flora & fauna assessment, waterbrook bayview

Bayview Golf Course Cabbage Tree Road, Bayview

2nd July 2014

prepared by

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OEH - Scientific Licence No. S L100777, DPI - Animal Research Authority 04-4786

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Acknowledgements
Flora Survey - Mark Couston, Paul Burcher & Agata Mitchell.
Fauna Survey - Mark Couston

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executive summary

This report has been prepared to accompany an application to the NSW Department Planning & Environment for a site compatibility certificate involving a proposed subdivision and development on land that is currently part of Bayview Golf Course.

The report has been commissioned by the Bayview Waterbrook and site instructions have been provided by Planix Projects. Site inspections and field work were conducted between the 23rd April 2014 & 30th May 2014. The subject site has an area of approximately 2ha and is predominately developed as a golf course with mown grass and remnant trees lining the fairways. The proposed development involves subdivision of part of the golf course and construction of a seniors living facility with a basement level car park (Marchese, 2014).

The subject site is considered in 3 main habitat units being:

- Open Forest – containing canopy trees, sub canopy trees and understorey vegetation located in a narrow band along the Cabbage Tree Road frontage,
- Modified Landscape – consisting of remnant and planted trees with mown ground covers either side of the golf fairways, and
- Golf Fairways, Greens & Tees.

This report identifies flora species on the site and fauna species residing on or using the site as part of their foraging range. Surveys and habitat assessment have been undertaken using a range of techniques to identify flora and fauna and ecological communities that may occur on or utilise the site.

A number of threatened species listed in the *Threatened Species Conservation Act 1995 (NSW)* and/or the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)* have been recorded as occurring within 5km of the site. Those threatened species that have been recorded on the site or have some habitat relationships with the habitats on site include:

- Bush Stone-curlew (*Burhinus grallarius*);
- Gang-gang Cockatoo (Callocephalon fimbriatum)l;
- Glossy Black-Cockatoo (*Calyptorhynchus lathami*);
- Little Lorikeet (Glossopsitta pusilla);
- Barking Owl (*Ninox connivens*);
- Powerful Owl (*Ninox strenua*);
- Eastern Bent-wing Bat (Miniopterus schreibersii oceanensis);
- Eastern Freetail Bat (*Mormopterus norfolkensis*);
- Grey-headed Flying-fox (*Pteropus poliocephalus*).

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Based upon the assessments carried out in accordance with section 5A of the *Environmental Planning and Assessment Act 1979 (NSW),* the proposed subdivision and development will not have a significant impact on threatened species and populations listed in the schedules of the *Threatened Species Conservation Act 1995 (NSW)* nor on those species listed in the schedules of the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth).*

Consideration has also been given to the application of State Environmental Planning Policy 44 Koala Habitat Protection (SEPP 44). Based upon the assessments in this report the site is not considered to be core koala habitat for the purposes of SEPP 44.

1. introduction

1.1 background

This report has been prepared to accompany an application to the NSW Department Planning & Environment for a site compatibility certificate involving a proposed subdivision and development on land that is currently part of Bayview Golf Course. The report identifies the flora species on the site and fauna species residing on or using the site as part of their foraging range. Specific assessment of the property has been undertaken to identify habitats of threatened species, populations and ecological communities listed in the schedules of the *Threatened Species Conservation Act (NSW) 1995* & *Environmental Protection Biodiversity Conservation Act (Cwlth) 1999*.

The report has been commissioned by Bayview Waterbrook and site instructions have been provided by Planix Projects. Site inspections and field work were conducted between the 23rd April 2014 & 30th May 2014.

For the purposes of this report, the proposed new subdivision allotment within Lot 1 in DP 662920 at Bayview Golf Course, Bayview will be referred to as the subject site.

1.2 existing site & proposed development

The subject site has an area of approximately 2ha and is predominately developed as a golf course with mown grass and remnant trees lining the fairways. The proposed development involves subdivision of part of the golf course and construction of a seniors living facility with a basement level car park (Marchese, 2014).

Figure 1.1 Typical view of the site looking south to Cabbage Tree Road.

2. the site

2.1 general information

The site is situated on the northern side of Cabbage Tree Road, Bayview and is currently within the Bayview Golf Club land. The general site characteristics are:

Site Area	20,000 m2
Landform Morphology	Simple slope, Maximal Lower-slope,
Aspect	South east
Geology	Narrabeen Group
Soil Landscape	Watagan Soil Landscape
Watercourse	No defined channel on site
Catchment	Cahill Creek
Receiving Waters	Winnererremy Bay / Pittwater Inlet
Vegetation	Open mown grass with indigenous trees Open Forest – North Coast Wet Sclerophyll Forest (Keith, 2004)

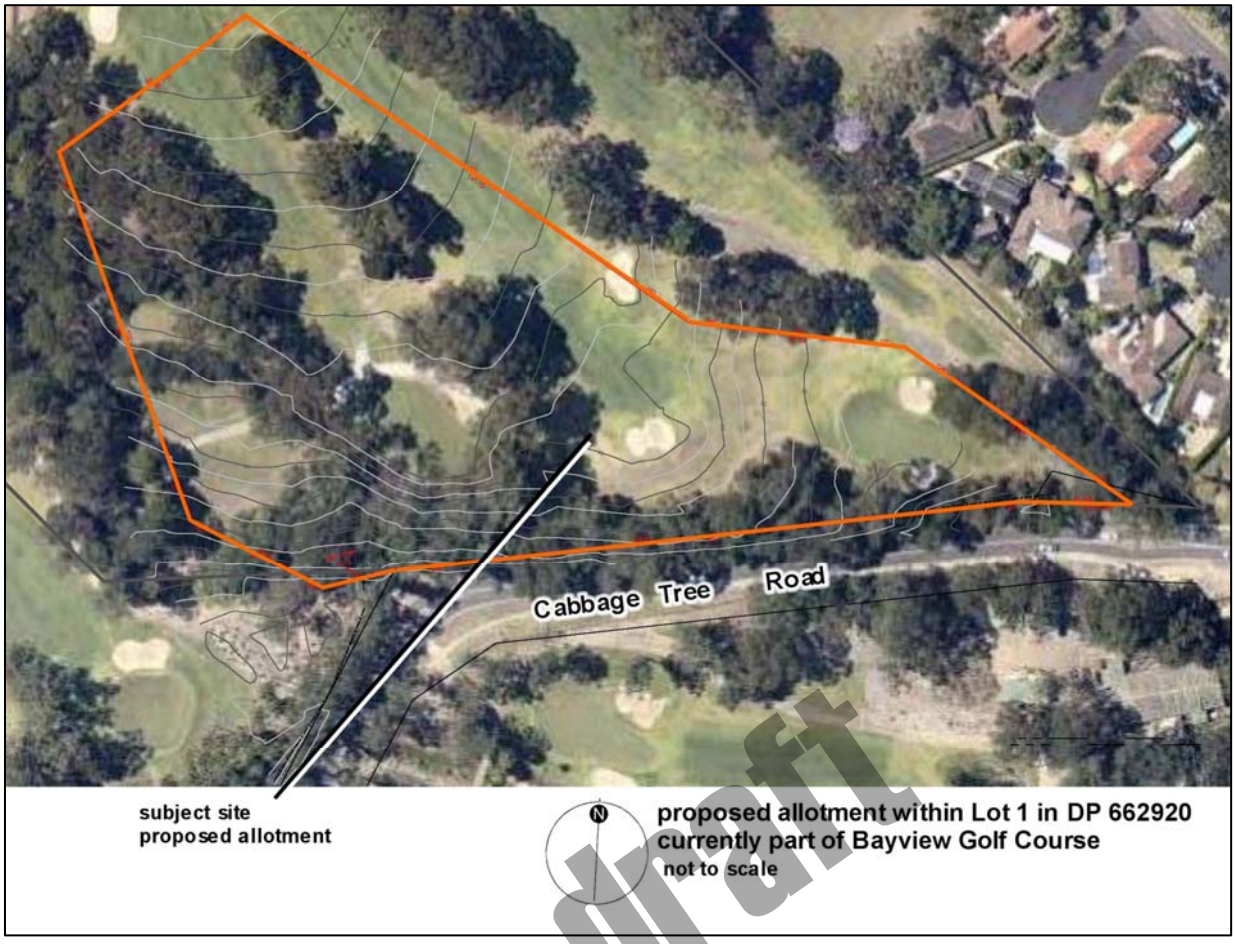

Figure 1.2 Aerial photo of the current site and proposed allotment.

3. flora & fauna survey

3.1 flora species survey methods

3.1.1 Flora literature search

Flora records were obtained from the NSW Office of Environment & Heritage's (OEH, 2014) BioNet database searching a 10km grid square centred on the site (AMG co-ordinates E 341360 and N 6273360).

3.1.2 Flora field surveys

The flora survey covered an area of approximately 10,000m^2 using the Random Meander Method described by Cropper (1993) involving 23 person hours and was conducted on the 02/05/14 & 17/05/14.

Specific effort was undertaken to identify optimal and sub-optimal habitats of threatened species and communities and in these areas detailed searches were undertaken.

Species identifications are consistent with the nomenclature in Harden (1992, 1993, 2000 & 2002) with recent name changes as amended in the Royal Botanic Gardens Sydney publication *Cunninghamia*. Where some taxonomic uncertainty exists, samples were taken for verification using recognised floristic keys.

3.2 fauna species survey methods

3.2.1 Fauna Literature search

Fauna records were obtained from the NSW Office of Environment & Heritage's (OEH, 2014) BioNet database searching a 10km grid square centred on the site (AMG co-ordinates E 341360 and N 6273360).

3.2.2 Fauna field surveys

The fauna surveys carried out have departed from those outlined in Threatened Biodiversity Survey & Assessment Guidelines for Developments & Activities Working Draft (OEH, 2004) because of the extent of site modifications, the simplified habitats on the site and the site's context, being surrounded by developed urban areas,. Fauna survey methods carried out involved:

- habitat assessments;
- diurnal bird surveys;
- nocturnal spotlight surveys;
- ultrasonic microchiropteran bat detection, and
- opportunistic sightings conducted as part of other site surveys.

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3.2.2.1 Habitat Assessment

To overcome the limitations associated with short term surveys and seasonal variations, habitat assessments are carried out to identify key habitat features, such as trees with hollows, rock overhangs and watercourses, and to identify potential habitats where threatened fauna species could reside, find refuge, breed or forage. This habitat assessment was carried out in conjunction with the flora survey on the 02/05/14.

3.2.2.2 Diurnal bird survey

Four (4), 60 minute surveys were undertaken, of which 2 were conducted in the morning on 25/04/14 & 05/05/14 and 2 were conducted in the afternoons of 24/04/14 & 07/05/12. These surveys were generally conducted along a transect through each habitat unit on site and additional data collected as incidental observations.

3.2.2.3 Herpetofauna diurnal observations

Because of the extent of the open mown lawn area and other site modifications no herpetofauna survey was conducted.

3.2.2.4 Nocturnal survey

Spotlighting was conducted to identify frogs, bats, mammals and nocturnal birds and reptiles and specifically targeted small ground mammals, possums, gliders, and owls. Two (2) 60-minute surveys were undertaken on the site using a 100-watt hand held spotlight. Surveys were conducted on dusk extending for 60 minutes into the early evening on the 24/04/14 & 06/05/14.

3.2.2.5 Ultrasonic microchiropteran bat detection

Ultrasonic bat detection was undertaken over 3 nights commencing on the evenings of the 24/04/14, 05/05/14 and 06/05/14. Recording equipment was activated before dusk, running throughout the night until the following morning. Bat ultrasonic recordings were taken on the 24/04/14 using an Anabat II detector with a digital ZCAIM storage unit and recordings taken on the 05/05/14 & 06/05/14 were carried out using an Anabat Express detector. Recordings were analysed by Lesryk Environmental Consultants.

3.2.2.6 Call playback

Nocturnal call play back for forest owls was not conducted as it disrupts the activities of nocturnal mammals and hinders their detection.

Call playback for threatened frog species such as Red-crowned Toadlet (*Pseudophryne australis*) and the Giant Burrowing Frog (*Heleioporus australiacus*) were also not conducted as the site is not considered to be suitable habitat.

3.2.2.7 Opportunistic sighting, calls, scats and scratchings

During the course of individual surveys opportunistic observations, calls, scats, tracks and scratchings were also recorded both within the study area and locally off site.

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3.3 survey findings

3.3.1 Flora data

The following table identifies flora species:

- listed in the schedules of the *Environment Protection & Biodiversity Conservation Act 1999 (Cwlth)* and recorded within a 10km grid square centered on the site in the BioNet database (OEH 2014);
- listed in the schedules of the *Threatened Species Conservation Act 1995 (NSW)* and recorded within a 10km grid square centered on the site in the BioNet database (OEH 2014), and
- recorded on the site as part of field surveys.

OEH Bionet Database (2014)	Recorded on subject site (Open Forest)	Recorded on subject site (Modified Landscape)	Family	Genus species	Common Name	Conservation Status	Autochthony
✔ - Recorded, - Planted Native Specimen. **Unprotected** / **Protected** - Schedule 13 National Parks & Wildlife Act 1974 (NSW), Vulnerable **NSW** / **Endangered NSW / Critically Endangered NSW** - NSW Threatened Species Conservation Act 1995 (NSW), **Noxious** - Noxious Weeds Act 1993 (NSW), **Critically Endangered Cwlth** / **Endangered Cwlth** / **Vulnerable Cwlth** - Environment Protection & Biodiversity Conservation Act 1999 (Cwlth).							
	✔	✔	Acanthaceae	*Pseuderanthemum variabile*	Pastel Flower	Unprotected	Indigenous
	✔		Adiantaceae	*Adiantum aethiopicum*	Common Maidenhair Fern	Protected	Indigenous
	✔		Adiantaceae	*Adiantum formosum*	Giant Maidenhair Fern	Protected	Indigenous
	✔		Agapanthacea	*Agapanthus africanus*	Agapanthus	Unprotected	Exotic
	✔		Anthericaceae	*Chlorophytum comosum*	Ribbon / Spider Plant	Unprotected	Exotic
		✔	Apiaceae	*Actinotus minor*	Lesser Flannel Flower	Unprotected	Indigenous
	✔		Apiaceae	*Apium sp.*	Celery	Unprotected	Exotic
	✔		Apiaceae	*Hydrocotyle bonariensis*	Pennywort	Unprotected	Exotic
	✔		Apiaceae	*Hydrocotyle peduncularis*	-	Unprotected	Indigenous
	✔		Apocynaceae	*Nerium oleander*	Oleander	Unprotected	Exotic
	✔	✔	Apocynaceae	*Parsonsia straminea*	Common Silkpod	Unprotected	Indigenous
	✔		Araceae	*Gymnostachys anceps*	Settler's Flax	Unprotected	Indigenous
	✔	✔	Arecaceae	*Livistona australis*	Cabbage Palm	Protected	Indigenous
	✔		Arecaceae	*Phoenix canariensis*	Canary Island Date Palm	Unprotected	Exotic
	✔		Asclepiadaceae	*Araujia sericiflora*	Moth Vine	Noxious	Exotic

