and Wetlands and Eco-tours**.** Specializing in design, assessment, monitoring and rehabilitation of urban waterways, wetlands and Saltmarsh. Mia is responsible for projects with multi-stakeholder communications and community engagement.
2001–2010	**Pittwater Council, Natural Environment and Education Manager**. Responsible for leading the Natural Environment and Education Unit, including the Coastal Environment Centre, in facilitating community and council actions resulting in the long-term sustainability of natural areas. Mia inspired, gained funding for and ran many very successful community engagement projects including: *Ecoferry trips, Bilarong Festival, Seasons and Cycles*. More information on these can be provided if interested.
1998–2004	**Sainty and Associates**, Environmental Scientist. Involved in; wetland and waterway restoration, designing and planting constructed wetlands, writing and implementing management plans, project management, expert witness in Land and Environment Court and all aspects of field work and report writing.
1998–2000	Contracted to a number of Environmental and Engineering based companies including Martens and Associates, Pty. Ltd and GIS Consulting, Pty. Ltd., as an Environmental Scientist. Responsible for conducting on-site wastewater assessments, soil identification, EIS, Biodiversity studies and impact assessments (EIS) relating to fauna and design and calculations for wastewater disposal systems.
1994—1996	Associate Lecturer and Assistant Co-coordinator of first year biology, Univ. of Sydney.

11 Appendix I – Threatened Fauna Species Considered

11.1.1 Glossy Black Cockatoo – Profile

Scientific name: *Calyptorhynchus lathami*
Conservation status in NSW: Vulnerable
National conservation status: Endangered (only the South Australian sub-species)

Description

The Glossy Black-cockatoo is a dusky brown to black cockatoo with a massive, bulbous bill and a broad, red band through the tail. The red in the tail is barred black and edged with yellow. The female usually has irregular pale-yellow markings on the head and neck and yellow flecks on the underparts and underwing. They are usually seen in pairs or small groups feeding quietly in she-oaks. They are smaller than other black-cockatoos (about 50 cm in length), with a smaller crest.
Location and habitat

Distribution

The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia.

Habitat and ecology

- Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly Black She-oak (Allocasuarina littoralis), Forest She-oak (A. torulosa) or Drooping She-oak (A. verticillata) occur.
- In the Riverina area, inhabits open woodlands dominated by Belah (Casuarina cristata).
- Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding the cones with the massive bill.
- Dependent on large hollow-bearing eucalypts for nest sites. One or two eggs are laid between March and August.

Threats

- Reduction of suitable habitat through clearing for development.
- Loss of tree hollows.
- Excessively frequent fire which reduces the abundance and recovery of she-oaks.
- Illegal bird smuggling and egg-collecting.

Recovery strategies

Priority actions are the specific, practical things that must be done to recover a threatened species, population or ecological community. The Department of Environment and Conservation has identified 9 priority actions to help recover the Glossy Black-cockatoo in New South Wales.
What needs to be done to recover this species?

- Reduce the impact of burning to retain diverse understorey species and in particular to permit the regeneration of she-oaks.
- Protect existing and future hollow-bearing trees for nest sites.
- Retain and protect areas of native forest and woodland containing she-oaks.
- Establish forested corridors linking remnant areas of habitat; include local she-oak species in bush revegetation works.
- Report suspected illegal bird trapping and egg-collecting.

11.1.2 Eastern Freetail-bat – Profile - also applies to other tree roosting species

Scientific name: *Mormopterus norfolkensis* Conservation status in NSW: Vulnerable

Description

The Eastern Freetail-bat has dark brown to reddish brown fur on the back and is slightly paler below. Like other freetail-bats it has a long (3 - 4 cm) bare tail. They weigh upto 10g.

Distribution

The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW.

Habitat and ecology

- Occur in dry sclerophyll forest and woodland east of the Great Dividing Range.
- Roost mainly in tree hollows but will also roost under bark or in man-made structures.
- Solitary and probably insectivorous.

Threats

- Loss of hollow-bearing trees.
- Loss of foraging habitat.
- Application of pesticides in or adjacent to foraging areas.