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OEH Bionet Database (2014)	Recorded on subject site (Open Forest)	Recorded on subject site (Modified Landscape)	Family	Genus species	Common Name	Conservation Status	Autochthony
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	✔	✔	Asclepiadaceae	*Tylophora barbata*	Bearded Tylophora	Unprotected	Indigenous
	✔	✔	Asparagaceae	*Asparagus aethiopicus*	Asparagus Fern	Noxious	Exotic
	✔		Asparagaceae	*Asparagus falcatus*	Sicklethorn	Unprotected	Exotic
	✔		Aspleniaceae	*Asplenium australasicum*	Bird's Nest Fern	Unprotected	Native
	✔		Aspleniaceae	*Asplenium flabellifolium*	Necklace Fern	Unprotected	Indigenous
	✔		Asteracae	*Bidens pilosa*	Cobbler's Peg	Unprotected	Exotic
	✔		Asteraceae	*Ageratina adenophora*	Crofton Weed	Noxious	Exotic
		✔	Asteraceae	*Conyza sp.*	Fleabane	Unprotected	Exotic
	✔	✔	Asteraceae	*Crassocephalum crepidioides*	Thickhead	Unprotected	Exotic
		✔	Asteraceae	*Gnaphalium sp.*	Cudweed	Unprotected	Exotic
		✔	Asteraceae	*Soliva sessilis*	Bindi	Unprotected	Introduced
		✔	Asteraceae	*Taraxacum officinale*	Dandelion	Unprotected	Exotic
	✔	✔	Basellaceae	*Anredera cordifolia*	Maderia Vine	Noxious	Exotic
	✔	✔	Bignoniaceae	*Pandorea pandorana*	Wonga Wonga Vine	Unprotected	Indigenous
	✔		Blechnaceae	*Blechnum nudum*	Water-fern	Unprotected	Indigenous
	✔	✔	Blechnaceae	*Doodia aspera*	Prickly Rasp-fern	Unprotected	Indigenous
	✔	✔	Caryophyllaceae	*Cerastium glomeratum*	Mouse-ear Chickweed	Unprotected	Exotic
	✔		Caryophyllaceae	*Stellaria media*	Chickweed	Unprotected	Exotic
	✔		Cassythaceae	*Cassytha sp.*	Devil's Twine	Unprotected	Indigenous
	✔	✔	Casuarinaceae	*Allocasuarina torulosa*	Forest Oak	Unprotected	Indigenous
	✔	✔	Casuarinaceae	*Casuarina glauca*	Swamp Oak	Unprotected	Indigenous
	✔		Celastraceae	*Cassine australis*	Red Olive Plum	Unprotected	Indigenous
		✔	Celastraceae	*Maytenus silvestris*	Narrow-leaved Orangebark	Unprotected	Indigenous
	✔		Commelinacea	*Commelina cyanea*	Scurvy Weed	Unprotected	Indigenous
	✔		Commelinaceae	*Tradescantia fluminensis*	Wandering Jew	Noxious	Exotic
	✔	✔	Convolvulaceae	*Dichondra repens*	Kidney Weed	Unprotected	Indigenous

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		✔	Cyperaceae	*Cyperus rotundus*	Nutgrass	Unprotected	Exotic
	✔		Cyperaceae	*Lepidosperma laterale*	Variable Sword-sedge	Unprotected	Indigenous
		✔	Cyperaceae	*Schoenus sp.*	-	Unprotected	Exotic
	✔		Dennstaedtiaceae	*Hypolepis muelleri*	Harsh Ground Fern	Unprotected	Indigenous
	✔		Dennstaedtiaceae	*Pteridium esculentum*	Bracken Common	Unprotected	Indigenous
	✔		Dicksoniaceae	*Calochlaena dubia*	Common Ground Fern	Protected	Indigenous
	✔		Dilleniaceae	*Hibbertia dentata*	Twining Guinea Flower	Unprotected	Indigenous
	✔	✔	Dioscoreaceae	*Dioscorea transversa*	Native Yam	Unprotected	Indigenous
	✔		Ebenaceae	*Diospyros australis*	Black Plum	Unprotected	Indigenous
	✔		Elaeocarpaceae	*Elaeocarpus reticulatus*	Blueberry Ash	Unprotected	Indigenous
✔			Elaeocarpaceae	*Tetratheca glandulosa*	Glandular Pink-bell	Vulnerable NSW, Cwth	Indigenous
✔			Epacridaceae	*Epacris purpurascens var. purpurascens*	-	Vulnerable NSW	Indigenous
	✔		Epacridaceae	*Trochocarpa laurina*	Tree Heath	Unprotected	Indigenous
	✔		Euphorbiaceae	*Breynia oblongifolia*	Coffee Bush Shrub	Unprotected	Indigenous
		✔	Euphorbiaceae	*Euphorbia peplus*	Petty Spurge	Unprotected	Exotic
	✔	✔	Euphorbiaceae	*Glochidion ferdinandi*	Cheese Tree	Unprotected	Indigenous
	✔		Euphorbiaceae	*Homalanthus populifolius*	Bleeding Heart	Unprotected	Indigenous
	✔		Eupomatiaceae	*Eupomatia laurina*	Bolwarra Shrub	Unprotected	Indigenous
	✔	✔	Fabaceae	*Acacia implexa*	Hickory Wattle	Unprotected	Indigenous
	✔	✔	Fabaceae	*Acacia saligna*	Golden Wreath Wattle	Unprotected	Native
	✔	✔	Fabaceae	*Glycine clandestina*	Twining Glycine	Unprotected	Indigenous
	✔		Fabaceae	*Senna pendula*	Cassia	Unprotected	Exotic
		✔	Fabaceae	*Trifolium repens*	White Clover	Unprotected	Exotic
	✔	✔	Fabaceae	*Vicia sativa*	Vetch	Unprotected	Exoitc
	✔		Geraniaceae	*Geranium homeanum*	-	Unprotected	Indigenous
		✔	Lamiaceae	*Stachys arvensis*	Stagger Weed	Unprotected	Exotic

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	✔	✔	Lauraceae	*Cinnamomum camphora*	Camphor Laurel	Noxious	Exotic
	✔		Lauraceae	*Endiandra sieberi*	Hard Corkwood	Unprotected	Indigenous
	✔	✔	Liliaceae	*Dianella caerulea*	Blue Flax Lily	Unprotected	Indigenous
	✔		Liliaceae	*Lilium formosanum*	Formosan Lily	Unprotected	Exotic
	✔	✔	Lobeliaceae	*Pratia purpurascens*	Whiteroot	Unprotected	Indigenous
	✔	✔	Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush	Unprotected	Indigenous
	✔	✔	Luzuriagaceae	*Geitonoplesium cymosum*	Scrambling Lilly	Unprotected	Indigenous
	✔		Malvaceae	*Lagunaria patersonia*	Norfolk Island Hibiscus	Unprotected	Native
	✔	✔	Malvaceae	*Modiola caroliniana*	Red-flowered Mallow	Unprotected	Exotic
	✔		Malvaceae	*Sida rhombifolia*	Paddy's Lucerne	Unprotected	Exotic
	✔		Meliaceae	*Melia azederach*	White Cedar	Unprotected	Exotic
	✔	✔	Meliaceae	*Synoum glandulosum*	Scentless Rosewood	Unprotected	Indigenous
	✔		Menispermaceae	*Stephania japonica*	Snake Vine	Unprotected	Indigenous
	✔		Monimiaceae	*Wilkiea huegeliana*	Veiny Wilkiea	Unprotected	Indigenous
		✔	Moraceae	*Ficus microcarpa var.hillii*	Hills Fig	Unprotected	Native
	✔	✔	Myrsinaceae	*Myrsine variabilis*	Muttonwood	Unprotected	Indigenous
	✔	✔	Myrtaceae	*Angophora floribunda*	Rough-barked Apple	Unprotected	Indigenous
✔			Myrtaceae	*Callistemon linearifolius*	Netted Bottle Brush	Vulnerable NSW	Indigenous
	✔		Myrtaceae	*Corymbia maculata*	Spotted Gum	Unprotected	Indigenous
✔			Myrtaceae	*Eucalyptus camfieldii*	Heart-Leaved Stringybark	Vulnerable NSW, Cwth	Indigenous
✔			Myrtaceae	*Eucalyptus nicholii*	Narrow-Leaf Peppermint	Vulnerable NSW	Native
	✔	✔	Myrtaceae	*Eucalyptus paniculata*	Grey Ironbark	Unprotected	Indigenous
		✔	Myrtaceae	*Eucalyptus umbra*	Broad-leaved White Mahogany	Unprotected	Indigenous
		✔	Myrtaceae	*Eucapyptus scias*	Large-fruited Red Mahogony	Unprotected	Indigenous
		✔	Myrtaceae	*Lophostemon confertus*	Brushbox	Unprotected	Native
	✔		Myrtaceae	*Melaleuca quinquenervia*	Paperpark	Unprotected	Native

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OEH Bionet Database (2014)	Recorded on subject site (Open Forest)	Recorded on subject site (Modified Landscape)	Family	Genus species	Common Name	Conservation Status	Autochthony
✔ - Recorded, - Planted Native Specimen. **Unprotected** / **Protected** - Schedule 13 National Parks & Wildlife Act 1974 (NSW), Vulnerable **NSW** / **Endangered NSW / Critically Endangered NSW** - NSW Threatened Species Conservation Act 1995 (NSW), **Noxious** - Noxious Weeds Act 1993 (NSW), **Critically Endangered Cwlth** / **Endangered Cwlth** / **Vulnerable Cwlth** - Environment Protection & Biodiversity Conservation Act 1999 (Cwlth).							
	✔	✔	Myrtaceae	*Syncarpia glomulifera*	Turpentine	Unprotected	Indigenous
✔			Myrtaceae	*Syzygium paniculatum*	Magenta Lillypilly	Vulnerable NSW, Cwth	Indigenous
	✔		Myrtaceae	*Syzygium smithii*	Lilly Pilly	Unprotected	Indigenous
	✔		Ochnaceae	*Ochna serrulata*	Ochna	Noxious	Exotic
	✔		Oleaceae	*Ligustrum lucidum*	Large Leaf Privet	Noxious	Exotic
	✔	✔	Oleaceae	*Ligustrum sinense*	Small Leaf Privet	Noxious	Exotic
	✔	✔	Oleaceae	*Notelaea longifolia*	Large Mock-olive	Unprotected	Indigenous
	✔		Oleaceae	*Olea europaea subsp. cuspidata*	African Olive	Noxious	Exotic
✔			Orchidaceae	*Cryptostylis hunteriana*	Leafless Tongue-orchid	Vulnerable NSW, Cwth	Indigenous
	✔	✔	Philesiaceae	*Eustrephus latifolius*	Wombat Berry	Unprotected	Indigenous
		✔	Pinaceae	*Pinus radiata*	Monterey Pine / Radiata Pine	Unprotected	Exotic
	✔		Pittosporaceae	*Pittosporum multiflorum*	Orange Thorn	Unprotected	Indigenous
	✔	✔	Pittosporaceae	*Pittosporum revolutum*	Yellow / Rough Fruit Pittosporum	Unprotected	Indigenous
	✔		Pittosporaceae	*Pittosporum undulatum*	Native Daphne	Unprotected	Indigenous
	✔	✔	Plantaginaceae	*Plantago lanceolata*	Lambs Tongue	Unprotected	Exotic
	✔	✔	Poaceae	*Cynodon dactylon*	Couch Grass	Unprotected	Exotic
	✔		Poaceae	*Digitaria sanguinalis*	Summer/ Crab Grass	Unprotected	Exotic
	✔		Poaceae	*Ehrharta erecta*	Panic Veldtgrass	Unprotected	Exotic
	✔		Poaceae	*Entolasia marginata*	Bordered Panic	Unprotected	Indigenous
	✔	✔	Poaceae	*Imperata cylindrica*	Blady Grass	Unprotected	Indigenous
	✔	✔	Poaceae	*Microlaena stipoides*	Weeping Grass	Unprotected	Indigenous
	✔		Poaceae	*Oplismenus imbecillis*	Basket Grass	Unprotected	Indigenous
		✔	Poaceae	*Pennisetum clandestinum*	Kikuyu Grass	Unprotected	Exotic
	✔		Poaceae	*Setaria palmifolia*	Palm Grass	Unprotected	Exotic
	✔		Polygonaceae	*Acetosa sagittata*	Potato Vine	Unprotected	Exotic
✔			Proteaceae	*Grevillea caleyi*	Caley's Grevillea	Endangered NSW, Cwlth	Indigenous

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OEH Bionet Database (2014)	Recorded on subject site (Open Forest)	Recorded on subject site (Modified Landscape)	Family	Genus species	Common Name	Conservation Status	Autochthony
✔ - Recorded, - Planted Native Specimen. **Unprotected** / **Protected** - Schedule 13 National Parks & Wildlife Act 1974 (NSW), Vulnerable **NSW** / **Endangered NSW / Critically Endangered NSW** - NSW Threatened Species Conservation Act 1995 (NSW), **Noxious** - Noxious Weeds Act 1993 (NSW), **Critically Endangered Cwlth** / **Endangered Cwlth** / **Vulnerable Cwlth** - Environment Protection & Biodiversity Conservation Act 1999 (Cwlth).							
✔			Proteaceae	*Persoonia hirsuta*	Hairy Geebung	Endangered NSW, Cwlth	Indigenous
	✔		Ranunculaceae	*Clematis glycinoides*	Headache Vine Climber	Unprotected	Indigenous
	✔		Ranunculaceae	*Ranunculus sp.*	Buttercup	Unprotected	Exotic
	✔		Rosaceae	*Rubus fruticosus*	Blackberry	Noxious	Exotic
	✔		Rosaceae	*Rubus moluccanus*	Molucca Bramble	Unprotected	Indigenous
	✔		Rubiaceae	*Morinda jasminoides*	Morinda	Unprotected	Indigenous
	✔		Rubiaceae	*Psychotria loniceroides*	Hairy Psychotria	Unprotected	Indigenous
✔			Rutaceae	*Boronia umbellata*	Orara Boroonia	Vulnerable NSW, Cwth	Native
	✔		Sapindaceae	*Cardiospermum grandiflorum*	Balloon Vine	Unprotected	Exotic
	✔		Smilacaceae	*Smilax australis*	Sarsaparilla	Unprotected	Indigenous
	✔	✔	Smilacaceae	*Smilax glyciphylla*	Sweet Sarsaparilla	Unprotected	Indigenous
	✔	✔	Solanaceae	*Solanum nigrum*	Blackberry Nightshade	Unprotected	Exotic
	✔		Sterculiaceae	*Brachychiton acerifolius*	Illawarra Flame Tree	Unprotected	Native
	✔		Strelitziaceae	*Strelitzia sp.*	-	Unprotected	Exotic
✔			Thymelaeaceae	*Pimelea curviflora var. curviflora*	Curved Rice-flower	Vulnerable NSW, Cwth	Indigenous
		✔	Urticaceae	*Parietaria judaica*	Asthma Weed / Pellitory	Noxious	Exotic
	✔		Verbenaceae	*Clerodendrum tomentosum*	Hairy Clerodendrum	Unprotected	Indigenous
	✔		Verbenaceae	*Lantana camara*	Lantana	Unprotected	Exotic
	✔		Violaceae	*Viola hederacea*	Ivy-Leaved Violet	Unprotected	Indigenous
	✔		Vitaceae	*Cayratia clematidea*	Slender Grape	Unprotected	Indigenous
	✔		Vitaceae	*Cissus antarctica*	Water Vine	Unprotected	Indigenous
	✔		Vitaceae	*Cissus hypoglauca*	Giant Water Vine	Unprotected	Indigenous

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3.3.2 Fauna data

The following table identifies fauna species:

- listed in the schedules of the *Environment Protection & Biodiversity Conservation Act 1999 (Cwlth)* and recorded within a 10km grid square centered on the site in the BioNet database (OEH 2014);
- listed in the schedules of the *Threatened Species Conservation Act 1995 (NSW)* and recorded within a 10km grid square centered on the site in the BioNet database (OEH 2014), and
- recorded on the site as part of field surveys.

OEH Bionet Database (2014)	Recorded on Site	Class	Genus species	Common Name	Conservation Status	Autochthony
✔ - Recorded / Identified, ✔ θ Record Highly Probable, ✔ Record Probable, ✔ Record Likely / Possible. **Unprotected** / **Protected** - National Parks & Wildlife Act 1974 (NSW), **Vulnerable NSW** / **Endangered NSW** - NSW Threatened Species Conservation Act 1995 (NSW), **Critically Endangered Cwlth** / **Endangered Cwlth** / **Vulnerable Cwlth** - Environment Protection & Biodiversity Conservation Act 1999 (Cwlth)						
✔		Amphibia	*Heleioporus australiacus*	Giant Burrowing Frog	Vulnerable NSW, Cwth	Native
✔		Amphibia	*Pseudophryne australis*	Red-crowned Toadlet	Vulnerable NSW	Native
	✔	Arachnida	*Ixodes holocyclus*	Paralysis Tick	Unprotected	Native
	✔	Arachnida	*Nephila plumipes*	Golden Orb Spider	Unprotected	Native
	✔	Arachnida	*Phonognatha graeffei*	Leaf-curling Spider	Unprotected	Native
	✔	Aves	*Alectura lathami*	Australian Brush-turkey	Protected	Native
	✔	Aves	*Alisterus scapularis*	Australian King-Parrot	Protected	Native
✔		Aves	*Anthochaera phrygia*	Regent Honeyeater	Critically Endangered NSW, Endagered Cwlth	Native
✔		Aves	*Burhinus grallarius*	Bush Stone-curlew	Endangered NSW	Native
	✔	Aves	*Cacatua galerita*	Sulphur-crested Cockatoo	Protected	Native
✔		Aves	*Callocephalon fimbriatum*	Gang-gang Cockatoo	Vulnerable NSW	Native
✔		Aves	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	Vulnerable NSW	Native
	✔	Aves	*Corvus coronoides*	Australian Raven	Protected	Native
	✔	Aves	*Cracticus torquatus*	Grey Butcherbird	Protected	Native
	✔	Aves	*Dacelo novaeguineae*	Laughing Kookaburra	Protected	Native
✔		Aves	*Diomedea exulans*	Wandering Albatross	Endangered NSW, Vulnerable Cwth	Migratory
	✔	Aves	*Eolophus roseicapillus*	Galah	Protected	Native
	✔	Aves	*Glossopsitta concinna*	Musk Lorikeet	Protected	Native

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OEH Bionet Database (2014)	Recorded on Site	Class	Genus species	Common Name	Conservation Status	Autochthony
✔ - Recorded / Identified, ✔ θ Record Highly Probable, ✔ Record Probable, ✔ Record Likely / Possible. **Unprotected** / **Protected** - National Parks & Wildlife Act 1974 (NSW), **Vulnerable NSW** / **Endangered NSW** - NSW Threatened Species Conservation Act 1995 (NSW), **Critically Endangered Cwlth** / **Endangered Cwlth** / **Vulnerable Cwlth** - Environment Protection & Biodiversity Conservation Act 1999 (Cwlth)						
✔		Aves	*Glossopsitta pusilla*	Little Lorikeet	Vulnerable NSW	Native
	✔	Aves	*Gymnorhina tibicen*	Australian Magpie	Protected	Native
✔		Aves	*Haematopus fuliginosus*	Sooty Oystercatcher	Vulnerable NSW	Native
✔		Aves	*Hieraaetus morphnoides*	Little Eagle	Vulnerable NSW	Native
	✔	Aves	*Hirundo neoxena*	Welcome Swallow	Protected	Native
✔		Aves	*Lathamus discolor*	Swift Parrot	Endangered NSW, Cwlth	Native
	✔	Aves	*Lichenostomus chrysops*	Yellow-faced Honeyeater	Protected	Native
	✔	Aves	*Manorina melanocephala*	Noisy Miner	Protected	Native
✔		Aves	*Ninox connivens*	Barking Owl	Vulnerable NSW	Native
✔		Aves	*Ninox strenua*	Powerful Owl	Vulnerable NSW	Native
	✔	Aves	*Ocyphaps lophotes*	Crested Pigeon	Protected	Native
✔		Aves	*Pandion cristatus*	Eastern Osprey	Vulnerable NSW	Native
	✔	Aves	*Platycercus adscitus eximius*	Eastern Rosella	Protected	Native
	✔	Aves	*Psophodes olivaceus*	Eastern Whipbird	Protected	Native
✔		Aves	*Ptilinopus superbus*	Superb Fruit-Dove	Vulnerable NSW	Native
	✔	Aves	*Rhipidura leucophrys*	Willie Wagtail	Protected	Native
✔		Aves	*Thalassarche cauta*	Shy Albatross	Vulnerable NSW, Cwth	Native
✔		Aves	*Thalassarche melanophris*	Black-browed Albatross	Vulnerable NSW, Cwth	Native
	✔	Aves	*Trichoglossus haematodus*	Rainbow Lorikeet	Protected	Native
	✔	Insecta	*Apis mellifera*	European Honey Bee	Unprotected	Introduced
	✔	Insecta	*Nasutitermes walkeri*	Niggerhead Termite	Unprotected	Native
	✔	Mammalia	*Austronomus australis*	White-striped Freetail Bat	Protected	Native
✔		Mammalia	*Cercartetus nanus*	Eastern Pigmy-possum	Vulnerable NSW	Native
✔		Mammalia	*Dasyurus maculatus*	Spotted-tailed Quoll	Vulnerable NSW, Endangered Cwth	Native
✔		Mammalia	*Dugong dugon*	Dugong	Endangered NSW	Migratory
✔		Mammalia	*Eubalaena australis*	Southern Right Whale	Vulnerable NSW, Endangered Cwthwlth	Migratory
✔		Mammalia	*Isoodon obesulus obesulus*	Southern Brown Bandicoot	Endangered NSW, Cwlth	Native

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OEH Bionet Database (2014)	Recorded on Site	Class	Genus species	Common Name	Conservation Status	Autochthony
✔ - Recorded / Identified, ✔ θ Record Highly Probable, ✔ Record Probable, ✔ Record Likely / Possible. **Unprotected** / **Protected** - National Parks & Wildlife Act 1974 (NSW), **Vulnerable NSW** / **Endangered NSW** - NSW Threatened Species Conservation Act 1995 (NSW), **Critically Endangered Cwlth** / **Endangered Cwlth** / **Vulnerable Cwlth** - Environment Protection & Biodiversity Conservation Act 1999 (Cwlth)						
✔		Mammalia	*Megaptera novaeangliae*	Humpback Whale	Vulnerable NSW, Cwth	Native
✔	✔	Mammalia	*Miniopterus australis*	Little Bentwing-bat	Vulnerable NSW	Native
✔	✔	Mammalia	*Miniopterus schreibersii oceanensis*	Eastern Bent-wing Bat	Vulnerable NSW	Native
✔	✔	Mammalia	*Mormopterus norfolkensis*	Eastern Freetail Bat	Vulnerable NSW	Native
✔		Mammalia	*Myotis macropus*	Southern Myotis	Vulnerable NSW	Native
	✔	Mammalia	*Oryctolagus cuniculus*	Rabbit	Unprotected	Introduced
	✔	Mammalia	*Perameles nasuta*	Long-nosed Bandicoot	Protected	Native
✔		Mammalia	*Petaurus norfolcensis*	Squirrel Glider	Vulnerable NSW	Native
✔		Mammalia	*Phascolarctos cinereus*	Koala	Vulnerable NSW	Native
✔		Mammalia	*Pseudomys novaehollandiae*	New Holland Mouse	Protected NSW, Vulnerable Cwlth	Native
✔	✔	Mammalia	*Pteropus poliocephalus*	Grey-headed Flying-fox	Vulnerable NSW, Cwth	Native
	✔	Mammalia	*Rattus rattus*	Black Rat	Unprotected	Introduced
✔		Mammalia	*Scoteanax rueppellii*	Greater Broad-nosed Bat	Vulnerable NSW	Native
	✔	Mammalia	*Trichosurus vulpecula*	Common Brushtail Possum	Protected	Native
	✔	Mammalia	*Vulpes vulpes*	Fox	Unprotected	Introduced
✔		Reptilia	*Chelonia mydas*	Green Turtle	Vulnerable NSW, Cwth	Native
✔		Reptilia	*Dermochelys coriacea*	Leatherback Turtle	Endangered NSW, Cwlth	Migratory
	✔	Reptilia	*Lampropholis delicata*	Delicate Skink	Protected	Native
	✔	Reptilia	*Phyllurus platurus*	Southern Leaf-tailed Gecko	Protected	Native
✔		Reptilia	*Varanus rosenbergi*	Rosenberg's Goanna /Heath Monitor	Vulnerable NSW	Native

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3.3.3 Ecological communities data

The following table identifies ecological communities based upon community descriptions in determinations by NSW Scientific Committee and those described in the Pittwater Native Vegetation Classification (Pittwater Council, 2012) and include communities:

- listed in the schedules of the *Environment Protection & Biodiversity Conservation Act 1999 (Cwlth)* and recorded in the vicinity of the site (OEH, 2009);
- listed in the schedules of the *Threatened Species Conservation Act 1995 (NSW)* and recorded in the vicinity of the site (OEH, 2009);
- considered listed as occurring in the Pittwater Local Government Area (Pittwater Council, 2012), and
- recorded on the site from field surveys.

OEH (2009) Mapping	Recorded On Site	Community name	Conservation Status
Vulnerable NSW / Endangered NSW - Threatened Species Conservation Act 1995 (NSW), **Critically Endangered Cwth** / **Endangered Cwth** / **Vulnerable Cwth** - Environment Protection & Biodiversity Conservation Act 1999 (Cwth)			
✔		Pittwater and Wagstaffe Spotted Gum Forest	Endangered NSW, Cwlth
		Swamp Sclerophyll Forest on Coastal Floodplains	Endangered NSW
✔		Coastal Saltmarsh	Endangered NSW, Vulnerable Cwlth
✔		Duffy's Forest	Endangered NSW
✔		Littoral Rainforest / Littoral Rainforest & Coastal Vine Thickets.	Endangered NSW / Critically Endangered Cwlth
✔		Swamp Oak Floodplain Forest	Endangered NSW, Cwlth
✔		Themeda Grassland on Seacliffs & Headlands	Endangered NSW
	✔	North Coast Wet Sclerophyll Forest (Keith, 2006) / Coastal Enriched Sandstone Moist Forest (OEH, 2012)	Relatively Common

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3.3.4 Population data

The following table identifies threatened populations:

- listed in the schedules of the *Threatened Species Conservation Act 1995 (NSW)* and recorded within 5km of the site in the Wildlife Atlas (OEH, 2014),
- recorded on the site as part of field surveys.

OEH Bionet Database (2014)	Recorded on Site	Type	Population Name	Conservation Status
Vulnerable NSW / Endangered NSW - Threatened Species Conservation Act 1995 (NSW),				
✔		Fauna	Koala, *Phascolarctos cinereus*, in the Pittwater Local Government Area.	Endangered NSW
✔		Fauna	Pittwater population of the Squirrel Glider, *Petaurus norfolcensis* on the Barrenjoey Peninsula, north of Bushrangers Hill	Endangered NSW

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4. habitat assessment

4.1 local & regional habitat context

The site is located within the north western annex of Bayview Golf Course in a developed landscape and is located towards the base of the Warriewood escarpment.

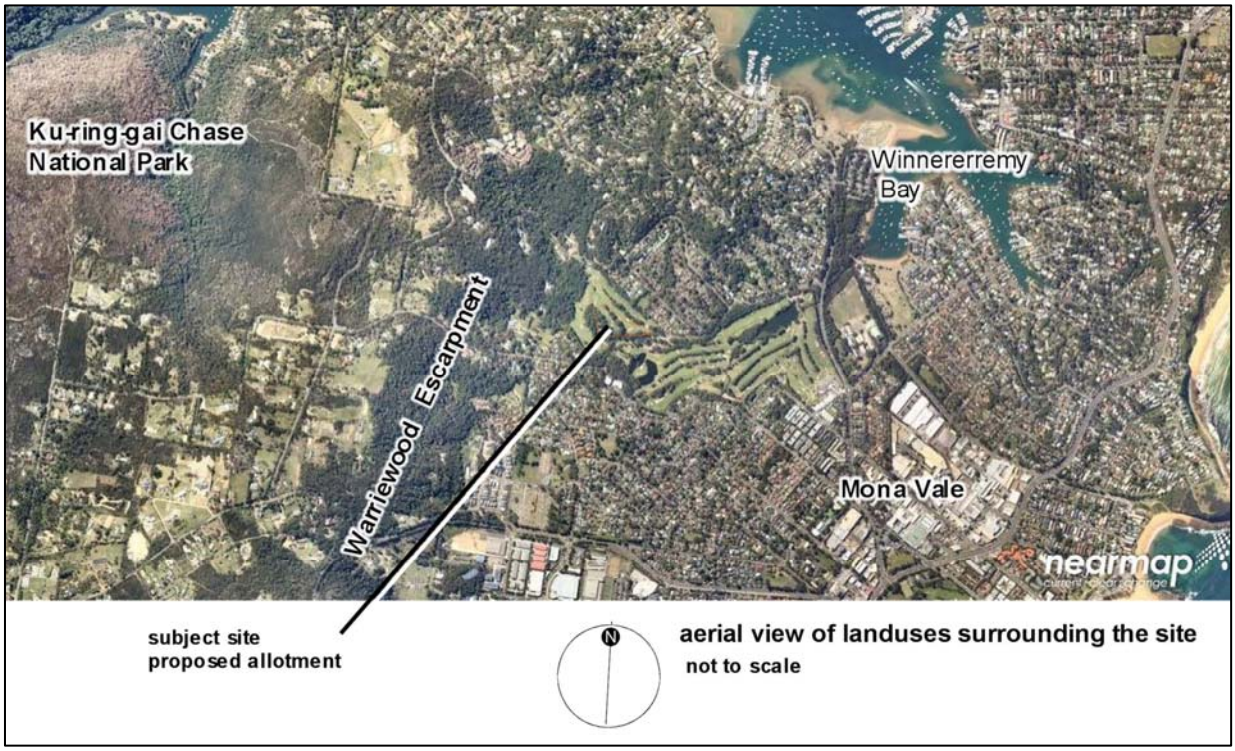

Figure 4.1 Aerial view of landuses surrounding the site

To the west of the golf course the steeper lands of the Warriewood escarpment retains remnant open forest and gully vegetation which occurs on private land.

The land to the north and south of the golf course is developed for residential purposes

Within the local area there are scattered pockets of indigenous trees in the local parks, local streets and peripheral areas and the local developed residential areas contain a moderate tree canopy that consists of individual and stands of indigenous and exotic trees amongst gardens and private open space areas.

Bushland reserves within proximity to the site include Katandra Reserve, (800m to the south west), Ku-ring-gai Chase National Park (1.5km to the west) and Winnererremy Bay Reserve (1.0km to the east).