Recovery strategies

Priority actions are the specific, practical things that must be done to recover a threatened species, population or ecological community. The Department of Environment and Conservation has identified 18 priority actions to help recover the Eastern Freetail-bat in New South Wales.

What needs to be done to recover this species?

- Retain hollow-bearing trees and provide for hollow tree recruitment.
- Retain foraging habitat.
- Minimise the use of pesticides in foraging areas.

11.1.3 Eastern Bentwing-bat – profile – also applies to other cave using micro-bats

Scientific name: *Miniopterus schreibersii oceanensis* Conservation status in NSW: Vulnerable

Habitat and ecology

- Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.
- Form discrete populations centered on a maternity cave that is used annually in spring and summer for the birth and rearing of young.
- Maternity caves have very specific temperature and humidity regimes.
- At other times of the year, populations disperse within about 300 km range of maternity caves.
- Cold caves are used for hibernation in southern Australia.
- Breeding or roosting colonies can number from 100 to 150,000 individuals.
- Hunt in forested areas, catching moths and other flying insects above the tree tops.

Threats

- Damage to or disturbance of roosting caves, particularly during winter or breeding.
- Loss of foraging habitat.
- Application of pesticides in or adjacent to foraging areas.
- Predation by cats and foxes.

11.1.4 Koala - profile

Scientific name: *Phascolarctos cinereus* Conservation status in NSW: Vulnerable

Description

The Koala is an arboreal marsupial with fur ranging from grey to brown above, and is white below. It has large furry ears, a prominent black nose and no tail. It spends most of its time in trees and has long, sharp claws, adapted for climbing. Adult males weigh 6 - 12 kg and adult females weigh 5 - 8 kg. During breeding, males advertise with loud snarling coughs and bellows.

Distribution

The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the western region. It was historically abundant on the south coast of NSW, but now occurs in sparse and possibly disjunct populations. Koalas are also known from several sites on the southern tablelands.

Habitat and ecology

- Inhabit eucalypt woodlands and forests.
- Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.
- Inactive for most of the day, feeding and moving mostly at night.
- Spend most of their time in trees, but will descend and traverse open ground to move between trees.
- Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.
- Generally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery.
- Females breed at two years of age and produce one young per year.

Threats

- Loss, modification and fragmentation of habitat.
- Predation by feral and domestic dogs.
- Intense fires that scorch or kill the tree canopy.
- Road-kills.

Recovery strategies

Priority actions are the specific, practical things that must be done to recover a threatened species, population or ecological community. The Department of Environment and Conservation has identified 53 priority actions to help recover the Koala in New South Wales.

What needs to be done to recover this species?

- Undertake feral predator control.
- Apply low intensity, mosaic pattern fuel reduction burns in or adjacent to Koala habitat.
- Retain suitable habitat, especially areas dominated by preferred feed-tree species.
- Protect populations close to urban areas from attacks by domestic dogs.
- Revegetate with suitable feed tree species and develop habitat corridors between populations.

11.1.5 Grey-headed Flying-fox - Profile

Scientific name: *Pteropus poliocephalus* Conservation status in NSW: Vulnerable National conservation status: Vulnerable

Description

The Grey-headed Flying-fox is the largest Australian bat, with a head and body length of 23 - 29 cm. It has dark grey fur on the body, lighter grey fur on the head and a russet collar encircling the neck. The wing membranes are black and the wingspan can be up to 1 m. It can be distinguished from other flying-foxes by the leg fur, which extends to the ankle.

Distribution

Grey-headed Flying-foxes are found within 200 km of the eastern coast of Australia, from Bundaberg in Queensland to Melbourne in Victoria.
Habitat and ecology

- Occur 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 generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.
- Individual camps may have tens of thousands of animals and are used for mating, birth and the rearing of young.
- Annual mating commences in January and a single young is born each October or November.
- Site fidelity to camps is high with some caps being used for over a century.
- Travel up to 50 km to forage.
- Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines.
- Also forage in cultivated gardens and fruit crops and can inflict severe crop damage.

Threats

- Loss of foraging habitat.
- Disturbance of roosting sites.
- Unregulated shooting.
- Electrocution on powerlines.