Immediately adjacent the site, within the golf course land, the vegetation is typical of that found on many golf courses with open mown grass areas, tree lined fairways and pockets of vegetation. Within the north western annex of the golf course, the trees and pockets of vegetation are predominately indigenous species.

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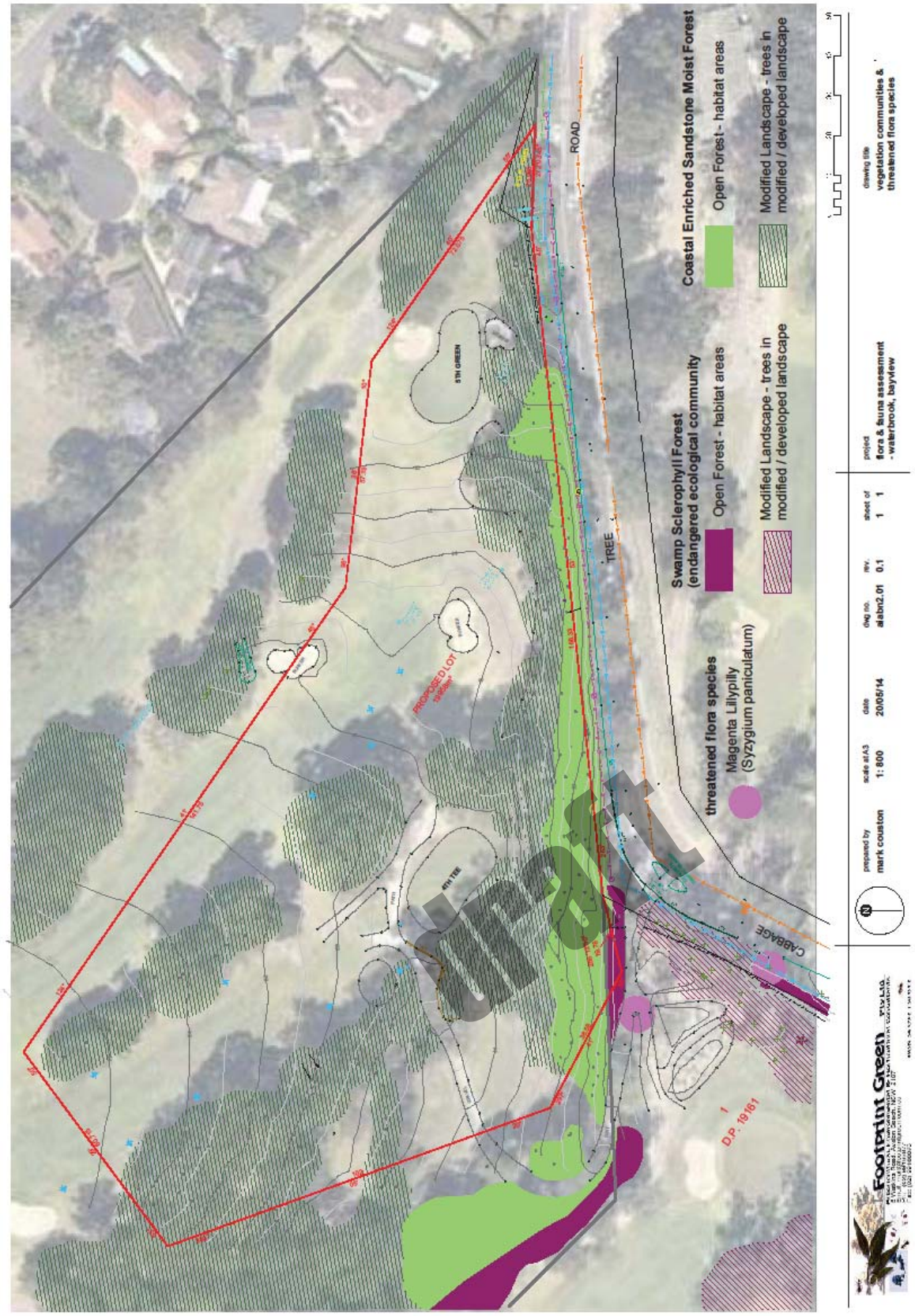
4.2 site habitat units

Based upon the structure of the vegetation structure, floristic composition, the site is considered in 3 main habitats being the:

- Open Forest,
- Modified Landscape
- Golf Fairways, Greens & Tees (not specifically shown below)



4.2.1 Open Forest

The open forest habitats extend along the site's frontage on Cabbage Tree Road and onto the site in a narrow band of vegetation.

The vegetation consists of canopy species of Ironbarks (*Eucalyptus paniculata*), Rough-barked Apple (*Angophora floribunda*) and Turpentines (*Syncarpia glomulifera*) with a sub-canopy of Forest Oak (*Allocasuarina torulosa*) and Coachwood (*Ceratopetalum apetalum*), Cheese Trees (*Glochidion ferdinandi*), Cabbage Palm (*Livistona australis*) and Lilly Pilly (*Syzygium smithii*). The understorey and ground covers typically consist of Morinda (*Morinda jasminoides*), Scentless Rosewood (*Synoum glandulosum*), Coffee Bush Shrub (*Breynia oblongifolia*), Black Plum (*Diospyros australis*) Common Silkpod (*Parsonsia straminea*), Scurvy Weed (*Commelina cyanea*) and Prickly Rasp-fern (*Doodia aspera*).

Based upon the flora species the vegetation is consistent with that described by Keith (2004) as North Coast Wet Sclerophyll Forest and described by NSW Office of Environment & Heritage (2009) as Coastal Enriched Sandstone Moist Forest.

The vegetation is subject to varying levels of exotic species with included many noxious and environmental weeds such as Ochna (*Ochna serrulata*), Maderia Vine (*Anredera cordifolia*), Asparagus Fern (*Asparagus aethiopicus*) and Balloon Vine (*Cardiospermum grandiflorum*).

Figure 4.1 Open Forest habitats forming a narrow band of vegetation along the Cabbage Tree Road frontage.

4.2.2 Modified Landscape

The modified landscape predominately occurs in the areas adjacent the open fairways and comprises of mainly indigenous trees and mown grass. This habitat unit also includes fill embankments and other modified areas where the understorey vegetation is absent and ground covers consist of environmental weeds and other exotic species.

Canopy trees include Ironbarks (*Eucalyptus paniculata*), Rough-barked Apple (*Angophora floribunda*), Broad-leaved White Mahogany (*Eucalyptus umbra*), Large-fruited Red Mahogany (*Eucapyptus scias*) and smaller sub-canopy trees consist of Forest Oak (*Allocasuarina torulosa*), Hickory Wattle (*Acacia implexa*),

Based upon the indigenous tree canopy species the original community that existed prior to development of the golf course was consistent with that described by Keith (2004) as North Coast Wet Sclerophyll Forest and described by NSW Office of Environment & Heritage (2009) as Coastal Enriched Sandstone Moist Forest.

Other native species appear to have been planted within this area and these include Brushbox (*Lophostemon confertus*), Paperbarks (Melaleuca quinquenervia) and Hills Figs (*Ficus microcarpa var. hillii*) and a row of Swamp Oak (*Casuarina glauca*). Exotic trees in this habitat consist of Monterey Pine (*Pinus radiata*), Camphor Laurel (*Cinnamomum camphora*) and Large leaf Privet (*Ligustrum lucidum*).

The understorey vegetation is absent and the ground covers are predominately exotic grasses and environmental weeds such as Maderia Vine (*Anredera cordifolia*) and Potato Vine (*Acetosa sagittata*). At the base of some trees where there is less disturbance some small patches of indigenous ground covers persist and these include; Blady Grass (*Imperata cylindrica*), Sweet Sarsaparilla (*Smilax glyciphylla*) and Wombat Berry (*Eustrephus latifolius*).

Figure 4.2 Modified Landscape in the upper south western parts of the proposed allotment.

Figure 4.3 Figure 4.2 Modified Landscape in the lower south eastern parts of the proposed allotment with the adjacent Open Forest (left of photo)

4.2.3 Golf Fairways, Greens & Tees

These areas consist of open turf dominated by mown exotic grass.

Figure 4.4 Typical view of the Golf Fairways, Greens & Tees lines with adjacent trees forming part of the Modified Landscape.

4.3 habitats within the golf course adjacent the site

Immediately to the north and north east of the site, the habitats on the golf course are similar to the Modified Landscape (refer 4.2.2) and the Golf Fairways, Greens & Tees (refer 4.2.3) with open areas of mown grass and predominately indigenous trees. The trees are characteristic of Coastal Enriched Sandstone Moist Forest (OEH, 2009).

Within the golf course land approximately 1.4ha of bushland remains on the steeper slopes approximately 50m to the north west of the site. The vegetation and habitats in this area are undisturbed and are typically of the Coastal Enriched Sandstone Moist Forest.

To the south west of the site, the topography on the golf course grades into flat low lying areas through which runs an open channel watercourse. The vegetation in this area is characterized by Swamp Mahogany (*Eucapyptus robusta*) and Cabbage Palms (*Livistiona australis*). Although this area is predominately cleared and currently used as golf fairways and greens the remnant trees are characteristic of the endangered Swamp Sclerophyll Forest. Within these habitats there are 2 Magenta Lilly Pilly (*Syzygium paniculatum*) which are currently listed as endangered species in the schedules of the *Threatened Species Conservation Act (NSW) 1995.*

Figure 4.5 A stand of Cabbage Palms (*Livistona australis*) on the golf course in the lower floodplain habitats adjacent the site.

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4.4 fauna habitats on the site

The site is moderately sloping and terraced in parts and a road cutting is present along a section of Cabbage Tree Road fronting the site. There are no caves or rock undercroft areas and no surface rock boulders are present. The site does not contain a defined watercourse and runoff occurs as overland sheet flow and is piped around the golf greens.

With the exception of the narrow band of Open Forest along the Cabbage Tree Road frontage, the vegetation on the site predominately has an open structure in comparison to native bushland areas.

The trees on the site do not contain large habitat hollows suitable for large forest owls however a several (<10) trees contain smaller hollows. These smaller hollows typically provide breeding refuge for Rainbow Lorikeets (*Trichoglossus haematodus*) or may provide seasonal refuge for some microchiropteran bat species.

There are a number of microchiropteran bat species that are known to occur within the vicinity of the site. Those recorded as part of the fauna survey include White-striped Freetail Bat (*Austronomus australis*), Little Bentwing-bat (*Miniopterus australis*), Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*) and Eastern Freetail Bat (*Mormopterus norfolkensis*). Of these species recoded on the site the Little Bentwing-bat (*Miniopterus australis*), Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*) are not known to roost in trees.

During the nocturnal survey a domestic Cat (*Felis catus*) was observed on the site and in the late afternoon a Fox (*Vulpes vulpes*) was recorded on the site by remote camera. Despite these predators an Australian Brush-turkey (*Alectura lathami*) was recorded by remote camera within the denser vegetation of the Open Forest.

There are no feeding scars on trees typical of those left by Gliders (*Petaurus sp.).* Taking into account the open nature of the majority of the site and the surrounding developed allotments, the site's potential habitat for small mammals is limited to those resilient species typically found in developed or urban areas. These recorded on the site include the introduced Black Rat (*Rattus rattus*) and the native Long-nosed Bandicoot (*Perameles nasuta*). As part of the nocturnal spotlighting a Common Ringtail Possum (*Pseudocheirus peregrinus*) was observed in the lower sub-canopy trees in the Open Forest area and a Common Brushtail Possum (*Trichosurus vulpecula*) was observed in a tree within the Modified Landscape habitats in the south eastern portion of the site.

Rainbow Lorikeets (*Trichoglossus haematodus*) and Noisy Miners (*Manorina melanocephala*) were observed on and adjacent the site and were the dominant bird species. Rainbow Lorikeets (*Trichoglossus haematodus*) were observed using the majority of the smaller tree hollows. Other bird species such as Sulphur-crested Cockatoo (*Cacatua galerita*), Eastern Rosella (*Platycercus adscitus eximius*), Australian King-Parrot (*Alisterus scapularis*), Laughing Kookaburra (*Dacelo novaeguineae*) and Australian Raven (*Corvus coronoides*) were also observed on the site. These species are considered to be typical of the resilient and aggressive avifauna found in urban areas where some tree cover remains and these species are known to adapt and survive well in developed open space areas and urban landscapes.

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The range and populations of several native hollow using bird species has increased significantly since European settlement (Gibbons & Lindenmayer, 2002) and these species typically include Rainbow Lorikeet (*Trichoglossus haematodus*) and Sulphur-crested Cockatoo (*Cacatua galerita*). Being more resilient to habitat modification and/or aggressive to other species, these species tend to dominate where there is competition for nest sites.

Noisy Miners (*Manorina melanocephala*) are also known to defend territories and aggressively drive other bird species away. It is thought that aggressive species particularly Noisy Minors (*Manorina melanocephala*) may be displacing the threatened species Regent Honeyeater (*Xanthomyza phrygia*) (Franklin et al., 1989, Grey et al., 1998).

Fauna that do not reside locally and have broader foraging ranges are expected to be able to frequent the site. Some of these species such as the Grey-headed Flying-fox (*Pteropus poliocephalus*) and Powerful Owl (*Ninox strenua*) are listed in the schedules of the *Threatened Species Conservation Act (NSW) 1995.*

Avifauna studies in urban areas have identified that many bird species are selective in their habitat and foraging range, depending upon the extent of tree cover (Catterall, Green & Jones 1991). Certain species are restricted to forest areas, others prefer the forest edges, some have a preference for treed suburbs and others favour urban areas with little tree cover. Although the study was restricted to birds they can be considered surrogate indicators for the types of fauna species expected to be found.

The faunal composition in the study area is considered to be consistent with that found in the local developed open space and urban areas and in particular those areas where tree hollows occur locally and some tree canopy remains. The faunal compositions in these areas tend to be:

- aggressive or dominating species such as Rainbow Lorikeet (*Trichoglossus haematodus*) and Noisy Miner (*Manorina melanocephala*);
- resilient and adaptable species such as Common Brushtail Possum (*Trichosurus vulpecular);*
- species that reside off site in larger bushland reserves and have broad foraging ranges such as Powerful Owl (*Ninox strenua*) and Grey-headed Flying-fox (*Pteropus poliocephalus),* and
- occasional species that seasonally migrate from other areas and take advantage of breeding and foraging opportunities such as Channel-billed Cuckoo (*Scythrops novaehollandiae)*.

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4.5 local habitat connectivity

The site is within Bayview Golf Course which is a large open space area approximately 1.0km long (east-west) and approximately 250m wide (north south).

The golf course is identified as being within a wildlife corridor in Pittwater Council's mapping associated with the Pittwater DCP.

Natural bushland habitats to the west of the golf course are located on private land and these form part of the Warriewood Escarpment. To the east of the golf course, natural habitats occur on the western foreshore of Winnererremy Bay as a small area of less than 5ha.

To the north and south of the golf course the land is developed for residential purposes and contains tree canopy cover that varies from moderate to sparse.

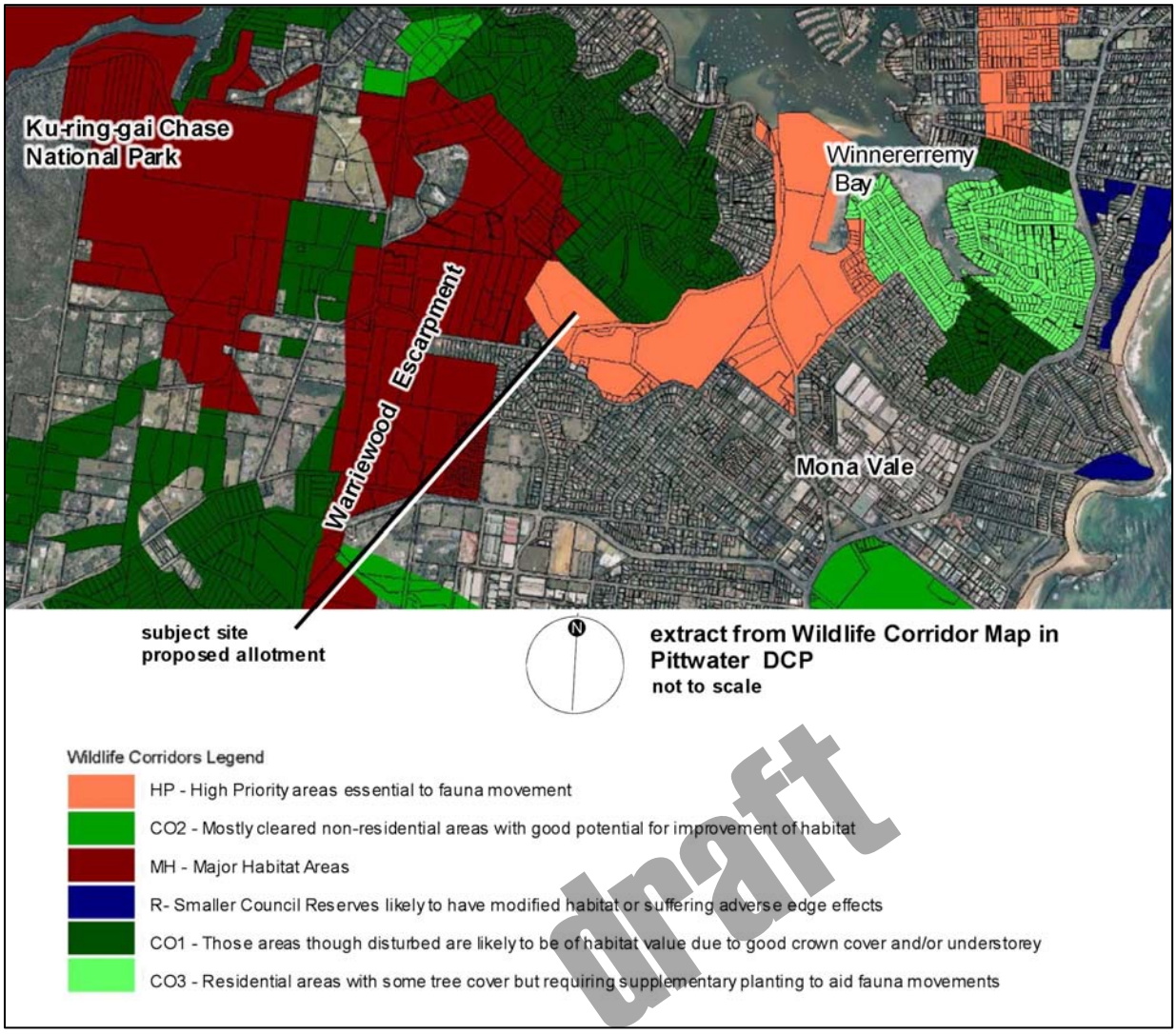

Figure 4.6 Extract from Wildlife Corridor Map in Pittwater DCP.

4.6 use of modified environments by wildlife

The movement of fauna across fragmented landscapes in urban areas greatly varies depending upon the species considered.

Threatened species such as the Powerful Owl (*Ninox strenua)* and Grey-headed Flying-fox (*Pteropus poliocephalus)* do not require contiguous vegetation or natural habitats to move between foraging and breeding sites. A pair of Powerful Owls are known to breed over successive years on a developed residential allotment in Avalon where remnant trees occur in a developed urban area. The Grey-headed Flying-fox (*Pteropus poliocephalus)* is also known to roost in colonies in developed areas in Avalon and the Sydney Botanical Gardens.

Fragmented landscapes are also not an impediment to the movement of common species such as Sulphur-crested Cockatoo (*Cacatua galerita*), Rainbow Lorikeet (*Trichoglossus haematodus*), Long-nosed Bandicoot (*Perameles nasuta*), Common Brushtail Possum (*Trichosurus vulpecula*) and Noisy Miners (*Manorina melanocephala*). Other species such as Long-nosed Bandicoot (*Perameles nasuta*) survive in urban areas in the absence of natural habitats in Pittwater and in Manly.

The majority of indigenous flora species on and adjacent the site rely on invertebrate and vertebrate fauna for pollination and seed dispersal. The Grey-headed Flying-fox pollinates Eucalypts and other species and individuals have been recorded travelling 100's of kilometres within weeks (Eby 1991, Spencer et al 1991) and nightly foraging distances from roosting camps are commonly 20km and can be up to 50km (Eby 1996). The gene flow through pollination by Grey-headed Flying-foxes is not reliant on contiguous vegetation links.

The dispersal of seed/fruit from species such as Magenta Lillypilly (*Syzygium paniculatum*) by Grey-headed Flying-foxes and Pied Currawong (*Strepera graculina*) is also not restricted or reliant on contiguous vegetation links.

Some flora species rely on insects for pollination and the movements of European and native bees are not restricted by fragmented landscapes.

Corridors of dense vegetation can facilitate the movement of ground dwelling fauna such as frogs, amphibians, reptiles and mammals and smaller sensitive insectivorous birds, however the golf course does not contain contiguous large areas of undisturbed habitats where native vegetation occurs as canopy trees with dense understorey and ground covers.

The narrow band of Open Forest along the Cabbage Tree Road frontage despite having a complex structure does not contain sensitive bird species such as *Spotted Pardalote (Pardalotus punctatus),* White-cheeked Honeyeater *(Phylidonyris nigra),* White-browed Scrubwren (*Sericornis frontalis*) and *Superb Fairy-wren (Malurus cyaneus*). Fauna species recorded using this dense band of vegetation include Black Rat (*Rattus rattus*) and the native Long-nosed Bandicoot (*Perameles nasuta*) Common Ringtail Possum (*Pseudocheirus peregrinus*) and Australian Brush-turkey (*Alectura lathami*).

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4.7 critical habitat

Critical habitat is declared under the provisions of the *Threatened Species Conservation Act 1995 (NSW)* and this site is not listed as being part of any gazetted critical habitat. Currently the critical habitats listed in the schedules of the Act are

- Gould's Petrel;
- Little Penguin habitat in Sydney's North Harbour;
- Mitchell's Rainforest Snail in Stott's Island Nature Reserve;
- *Wollemia nobilis* (The Wollemi Pine);
- *Bomaderry zieria* within the Bomaderry bushland - critical habitat recommendation, and
- Eastern Suburbs Banksia Scrub Endangered Ecological Community - critical habitat recommendation.

The site is not considered to be critical habitat for the purposes of the *Threatened Species Conservation Act 1995 (NSW)*.

Figure 4.7 Unfortunate fate of a Grey-headed Flying-fox (*Pteropus poliocephalus)* in overhead power lines at the front of the site on Cabbage Tree Road.

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5. proposed development

5.1 nature of development impacts

In terms of the ecology, biophysical changes to the site can have impacts that are:

- direct, affecting the site, or
- indirect, affecting the down stream or adjacent environment.

These impacts can also be considered as being:

- short term, during construction / demolition activities, or
- long term, extending over the life of the development and are influenced by the development design.

Impacts on the natural environment, whether direct or indirect, short term or long term are also considered generally in the context of having either a negative or positive effect.

5.2 existing site & proposed developments

The existing site has an area of 20,000 m^2 and is described as consisting of a narrow band of Open Forest along the Cabbage Tree Road frontage, modified tree landscapes and golf fairways, greens & tees.

The proposed development involves subdivision of part of the golf course and construction of a seniors living facility with a basement level car park (Marchese, 2014).

5.3 scope of development impact

The scope of the development impact is based upon the survey (Bee & Lethbridge, 2014), architectural plans Proposed Site Plan (Marchese, 2014), Arboricultural Impact Assessment (Footprint Green, 2014) and field surveys and habitat assessments in this report,

The existing subject site has an area of 20,000 m^2 and is described as:

- Open Forest 1,375m^2;
- Modified Landscape 7,150m^2, and
- Golf Fairways, Greens & Tees 11, 475 m^2.

The proposed development will involve;

- creation of the allotment of 20,000 m^2:
- retention of the Open Forest habitats 1,375m^2;
- retention of part of Modified Landscape habitats 1,215m^2
- landscaping of mown grass areas outside the basement car park 5,106m^2 ,
- landscaping above the basement car park outside the building footprints 2800m^2.

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Although it is difficult, if not impossible, to consider ecological boundaries at such a small scale, it is useful for the purposes of assessing the scope of the impacts in the following sections.

5.3.1 Direct long term negative impacts

From an ecological perspective the proposed development involves:

- removal of 5,935m^2 of Modified Landscape habitats involving the removal of 136 trees the majority of which are characteristic of Coastal Enriched Sandstone Moist Forest, and
- removal of 5,865 m^2 of Golf Fairways, Greens & Tee habitats.

5.3.2 Indirect long term negative impacts

5.3.2.1 Hydrological impacts

The proposed development will involve an increase in the built upon area. With the increase of impervious surface area there is the potential for an increase in the peak flows in the watercourse during rain events. Taking into account the developed nature of the catchment and current land uses, the ecological impact in the down stream environments and in the receiving waters is considered to be negligible with adequate onsite detention controls.

5.3.2.2 Ecological impacts

The habitats to be removed are currently modified and the vegetation structure is simplified, consisting of indigenous trees in open mown grass areas. Although the habitats are modified these trees provide a contribution to the local ecology by providing seasonal foraging opportunities and refuge for primarily bird species and potentially bat species. Taking into account the vegetation to be retained on the golf course, the proposed development is unlikely to have a significant impact on common urban fauna populations and it is unlikely that the development will restrict the movement of common fauna between local and regional habitats. Detailed assessments on the impact on threatened species are considered in the following sections of this report.

5.3.3 Potential indirect short term negative impacts

Redevelopment of the site will have some short-term impacts associated with building activities including noise and soil disturbance.

5.3.3.1 Noise during construction

Taking into account the typical urban fauna found on site and within the surrounding areas, there may be some displacement of native fauna whilst works are in progress. The ecological impact is considered to be minimal after considering the habitats to be retained on the golf course and the ability of common native fauna to utilise adjoining habitats. Whilst there may be some temporary displacement of more common native fauna as a result of construction noise a detailed assessment on the impact on threatened species is considered in the following sections.

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5.3.3.2 Soil disturbance during construction

During construction soil disturbance will occur. To minimise the impact on the natural environment and the receiving waters down stream standard industry erosion & sediment controls will need to be in place and maintained. These are typically overcome and dealt with as conditions of consent and site management.

5.4 opportunities to minimise the impact on the local ecology

To minimize the impact on the local ecology consideration should be given to replenishment of the indigenous tree canopy within the golf course land. Realignment of the golf fairways, particularly adjacent the north western portion of the proposed allotment could be utalised for tree planting, however being within a bushfire prone area, it is unlikely that dense understorey plantings could be carried out.

There are some (<10) trees proposed to be removed that contain small hollows. Whilst the majority of these smaller hollows are being used by Rainbow Lorikeets (*Trichoglossus haematodus*) consideration should be given to the installation of roost boxes specifically designed for microchiropteran bats.

6. relationship between threatened species and site habitats

6.1 threatened species habitat assessment

The following assessment is made of the species, communities or populations identified in the previous data tables despite whether they were recorded as part of this survey or have been recorded previously in the vicinity of the site. The following habitat assessment takes into account the habitats on the site and the relationship between these habitats and those of threatened species, communities and populations.

In accordance with the Threatened Species Assessment Guidelines (OEH, 2007) if adequate surveys/studies have been carried out that clearly show that a species: does not occur within the study area; will not use the habitats on the site on occasion, or will not be influenced by off-site impacts, the species does not need further consideration.

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6.2 threatened flora habitat assessment

Conservation Status	Genus species	Common Name	Habitat Requirements	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✕ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW)*						
Vulnerable NSW, Cwth	*Boronia umbellata*	Orara Boroonia	The species is found at only a few locations between Glenreagh and Lower Bucca, north of Coffs Harbour, but it is locally common in the restricted area where it occurs (OEH, 2005). The species has been confused wirh B. rubiginosa and B. keysii but differs in its leaflet morphology (Weston 1990). This species occurs in coastal ranges, in sclerophyll forest on sandstone & metasediments at 100-600 m alt. (Weston 1990) and also occurs in (or is likely to occur in) heath, mainly at low to medium altitudes.	1	Habitat not present, unlikely to occur	✕
Vulnerable NSW	*Callistemon linearifolius*	Netted Bottle Brush	The species has been recorded growing in dry sclerophyll forest on the coast and adjacent ranges. Its known distribution occurs from the Georges River to Hawkesbury River in the Sydney area and north to Nelson Bay. Other records in 2000 have been from Coal Cliffs in the Southern Rivers CMA. Within the Sydney area, recent records are predominately limited to the Hornsby Plateau area near the Hawkesbury River and 4 records of the species also occur within Pittwater. Currently only 5-6 populations of the previous 22 populations remain. Three of these populations occur within Ku-ring-gai Chase National Park, Lion Island Nature Reserve, and Spectacle Island Nature Reserve.	3	Habitat not present, unlikely to occur	✕
Vulnerable NSW, Cwth	*Cryptostylis hunteriana*	Leafless Tongue-orchid	The species flowers from December through to February, often in association with *Cryptostylis erecta* and *Cryptostylis subulata*. Flowers are green, red, black, and are carried on an auxiliary (lateral) raceme. It is chiefly a coastal species but can be found in a range of habitats including areas bordering swamps to open forest. This species, favours dry sclerophyll forests, heaths, dunes (including stabilised sands), riparian areas, swampy forests, swampy areas and wetlands.	1	Some potential habitat within the Open Forest which is to remain on site	✕
Vulnerable NSW	*Epacris purpurascens var. purpurascens*	-	*Epacris purpurascens var. purpurascens* is found at 30 locations in and around Sydney extending from Gosford in the north, Narrabeen in the east, Silverdale in the west and Avon Dam vicinity in the south. Its habitat consists of ridgetop drainage depressions supporting wet heath within or adjoining shale cap communities such as Stringybark and Ironbark woodlands and various shale/sandstone transition forest (OEH, 2002).	1	Some potential habitat within the Open Forest which is to remain on site	✕
Vulnerable NSW, Cwth	*Eucalyptus camfieldii*	Heart-Leaved Stringybark	This species is found on lateritic soils of the Mittagong formation and in Hawkesbury sandstone. Usually located on upper slopes and ridge tops its habitat is characterized by well drained soils and associated with dry sclerophyll woodlands and scrub.	8	Habitat not present, unlikely to occur	✕
Vulnerable NSW	*Eucalyptus nicholii*	Narrow-Leaf Peppermint	The species is endemic on the northern tablelands of NSW however it is widely planted as an urban street tree and in gardens It is quite rare in the wild and is confined to the New England Tablelands of NSW, where it occurs from Nundle to north of Tenterfield, largely on private property. The species grows in dry grassy woodland, on shallow and infertile soils, mainly on growing on porphyry or granite soils (Brooker & Kleinig, 1999).	4	Outside the natural range of the species	✕
Endangered NSW, Cwlth	*Grevillea caleyi*	Caley's Grevillea	This species typically grows on Mittagong soil landscapes characterized by lateritic soils rich in iron and can be associated with the Duffys Forest vegetation association.	23	Habitat not present, unlikely to occur	✕