Recovery strategies

Priority actions are the specific, practical things that must be done to recover a threatened species, population or ecological community. The Department of Environment and Conservation has identified 31 priority actions to help recover the Grey-headed Flying-fox in New South Wales.

What needs to be done to recover this species?

- Protect roost sites, particularly avoid disturbance September through November.
- Identify and protect key foraging areas.
- Manage and enforce licensed shooting.
- Investigate and promote alternative non-lethal crop protection mechanisms.
- Identify powerline blackspots and implement measures to reduce deaths.

12 Appendix II – Bushfire Protection

Extract from - *Appendix 5 of Planning for Bushfire Protection 2006*

Landscaping within the APZ is to comply with the principles of ***Appendix 5 of Planning for Bushfire Protection 2006.*** In this regard the following landscaping principles are to be incorporated into the development.

a) Suitable impervious areas being provided immediately surrounding the building such as courtyards, paths and driveways.
b) Grassed areas/mowed lawns/ or ground cover plantings being provided in close proximity to the building.
c) Restrict planting in the immediate vicinity of the building which may over time and if not properly maintained come in contact with the building.
d) maintaining a clear area of low cut lawn or pavement adjacent to the house;
e) keeping areas under fences, fence posts and gates and trees raked and cleared of fuel;
f) utilising non-combustible fencing and retaining walls• breaking up the canopy of trees and shrubs with defined garden beds;
g) organic mulch should not be used in bush fire prone areas and non flammable material should be used as ground cover, eg Scoria, pebbles, recycled crushed bricks.
h) planting trees and shrubs such that:
    - the branches will not overhang the roof;
    - the tree canopy is not continuous; and
    - there is a windbreak in the direction from which fires are likely to approach.

2) The deemed to satisfy provisions for an Inner Protection Area are detailed within Appendix 2 of Planning for Bushfire Protection 2006 to be:

a) An Inner Protection Area should provide a tree canopy cover of less than 15% and should be located greater than 2 metres from any part of the roofline of a dwelling.
b) Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 metres from an exposed window or door.
c) Trees should have lower limbs removed up to a height of 2 metres above the ground."
d) An Outer Protection Area should provide a tree canopy cover of less than 30% and should have understorey managed (mowed) to treat all shrubs and grasses on an annual basis in advance of the fire season (usually September).

3) The Rural Fire Service document 'Standards for Asset Protection Zones' requires the following provisions for an Asset Protection Zone:

Fuels can be controlled by:

a) raking or manual removal of fine fuels
b) Ground fuels such as fallen leaves, twigs (less than 6 mm in diameter) and bark should be removed on a regular basis. This is fuel that burns quickly and increases the intensity of a fire.
c) Fine fuels can be removed by hand or with tools such as rakes, hoes and shovels.
d) mowing or grazing of grass. Grass needs to be kept short and, where possible, green.

e) removal or pruning of trees, shrubs and understorey. The control of existing vegetation involves both selective fuel reduction (removal, thinning and pruning) and the retention of vegetation.
f) Prune or remove trees so that you do not have a continuous tree canopy leading from the hazard to the asset. Separate tree crowns by two to five metres. A canopy should not overhang within two to five metres of a dwelling.
g) Native trees and shrubs should be retained as clumps or islands and should maintain a covering of no more than 20% of the area.

Layout of gardens in an APZ

When creating and maintaining a garden that is part of an APZ you should:

a) ensure that vegetation does not provide a continuous path to the house;
b) remove all noxious and environmental weeds;
c) plant or clear vegetation into clumps rather than continuous rows;
d) prune low branches two metres from the ground to prevent a ground fire from spreading into trees;
e) locate vegetation far enough away from the asset so that plants will not ignite the asset by direct flame contact or radiant heat emission;
f) plant and maintain short green grass around the house as this will slow the fire and reduce fire intensity. Alternatively, provide non-flammable pathways directly around the dwelling;
g) ensure that shrubs and other plants do not directly abut the dwelling. Where this does occur, gardens should contain low-flammability plants and non flammable ground cover such as pebbles and crush tile; and
h) avoid erecting brush type fencing and planting “pencil pine” type trees next to buildings, as these are highly flammable.

13 Appendix III – Tree Management and Fauna Habitat