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Conservation Status	Genus species	Common Name	Habitat Requirements	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✕ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW)*						
Endangered NSW, Cwlth	*Persoonia hirsuta*	Hairy Geebung	The species typically grows on sandstone amongst heath and low woodland. It has been recorded growing in the Duffy's Forest association on lateritic soils. It occurs in small numbers in woodlands and dry sclerophyll forest on sandstone and is known from a number of locations from Gosford and Hill Top to Glen Davis, at Putty and in the Royal National Park.	5	Habitat not present, unlikely to occur	✕
Vulnerable NSW, Cwth	*Pimelea curviflora var. curviflora*	Curved Rice-flower	This species is confined to the coastal areas around Sydney found growing on Hawkesbury sandstone (Harden 2000) or on lateritic soils in similar habit to that occupied by the Duffys Forest association (Smith & Smith 2000).	1	Habitat not present, unlikely to occur.	✕
Vulnerable NSW, Cwth	*Syzygium paniculatum*	Magenta Lillypilly	The species has been known to be associated with coastal dunes and Littoral Rainforest and is also found in riparian habitats (Payne 1997). The species has been commercially propagated and sold and is known to have been planted in a variety of urban habitats. The species been recorded growing on moist slopes on Narrabeen Group geology (Smith & Smith 2000).	15	Some potential habitat within the Open Forest which is to remain on site	✕
Vulnerable NSW, Cwth	*Tetratheca glandulosa*	Glandular Pink-bell	This species typically grows on dryer open sites of Hawkesbury sandstone and can be found in open forests, woodlands and scrub. Grows in sandy or rocky heath or scrub (Gardner & Murray ex. Harden 1992).	20	Habitat not present, unlikely to occur.	✕

6.3 threatened fauna habitat assessment

Conservation Status (NSW)	Class	Genus species	Common Name	Habitat	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✕ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW*							
Vulnerable NSW, Cwth	Amphibia	*Heleioporus australiacus*	Giant Burrowing Frog	Sandy soil on sandstone ridges where sandy creek banks provide opportunities for burrowing. Tadpoles are typically found in rocky pools in the upper reaches of permanent and ephemeral creeks (Mahoney 1993)	18	Habitat not present, unlikely to occur.	✕
Vulnerable NSW	Amphibia	*Pseudophryne australis*	Red-crowned Toadlet	Red-crowned Toadlets do not usually live along permanent flowing water courses such as occur in gullies, instead preferring permanently moist soaks, areas of dense ground vegetation or litter along or near head-water stream beds. It is known to inhabit upper forested slopes and ridges on Hawkesbury sandstone or Narrabeen group preferring is moist sandstone habits with grass and debris near ephemeral watercourses. Red-crowned Toadlets have not been recorded breeding in permanently flowing streams or waters that are even mildly polluted (OEH, 2002).	21	Habitat not present, unlikely to occur.	✕

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Conservation Status (NSW)	Class	Genus species	Common Name	Habitat	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✖ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW*							
Endangered NSW, Cwth	Aves	*Xanthomyza phrygia*	Regent Honeyeater	Once considered abundant across south-eastern Australia its population is in decline (Garnett 1992), In New South Wales, the species are mostly recorded in forest associations of box/ironbark and they prefer the wetter sites within these associations. Riparian forests of *Casuarina cunninghamiana* (River Oak) with *Amyema ambagei*, (Needle-leaf Mistletoe) are also important for feeding and breeding. Nectar is the principal food, but sugary exudates from insects are also used, and insects are essential for breeding (Oliver, 1998, 2000). Important feed trees are *Eucalyptus sideroxylon* (Mugga Ironbark), *Eucalyptus albens* (White Box), *Eucalyptus melliodora* (Yellow Box) and *Eucalyptus leucoxylon* (Yellow Gum) however the species also use other woodland types and wet lowland coastal forest dominated by *Eucalyptus robusta* (Swamp Mahogany) or *Corymbia maculata* (Spotted Gum) when shortages of preferred food trees occur (Franklin et al., 1989, Ley and Williams, 1992, Webster and Menkhorst, 1992, Geering and French, 1998, Oliver, 1999). It is thought that aggressive species particularly *Manorina melanocephala* (Noisy Miner) may be displacing the Regent Honeyeater (Franklin et al., 1989, Grey et al., 1998).	4	Core breeding habitat not present, low seasonal foraging habitat present likely to be displaced by urban avifauna, unlikely to occur.	✖
Endangered NSW	Aves	*Burhinus grallarius*	Bush Stone-curlew	The species is widespread in northern & north eastern Australia. Once common along the east coast of NSW, records indicate the species has contracted in range to Gosford, Port Stevens, Grafton, Karuah and Port Macquarie, Their habitat is considered to be eucalypt woodland with dry grassy understorey although recent records indicate that typical habitats are associated with mangrove, saltmarsh, and Swamp Oak (*Casuarinia glauca*) forest (Smith & Smith 2000).	17	Some potential foraging habitat within the Open Forest and Modified Landscape habitats on the site	✔
Vulnerable NSW	Aves	*Callocephalon fimbriatum*	Gang-gang Cockatoo	With a range restricted to south eastern NSW and south eastern Victoria the species feeds on terminal leaves of eucalypts or in hawthorn hedges and nests in deep hollows in eucalypts (Slater 1993). The species occurs in a variety of forests and woodlands and the last known breeding population in metropolitan Sydney area is in the Hornsby/ Ku-ring-gai area. The species shows a strong nest site fidelity (NSW Scientific Committee 2001).	1	Core breeding habitat not present, some foraging potential.	✔
Vulnerable NSW	Aves	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	Considered rare in a national context, but moderately common in N.S.W. Because of its dependence on one type of food it is considered to be vulnerable. It nests in large hollows of dead trees and roosts in both wet and dry eucalypts, feeding in open Casuarina woodland, primarily where the Black She-oak (*Allocasuarina littoralis*) and Forest Oak (*Allocasuarina torulosa*) occurs.	34	Core breeding habitat not present, some potential foraging habitat present	✔
Endangered NSW, Vulnerable Cwth	Aves	*Diomedea exulans*	Wandering Albatross	The species breeds in Australia, South Africa and South Georgia and in Australia it breeds on Macquarie Island. The immature birds remain at sea for the first 3-11 years of their life, until they return to their natal colony (DoE,2001).	2	Habitat not present, unlikely to occur.	✖

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Conservation Status (NSW)	Class	Genus species	Common Name	Habitat	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✘ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW*							
Vulnerable NSW	Aves	*Glossopsitta pusilla*	Little Lorikeet	Little Lorikeet occur along the east coast of Australia from Cairns to Adelaide. In New South Wales their distribution extends from the coast to the western slopes of the Great Dividing Range to Albury, Parkes, Dubbo and Narrabri (Barrett et al. 2003).They are generally considered to be nomadic and individuals can at any time of year when nectar and pollen, particularly on profusely-flowering eucalypts, is available. The species also feed on flowering Melaleucas and Mistletoes. (NSW Scientific Committee, 2009). Little Lorikeets nest in small hollows usually in live trees and nest-hollows are used "traditionally", with the same hollow known to be occupied for at least 29 years (not necessarily by the same individuals) (Courtney & Debus 2006). The breeding season extends from May to September (Higgins 1999).	3	Some potential breeding and foraging habitat	✔
Vulnerable NSW	Aves	*Haematopus fuliginosus*	Sooty Oystercatcher	Sooty Oystercatchers are found around the entire Australian coast, and the offshore islands, being most common in Bass Strait. Small numbers of the species are evenly distributed along the NSW coast. The species breeds in spring and summer, almost exclusively on offshore islands, and occasionally on isolated promontories (OEH, 2005) and is not known to breed in northern Sydney (Smith & Smith 2000). The species foraged on inter-tidal rock platforms along the coast favouring rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries where it feeds limpets and mussels.	1	Habitat not present, unlikely to occur.	✘
Vulnerable NSW	Aves	*Hieraaetus morphnoides*	Little Eagle	The Little Eagle occurs throughout Australia and occupies habitats that are rich in prey within open eucalypt forest, woodland or open woodland habitats. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. The species nests in tall living trees within a remnant patch of vegetation, where pairs build a large stick nest in winter and lay in early spring. The species preys on birds, reptiles and mammals and occasionally large insects (NSW Scientific Committee, 2009).	2	Not considered to be core breeding habitat, low foraging potential, unlikely to occur.	✘
Endangered NSW, Cwlth	Aves	*Lathamus discolor*	Swift Parrot	The Swift Parrot inhabits eucalypt forests and breeds in hollows of mature and senescing trees in Tasmania. On the mainland it feeds off winter flowering Eucalypts although it will also feed on lerps, honeydew, Banksia nectar, fruits, seeds and other plant material as well as insects and their larvae (Forshaw & Cooper 1981, Garnett 1992). In New South Wales important foraging tree species include, *Eucalyptus macrocarpa* (Grey Box), *Eucalyptus sideroxylon* (Mugga Ironbark) on the western slopes and *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus fibrosa* (Red Iron Bark), *Corymbia maculata* (Spotted Gum), *Eucalyptus robusta* (Swamp Mahogany) and *Corymbia gummifera* (Red Bloodwood) (Swift Parrot Recovery Team, 2000). Since 1980 there have been some 60 sightings recorded in the Wildlife Atlas database (OEH 2010) within the Sydney Metropolitan Areas and locally small flocks were reported at Ingleside in 1986 (Cooper 1990). In 1938 hundreds of Swift Parrots were reported feeding in *Eucalyptus robusta* (Swamp Mahogany) in Warriewood (Hindwood 1939).	6	Core breeding habitat not present, low foraging potential, unlikely to occur	✘

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Conservation Status (NSW)	Class	Genus species	Common Name	Habitat	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✘ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW*							
Vulnerable NSW	Aves	*Ninox connivens*	Barking Owl	The species can be found inhabiting eucalypt forests, paperbark and other woodlands, dense scrubs, foothills; river red gums and other large trees near watercourses. The species is dependant on large hollows of mature eucalypts for nests. The bird feeds on prey such as rabbits, rats, gliders and birds such as Rosella and starlings (Smith & Smith 2000).	9	Core breeding habitat not present, moderate foraging potential.	✔
Vulnerable NSW	Aves	*Ninox strenua*	Powerful Owl	The species has a range of 400 -1500ha (Davey 1993) and is known to nest in hollows in Eucalypts between 9-37m above ground usually in secluded well-vegetated gullies and usually occupying the largest emergent trees. Powerful Owls live alone or in pairs which occupy a permanent territory containing a number of roost sites and one or more nesting sites. The species feeds over a large range on small to medium sized mammals, including gliders, ringtail possum and immature brushtail possums.	46	Core breeding habitat not present, moderate foraging potential.	✔
Vulnerable NSW	Aves	*Pandion cristatus*	Eastern Osprey	In NSW, the breeding population occurs from the Queensland border (contiguous with the Queensland population) south to Gosford and recently (2005-2014) to Sydney, with a more recent (2008) breeding attempt recorded further south at Ulladulla, where a bird has been observed nest-building (NSW Scientific Committee, 2009). The Eastern Osprey forages over clear estuarine and inshore marine waters and coastal rivers, and nests in tall (usually dead or dead-topped) trees in coastal habitats from open woodland to open forest, within 1-2 km of water. Its preferred habitat is sheltered waters in bays estuaries and coastal river. In NSW their diet consisted primarily of mullet species, particularly the Sea Mullet (*Mugil cephalus*), and Yellowfin Bream (*Acanthopagrus australis*). Resident pairs of Eastern Ospreys defend exclusive breeding territory from against other Ospreys and other raptors.	6	Core breeding habitat not present, low foraging potential, unlikely to occur	✘
Vulnerable NSW	Aves	*Ptilinopus superbus*	Superb Fruit-Dove	It is a nomadic species known to occur from Indonesia, New Guinea, and north-eastern Queensland. It is considered to be a regular Autumn Winter migrant to the Hunter, Sydney and Illawarra regions. It is a common species in much of its usual range in northern Australia and is considered a vagrant but scarce species in N.S.W. (Slatter 1993).	1	Not considered to be core breeding habitat, low foraging potential, unlikely to occur.	✘
Vulnerable NSW, Cwth	Aves	*Thalassarche cauta*	Shy Albatross	Shy Albatross is a large albatross with a wide distribution in the southern hemisphere. In Australia it breeds on islands off Tasmania, but is a visitor to New South Wales waters. Birds in NSW waters may include individuals from New Zealand Colonies (NSW Scientific Committee, 1997)	3	Core breeding habitat not presen, unlikely to occur	✘
Vulnerable NSW, Cwth	Aves	*Thalassarche melanophris*	Black-browed Albatross	The species breeds in Australia, New Zealand, Chile South Georgia and the Falkland Islands. In Australia it breeds on Heard Island, McDonald Island, Macquarie Island, Bishop and Clerk Islets. In Australia it forages along the southern coasts (sometimes entering bays and harbours) from Brisbane around to Perth. (DoE, 2001).	1	Core breeding habitat not present, unlikely to occur.	✘

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Conservation Status (NSW)	Class	Genus species	Common Name	Habitat	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✗ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW*							
Vulnerable NSW	Mammalia	*Cercartetus nanus*	Eastern Pigmy-possum	The species is found in a range of habitats from rainforest, sclerophyll forests to sclerophyll tree heath and the species range extends from south eastern Qld to south eastern SA and Tasmania (Australian Museum 2000). It feeds primarily on nectar and pollen from banksias, eucalypts and callistemon. It is generally nocturnal and whilst preferring to nest in small tree hollows it has been found in small constructed nests of shredded bark. It appears to be solitary with males having a range of about 0.68 ha and females having a range of 0.35 ha (Turner & Ward 2000).	29	Low foraging potential, unlikely to occur.	✗
Vulnerable NSW, Endangered Cwth	Mammalia	*Dasyurus maculatus*	Spotted-tailed Quoll	Found in a range of habitats and generally prey on medium size mammals and birds such as possums, small wallabies, rats, birds, domestic fowl, bandicoots, rabbits and also feed on insects and carrion. It is estimated that the range of the species is in the order of 750 ha (females) – 3500ha (males) using hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites.	5	Habitat not present, unlikely to occur.	✗
Endangered NSW	Mammalia	*Dugong dugon*	Dugong	The Dugong is one of only four extant sirenian mammals. They are unique amongst marine mammals by being almost entirely herbivorous. The Dugongs main food is seagrass, and to a much lesser extent marine algae when seagrass is scarce. Individuals are known to occasionally take marine invertebrates such as mussels and tunicates (Heinsohn 1995). The Dugong does not breed in NSW, however habitat and resources within the state remain important to visiting individuals. Prior to 1992, only 14 Dugong records were known for NSW. A further 50 individuals, many of them dead, were recorded in NSW between 1992 and 1993.	1	Habitat not present, unlikely to occur.	✗
Vulnerable NSW, Endangered Cwlth	Mammalia	*Eubalaena australis*	Southern Right Whale	Southern right whales inhabit sub-antarctic waters where the main summer feeding grounds are thought to be between 40° and 55° S, but have been documented in latitudes south of 60° S. The species generally spends winters in warmer waters, with current strongholds off eastern South America, South Africa, southern Australia, and in the vicinity of oceanic islands at Tristan da Cunha and Auckland Island, New Zealand. Southern right whales feed predominantly on copepods, krill and other swarming zooplankton, Important calving areas in Austraila are Doubtful Islands Bay, Israelite Bay area, Twilight Cove, Flinders Bay, Albany/Cape Riche area, and Yokinup Bay/Cape Arid area in Western Australia; Head of the Bight, Fowlers Bay, and Encounter Bay in South Australia and Warrnambool in Victoria (DoE, 2005)	3	Habitat not present, unlikely to occur.	✗

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Conservation Status (NSW)	Class	Genus species	Common Name	Habitat	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✗ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW*							
Endangered NSW, Cwlth	Mammalia	*Isoodon obesulus obesulus*	Southern Brown Bandicoot (eastern)	The species has a patchy distribution along the southeast coast in NSW and reaches its most northern limit at the Hawkesbury River and has been recorded in the larger tracts of bushland in Ku-ring-gai Chase, Garigal National Parks and in Nadgee Nature Reserve. This species prefers sandy soil with scrubby vegetation and /or areas of low ground cover that is periodically burnt (Braithwait 1995). The species displays a preference for regenerating sites following disturbance (OEH, 2006) The species is known to feed on ants, beetle larvae and plant material and some fungal species and whilst recorded in Ku-ring-gai Chase and Garigal National Parks. The species is not known to occur in small patches of bushland <40ha in size (Atkin, 1983) and adjacent the urban / bushland interface. The Long-nosed Bandicoot is common in smaller reserves and urban areas of Pittwater.	28	Not considered to be core breeding or foraging habitat, unlikely to occur.	✗
Vulnerable NSW, Cwth	Mammalia	*Megaptera novaeangliae*	Humpback Whale	Humpback whales are distributed throughout Australian Antarctic waters, and Commonwealth offshore waters, and have been sighted in all State waters and recently in the Northern Territory. In Victoria, there are reports of humpback whales throughout state waters, including in Port Phillip Bay. Humpback whales have been sighted in the northern waters of the Great Barrier Reef (GBR) between October and January. Humpback whale feeding primarily occurs in Antarctic waters south of about 55°S. In general, most feeding occurs between 70°E and 130°E for west coast population, and 130°E and 170°W for the east coast population Calving occurs in tropical coastal waters However, exact locations have not yet been identified and births are rarely observed. Exact locations of mating grounds are also unknown, although much mating activity has been reported from the central Great Barrier Reef area. There is probably a wide range of opportunity for breeding, over several degrees of latitude on each coast (DoE 2005).	2	Habitat not present, unlikely to occur.	✗
Vulnerable NSW	Mammalia	*Miniopterus australis*	Little Bentwing-bat	The distribution of the species is primarily along the eastern coast of Australia extending from Cape York to Taree in NSW. Incidental records have been recently in the Sydney and Hunter Region. There is some evidence that pregnant females from the Central Coast and Lower Hunter district migrate north every winter (Williams R. pers com.) The nearest known breeding colony is Willi Willi Caves near Kempsey. It appears that the southern most breeding population seem to depend upon the larger nursery colony of *Miniopterus schreibersii* (Eastern Bentwing-bat) to produce higher ambient temperatures to rear its young (Australian Museum 2000). The species roosts in caves or tunnels and feeds on insects flying beneath the tree canopy.	4	Core breeding habitat not present, unlikely to occur.	✗

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Conservation Status (NSW)	Class	Genus species	Common Name	Habitat	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✘ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW*							
Vulnerable NSW	Mammalia	*Miniopterus schreibersii oceanensis*	Eastern Bent-wing Bat	The species has been recorded along the north coast of Australia from Qld to Vic and parts of northern WA and NT. Having been recorded in a variety of habitats it is typically found in well-timbered valleys. It roosts during the daylight hours in caves and has been recorded roosting in large storm water pipes. They fly quickly above tree tops in valleys, making fast dives to catch prey which are insects, mostly moths.	13	Core breeding habitat not present, moderate foraging potential.	✔
Vulnerable NSW	Mammalia	*Mormopterus norfolkensis*	Eastern Freetail Bat	Has a range along the eastern coastal strip Australia extending from southern Queensland to southern NSW. Has been recorded roosting in tree hollows and feeds on flying insects. They forage above the tree canopy in forests or along the edges of forests. (Australian Museum 1999), (Allison & Hoye 1995). The habitat preference of this species is unclear. It has been predominantly recorded in dry eucalypt forest and woodland, but has been recorded in moist and edge environments. The wing morphology indicates that this species is adapted to the more open habitats.	1	Core breeding habitat not present, moderate foraging potential.	✔
Vulnerable NSW	Mammalia	*Myotis macropus*	Southern Myotis	Has a range extending along the coastal areas of Australia from Victoria through NSW and Qld to NT and northern WA. The species is roosts in caves or overhangs never far from water bodies such as lakes streams and reservoirs. Their main diet is aquatic insects and is also is known to feed of flying insects (Richards 1995).	2	Core breeding habitat not present, unlikely to occur.	✘
Vulnerable NSW	Mammalia	*Petaurus norfolcensis*	Squirrel Glider	The glider inhabits sclerophyll forests and woodlands of south eastern Australia extending from Vic. to Nth Qld. In NSW and Qld the species inhabits coastal forests and in some wet forests bordering on rainforest. They have been found in a range of habitats from forests, low woodlands and scrub. The availability of all year round nectar or sap is considered as the critical factor determining their presence. Important food sources are likely to be *Banksia integrifolia*, *Corymbia maculata* in winter and Banksia serrata and *Eucalyptus paniculata* in summer (Smith & Smith 2000). The Squirrel Glider feeds on insects (beetles and caterpillars) the gum and seeds of acacias the sap, nectar and pollen of eucalypts. Individual gliders have been recorded to range over an average of 3 ha (Quin 1995).	1	Core breeding habitat not present, limited foraging potential.	✘

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Conservation Status (NSW)	Class	Genus species	Common Name	Habitat	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✘ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW*							
Vulnerable NSW	Mammalia	*Phascolarctos cinereus*	Koala	Koalas are generally solitary except during the mating season and have a home range of about 3 hectares. They can roam considerable distances in search of a mate or new food (Phillips 1990) and adolescent males can travel up to 10km in search for a mate. The breeding season begins around September when males commence calling and searching for reproductive females. Feeding on foliage, Koalas have been recorded feeding on tree species from Eucalyptus, Corymbia and Angophora genera. The preferred species of tree varies from region to region (Callaghan & Phillips 1995) and even within a region alternate species of trees may be favoured when growing on different soil landscapes (Jurskis 1996). Typical Koala feed trees in the Berowra Valley include *Angophora costata* (Sydney Red Gum), *Corymbia gummifera* (Red Bloodwood) and *Eucalyptus racemosa* (Narrow-Leaved Scribbly Gum).	63	Core breeding habitat not present, unlikely to forage within densely developed urban areas.	✘
Vulnerable NSW, Cwth	Mammalia	*Pteropus poliocephalus*	Grey-headed Flying-fox	The species has 2 permanent maternal colonies in Sydney at Gordon and at Cabramatta. Other temporary colonies exist at the Botanical Gardens. The species predominately feeds on nectar and when blossoms are unavailable it feeds on fruit.	32	Core breeding habitat not present, moderate foraging potential.	✔
Vulnerable NSW	Mammalia	*Scoteanax rueppellii*	Greater Broad-nosed Bat	The species occurs along the Australian east coast from the New South Wales / Victorian border to Cairns. It is found in a variety of habitats but its slow and direct flight favours habitats such as open woodlands, cleared lands and open creek corridors. It usually flies at a height of 3-6m and feeds off large slow flying insects such as beetles. It is thought that it may also prey on other bats. The species roosts in tree hollows and females congregate in suitable trees to give birth (Hoye & Richards ex Australian Museum 2000).	1	Core breeding habitat not present, limited foraging potential.	✘
Vulnerable NSW, Cwth	Reptillia	*Chelonia mydas*	Green Turtle	Green Turtles are found in tropical and subtropical waters throughout the world (Marquez 1990; Bowen et al. 1992) but normally remain within the northern and southern limits of the 20°C isotherms (Marquez 1990) although individuals have been known to stray into temperate waters (Cogger et al. 1993). There are 4 major breeding units are recognised in Australia and include the southern Great Barrier Reef, northern Great Barrier Reef, Wellesley Island in the Gulf of Carpentaria and the North West Shelf in Western Austalia. Although carnivorous when young (Cogger 2000), Green Turtles are primarily herbivorous, with a major diet of seagrass and algae (Read 1991; Brand-Gardner et al. Cogger 2000). They also feed on a variety of other items including mangrove (Limpus & Limpus 2000), fish eggcases, jellyfish (Limpus et al. 1994).	3	Habitat not present, unlikely to occur.	✘

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Conservation Status (NSW)	Class	Genus species	Common Name	Habitat	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✘ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW*							
Endangered NSW, Cwlth	Reptilia	*Dermochelys coriacea*	Leatherback Turtle	Leatherback Turtles are pelagic feeders, found in tropical, subtropical and temperate waters throughout the world (Marquez 1990). No major nesting has been recorded in Australia, although scattered isolated nesting occurs in southern Queensland and the Northern Territory. Some nesting has occurred in northern NSW near Ballina. However, no nesting has occurred in Queensland or NSW since 1996. The species has been reported from coastal waters from the Sunshine Coast in southern Queensland to central NSW; from Tasmania, Victoria and eastern South Australia and in south-western Western Australia. (DoE 2012).	1	Habitat not present, unlikely to occur.	✘
Vulnerable NSW	Reptilia	*Varanus rosenbergi*	Rosenberg's Goanna /Heath Monitor	The species is typically found in woodland and heathland on sandy soils associated with ridge top plateaus (Smith & Smith 2000). It is diurnal scavenger and shelters in burrows logs and rock crevices (Cogger 2000). It breeds in spring and summer and lays eggs in termite mounds that are important habitat features. It feeds on a range of species, including invertebrates, small lizards, snakes and bird eggs. The species can be confused with the more common *Varanus varius* (Lace Monitor) which is more commonly occurs in gully forests.	15	Not considered to be core breeding or foraging habitat, Unlikely to occur.	✘

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6.4 threatened ecological community habitat assessment

Conservation Status	Ecological Community	Habitat	Likelihood of Occurrence on site	Relationship to the site
✕ Site not considered significant habitat for the community, ✔ Potentially affected community requiring consideration in the site planning process and potentially requires assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW)*				
Endangered, NSW	Coastal Saltmarsh	The community occurs as a zone landward of mangrove stands. Occasional scattered mature *Avicennia marina* trees occur through saltmarsh at some sites, and *Avicennia* (and less frequently *Aegiceras corniculatum*) seedlings may occur throughout saltmarsh. Species composition within Coastal Saltmarsh varies with elevation S*arcocornia quinqueflora* dominates at lower, and hence more frequently flooded, levels than *Sporobolus virginicus* which dominates the mid saltmarsh, while *Juncus kraussii* and *Baumea juncea* are upper saltmarsh species.	Habitat not present.	✕
Endangered, NSW	Duffy's Forest	The forest occurs on lateritic soils and deeply weathered shale soils typically found on lower ridges in Ku-ring-gai. Characteristic tree species include *Eucalyptus capitellata, Eucalyptus sieberi, Eucalyptus oblonga, and Angophora costata.*	Habitat not present.	✕
Endangered, NSW	Freshwater Wetlands on Coastal Floodplains	Sydney Freshwater Wetlands are a mosaic community with considerable variation due to fluctuating water levels and seasonal conditions. Characteristic vegetation is sedges and aquatics particularly *Eleocharis sphacelata, Baumea juncea, Baumea rubiginosa, Baumea articulata, Gahnia sieberiana, Ludwigia peploides subsp. montevidensis* and *Persicaria species*. The community is restricted to freshwater swamps in swales and depressions on sand dunes and low nutrient sandplain sites in coastal areas (NSW Scientific Committee, 2000).	Habitat not present.	✕
Endangered NSW, Critically Endangered, Cwlth	Littoral Rainforest / Littoral Rainforest & Coastal Vine Thickets.	The Forest Littoral Rainforest generally is a closed forest, the structure and composition of which is strongly influenced by proximity to the ocean. The plant species in this ecological community are predominantly rainforest species with evergreen mesic or coriaceous leaves. Several species have compound leaves, and vines may be a major component of the canopy. The community comprises the *Cupaniopsis anacardioides - Acmena spp*. alliance of Floyd (1990) which includes five sub-alliances which include *Syzygium leuhmannii, Acmena smithii, Ficus sp, Livistona sp, & Podocarpus sp*. (NSW Scientific Committee 2004).	Habitat not present.	✕
Endangered, NSW	Pittwater and Wagstaffe Spotted Gum Forest	Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion is known to occur on shale-derived soils from Narrabeen series geology (Bell & Stables 2012). The ecological community has been recorded from the local government areas of Pittwater and Gosford, within the Sydney Basin Bioregion, and may occur elsewhere in the Bioregion. It is dominated by Spotted Gum (*Corymbia maculata*) and Grey Ironbark (*Eucalyptus paniculata*) and occurs as a 'dry' and a 'mesic' form.	Habitat not present.	✕
Endangered, NSW	Swamp Oak Floodplain Forest	The Swamp Oak Forest occurs on grey-black clay-loams and sandy loams, where the groundwater is saline or sub-saline, on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains. The community has a dense to sparse tree layer in which *Casuarina glauca* (swamp oak) is the dominant species northwards from Bermagui. Other trees including *Acmena smithii* (lilly pilly),*Glochidion* spp. (cheese trees) and *Melaleuca* spp. (paperbarks) may be present as subordinate species.	Habitat not present.	✕
Endangered, NSW	Swamp Sclerophyll Forest	The community occurs on humic clay loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains. The community has an open to dense tree layer of eucalypts and paperbarks, which may exceed 25 m in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality. For example, stands dominated by *Melaleuca ericifolia* typically do not exceed 8 m in height. The most widespread and abundant dominant trees include *Eucalyptus robusta* (swamp mahogany), *Melaleuca quinquenervia* (paperbark) and, south from Sydney, *Eucalyptus botryoides* (bangalay) and *Eucalyptus longifolia* (woollybut).	Habitat not present on the proposed site.	✕

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Conservation Status	Ecological Community	Habitat	Likelihood of Occurrence on site	Relationship to the site
✘ Site not considered significant habitat for the community, ✔ Potentially affected community requiring consideration in the site planning process and potentially requires assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW)*				
Endangered, NSW	Themeda Grassland on Seacliffs & Headlands	The structure of the community is typically closed tussock grassland, but may be open shrubland or open heath with a grassy matrix between the shrubs. *Themeda australis* is the dominant species in the community. Scattered shrubs occur in many stands, most frequently *Pimelea linifolia, Banksia integrifolia* and *Westringia fruticosa.*	Habitat not present.	✘

6.5 threatened population habitat assessment

Conservation Status	Type	Population Name	Habitat	Likelihood of Occurrence on site	Relationship to the site
✘ Site not considered significant habitat of the population, ✔ Potentially affected population requiring consideration in the site planning process and potentially requires assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW)*					
Endangered NSW	Fauna	Koala, *Phascolarctos cinereus*, in the Pittwater Local Government Area	The population occurs between Ingleside and Elanora heights to Palm Beach on the Barrenjoey Peninsula. Koalas are generally solitary except during the mating season and have a home range of about 3 hectares. They can roam considerable distances in search of a mate or new food (Phillips 1990) and adolescent males can travel up to 10km in search for a mate. The breeding season begins around September when males commence calling and searching for reproductive females. Feeding on foliage, Koalas have been recorded feeding on tree species from Eucalyptus, Corymbia and Angophora genera. The preferred species of tree varies from region to region (Callaghan & Phillips 1995) and even within a region alternate species of trees may be favoured when growing on different soil landscapes (Jurskis 1996).	Core breeding habitat not present, unlikely to forage within densely developed urban areas.	✘
Endangered NSW	Fauna	Pittwater population of the Squirrel Glider, *Petaurus norfolcensis* on the Barrenjoey Peninsula, north of Bushrangers Hill	The population of *Petaurus norfolcensis* north of Bushrangers Hill (Bungan Head) is listed as an endangered population. The glider inhabits sclerophyll forests and woodlands of south eastern Australia extending from Vic. to Nth Qld. In NSW and Qld inhabits coastal forests and in some wet forests bordering on rainforest. They have been found in a range of habitats from forests, low woodlands and scrub. The availability of all year round nectar or sap is considered as the critical factor determining their presence. Important food sources are likely to be *Banksia integrifolia*, *Corymbia maculata* in winter and *Banksia serrata* and *Eucalyptus paniculata* in summer (Smith & Smith 2000). The Squirrel Glider feeds on insects (beetles and caterpillars) the gum and seeds of acacias the sap, nectar and pollen of eucalypts. Individual gliders have been recorded to range over an average of 3 ha (Quin 1995).	The site is not north of Bushrangers Hill	✘

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7. SEPP 44 koala habitat protection - assessment

7.1 application of the policy

State Envoronmental Planning Policy 44 Koala Habitat Protection 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.

The SEPP 44 applies to land in the Pittwater Local Government area and assessment under this policy applies to the land upon which a development application is made if the land is more than 1 hectare, whether or not the development application applies to the whole or part of the land.

SEPP 44 also applies to rezoning of land (c16) where the proposed draft Local Environment Plan affects land that is potential Koala habitat or core Koala habitat. In lieu of any directions issued under c16 of the policy, consideration has been giving to Part 2 of the policy and the potential subsequent development on the site.

Bayview Golf Course land is owned by the Club and is greater than 1 ha in area; therefore the Policy applies.

7.2 general species information

Koalas are generally solitary except during the mating season and have a home range of about 3 hectares. They can roam considerable distances in search of a mate or new food (Phillips 1990) and adolescent males can travel up to 10km in search for a mate. The breeding season begins around September when males commence calling and searching for reproductive females.

Koalas have been recorded feeding on tree species from Eucalyptus, Corymbia and Angophora genera. The preferred species of tree varies from region to region (Callaghan & Phillips 1995) and even within a region alternate species of trees may be favoured when growing on different soil landscapes (Jurskis 1996).

Typical Koala feed trees in Pittwater include Grey Gum (*Eucalyptus punctata*), Scribbly Gum (*Eucalyptus haemastoma*), Swamp Mahogany (*Eucalyptus robusta*), Spotted Gum (*Corymbia maculata*), Red Bloodwood (*Corymbia gummifera*), Bangalay (*Eucalyptus botryoides*) , Grey Ironbark (*Eucalyptus paniculata*), Sydney Red Gum (*Angophora costata*), Broad-leaved White Mahogany (*Eucalyptus umbra*), Large-fruited Red Mahogany (*Eucalyptus scias*), Rough-barked Apple (*Angophora floribunda*) and other eucalypts (Smith & Smith 2000).

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7.3 regional distribution

Koalas occur widely in NSW but most commonly on the central and north coasts (OEH 2000). They have a very patchy and disjunct distribution in the Sydney basin bio-region.

7.4 local distribution

Sightings of Koalas have been recorded in Ku-ring-gai Chase National Park particularly in the Cottage Point area, Muogamarra National Park and in Berowra Valley Bushland Park and there have been an extremely limited number of sightings of Koalas in these areas after the 1994 bushfires (Smith & Smith 1990).

Philips & Callaghan (1997) note that bush fires can potentially result in mortality as high as 60%-70% in a breeding population of a local area, with recovery of the population dependent upon factors such as the size and composition of the remaining population, recruitment levels from adjoining populations and the intensity and frequency of subsequent fires.

There has been a decline in the Koala population on the Barrenjoey Peninsula between 1959 (estimated 120) and 2000 (1 record) (Smith & Smith 2000), the northern population on the Peninsula is thought to be extinct.

The population in the Ingleside and Ku-ring-gai Chase National Park areas also appears to have declined with only 3 records occurring since 1990 (Smith & Smith 2000, OEH 2014), 2 within Ku-ring-gai Chase National Park and 1 record on the slopes above Elvina Bay on the western foreshore of Pittwater.

7.5 potential & core koala habitat investigations

Whilst SEPP 44 does applies to the site consideration has been given to the criteria in the SEPP that defines potential Koala habitat.

Schedule 2 of SEPP 44 identifies the Koala feed tree species of which only 1 species, Swamp Mahogany (*Eucalyptus robusta*), occurs on the site. Of the 234 trees on the site the tree species listed in Schedule 2 of SEPP 44 account for 2% of the trees on the site. Based upon the definitions of Potential Koala Habitat the tree species listed in Schedule 2 of SEPP 44 account for less than 15% of the total number of trees and therefore the site is not considered to be potential Koala habitat for the purposes of SEPP 44.

Not withstanding this other Koala feed trees that occur on the site and these include Grey Ironbark (*Eucalyptus paniculata*), Broad-leaved White Mahogany (*Eucalyptus umbra*), Large-fruited Red Mahogany (*Eucalyptus scias*), Rough-barked Apple (*Angophora floribunda*) and Swamp Mahogany (*Eucalyptus robusta*).

Despite not strictly defined by SEPP 44 as being potential Koala habitat consideration has been given to assessing whether the site is core Koala habitat.

To determine whether or not the site is core Koala habitat an assessment of the level of Koala activity is necessary. The most commonly used and recognised technique is the revised Spot Assessment Technique (Phillips & Callaghan 2001) which is based upon the presence / absence of Koala faecal pellets or scats at the base of trees. A minimum of 30 trees are to be sampled and a survey duration of 2 minutes per tree is to be carried out.

The individual Koala feed trees on the site were assessed together with other species adjacent the site to determine whether Koalas were using the trees as foraging habitat and the surrounding areas were searched for Koala scats.

Based upon the field survey methods above, no Koala faecal pellets or scats were found. Therefore the site is not considered to be core Koala habitat for the purposes of SEPP 44.

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8. threatened species assessment

8.1 section 5a EP&A Act, 1979 (NSW) assessment

Assessment of Significance have been carried out (refer Appendix B) of this report addressing the threatened species, communities and populations identified as having some relationship to the site. Each assessment addresses the 7 points of consideration identified in section 5A of the *Environmental Planning and Assessment Act 1979 (NSW)*and is referred to as an Assessment of Significance.

The Assessment of Significance is not a “pass or fail” test and the purpose of the assessment is to allow proponents to undertake a qualitative assessment analysis of the likely impacts and whether further detailed assessment is necessary in the form of a Species Impact Statement (OEH 2007).

The Threatened Species Assessment Guidelines - The Assessment of Significance (OEH, 2007) outline that mitigating, ameliorative or compensatory measures proposed as part of the development should not normally be considered in determining the degree of the effect on threatened species, populations or ecological communities, unless the measure has been proven successful for that species in a similar situation. Where complex mitigating, ameliorative or compensatory measures are required, such as translocation, bush restoration, purchase of land, further assessment through the Species Impact Statement process is likely to be required.

8.2 EPBC Act, 1979 (Commonwealth) assessment

Part 13 Division 1 of the *Environment Protection & Biodiversity Act 1999 (Cwlth)* (EPBC) lists flora, fauna and ecological communities that are considered to be “matters of national environmental significance”. Under the Act consideration must be given as to whether the proposed actions will, or is likely to have a “significant impact” on “matters of national environmental significance”.

To minimise duplication in the environmental assessment procedures, a bilateral agreement was made in January 2007 between the Commonwealth & NSW Governments giving accreditation of New South Wales assessment processes in relation to threatened species, populations and ecological communities.

The agreement provides for “Controlled actions” as defined in the *Environment Protection & Biodiversity Act 1999 (Cwlth)* relating to threatened species, to no longer require assessment under Part 8 of the *Environment Protection & Biodiversity Act 1999 (Cwlth)* where they are assessed under Part 3A, 4 or 5 of the *Environmental Planning and Assessment Act 1979 (NSW)*.

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8.3 findings of Section 5a EP&A Act, 1979 (NSW) assessments

Through field surveys, habitat assessments and literature/database searches a number of the threatened species, populations and communities have been identified as having some habitat relationships with the habitats on site. These being;

- Bush Stone-curlew (*Burhinus grallarius*);
- Gang-gang Cockatoo (Callocephalon fimbriatum)l;
- Glossy Black-Cockatoo (*Calyptorhynchus lathami*);
- Little Lorikeet (Glossopsitta pusilla);
- Barking Owl (*Ninox connivens*);
- Powerful Owl (*Ninox strenua*);
- Eastern Bent-wing Bat (Miniopterus schreibersii oceanensis);
- Eastern Freetail Bat (*Mormopterus norfolkensis*);
- Grey-headed Flying-fox (*Pteropus poliocephalus*).

These species, populations and ecological communities have been considered in context with the Assessment of Significance outlined in section 5A of the *Environmental Planning and Assessment Act 1979 (NSW)* (refer Appendix B)

Based upon these assessment the proposed subdivision and development is unlikely to have a significant impact on threatened species and populations ecological communities listed in the schedules of the *Threatened Species Conservation Act 1995 (NSW)* or listed in the *Environment Protection & Biodiversity Conservation Act 1999 (Cwlth)*.

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9. conclusion

This report has been prepared to accompany an application to the NSW Department Planning & Environment for a site compatibility certificate involving a proposed subdivision and development on land that is currently part of Bayview Golf Course.

The subject site has an area of approximately 2ha and is predominately developed as a golf course with mown grass and remnant trees lining the fairways.

The proposed development involves subdivision of part of the golf course and construction of a seniors living facility with a basement level car park (Marchese, 2014).

This report identifies flora species on the site and fauna species residing on or using the site as part of their foraging range. Specific surveys and habitat assessment have been undertaken using a range of techniques to identify threatened species, populations and ecological communities that may occur on or utilise the site.

A number of threatened species listed in the *Threatened Species Conservation Act 1995 (NSW)* and/or the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)* have been recorded as occurring within 5km of the site. Those threatened species that have been recorded on the site, or have some habitat relationships with the habitats on site, have been considered in context with section 5A of the *Environmental Planning and Assessment Act 1979 (NSW).*

Based upon the assessments in this report the proposed development is unlikely to have a significant impact on threatened species and populations listed in the schedules of the *Threatened Species Conservation Act 1995 (NSW)* nor on those species listed in the schedules of the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth).*

Consideration has also been given to the application of State Environmental Planning Policy 44 Koala Habitat Protection (SEPP 44). Based upon the assessments in this report the site is not considered to be core koala habitat for the purposes of SEPP 44.

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appendix A –- assessment of significance, (section 5A of the *EP&A Act 1979)*

Background & definitions

The habitat assessments and the following impact assessments made in this report have focused on identifying the relationship of threatened species, populations and communities to the habitats on the site as well as determining the suitability of these to support resident populations of threatened species.

Definitions for the terms “Composition”, “Extent”, “Habitat”, “Life cycle”, ”Local occurrence”, “Local population”, “Risk of extinction”, “Study area”, “Subject site”, “Viable”, used in this assessment are consistent with the Threatened Species Assessment Guidelines (OEH 2007) being:

- “Composition” refers to both the assemblage of flora and fauna species, and the physical structure of the ecological community;
- “Extent” refers to the physical area removed and/or to the compositional components of the habitat and the degree to which each is affected;
- “Habitat” is the area occupied or periodically or occasionally occupied, by any threatened species, population or ecological community and includes all the different aspects (both biotic and abiotic) used by the different stages of their life cycles;
- “Life cycle” is the series or stages of reproduction, growth, development, aging and death of an organism;
- ”Local occurrence” is the community that occurs within the study area;
- “Local population” is the local population that occurs in the study area. In cases where multiple populations occur in the study area, each population should be assessed separately.
- “Risk of extinction” is the likelihood that the local population will become extinct either in the short- term or in the long term as a result of direct or indirect impacts on the viability of that population.
- “Study area” means the subject site and any other areas which are likely to be affected by the proposal, either directly or indirectly.
- “Subject site” means the area directly affected by the proposal.
- “Viable”, is the capacity to successfully complete each stage of the life cycle under normal conditions.

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Species – Bush Stone-curlew (Burhinus grallarius)

(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 viable local population of the species is likely to be placed at risk of extinction. "

Bush Stone-curlew (*Burhinus grallarius*) is a medium size bird approximately 550mm in height and stands on tall long legs. The species is known to occur in all states across Australia and the southern coastal areas of Papua New Guinea (Marchant and Higgins 1993). The species was widespread and reasonably common in NSW both east and west of the Great Dividing Range. Currently the species has a patchy distribution in NSW and is locally extinct in many areas of its previous range (OEH, 2006). In Pittwater the species has regularly been observed at Careel Bay and has been observed in the local area around Avalon and within the grounds of Avalon Public School in the late afternoon.

Whilst generally believed to be nocturnal the species has been observed foraging during the day. The species nests on the ground making it vulnerable to predators and nesting sites are frequently located in relatively open areas, where ground cover is extremely low and/or sparse. Roosting habitats are typically associated with fallen timber and logs (OEH, 2006). Individuals and pairs generally exhibit high site fidelity and are believed to hold long-term pair-bonds (OEH, 2006).

Their diet includes invertebrates seeds, small fruit, crustaceans, molluscs, frogs, lizards, snakes (Marchant & Higgins 1993, Barker and Vestjens 1989).

Home range sizes are likely to vary depending on the availability and proximity of roosting, foraging and breeding habitat. Breeding pairs are generally sedentary within home ranges estimated to be 250-600ha for foraging year round, with a core range of 10-25ha during breeding (OEH, 2006).

The species was not recorded on the site during field surveys and the site is not considered to be core breeding habitat. Some opportunistic nocturnal foraging habitat may be present both on the golf course and within the proposed site.

Taking into account the nature and scope of the proposed development (refer section 5), and the foraging range of the species, it is unlikely that a viable local population of the species is to be placed at risk of extinction.

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

Endangered populations are listed in Schedule 1 Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(c) " in the case of an endangered ecological community 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 be substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Endangered ecological communities are listed in Schedule 1 Part 3 of the Threatened Species Conservation Act 1995 and critically endangered ecological communities are listed in Schedule 1a Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

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(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 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".

The site is not considered to be core roosting or breeding habitat but may provide some opportunistic foraging potential. The extent of habitats to be removed or modified as a result of the development are summarised in section 5 of this report.

The species was not recorded on the site during field surveys and taking into account the mobility of the species, their foraging range and the potential foraging opportunities remaining on the golf course, the proposed development will not isolate foraging habitat of the species and the habitats to be removed are not considered to be significant to the long term survival of the species in this locality.

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

The area is not listed as critical habitat under Part 3 Division 1 of the Threatened Species Conservation Act 1995. There is no critical habitat within the site or in close proximity to the proposed development.

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

Recovery plans are prepared under the provisions of Part 4, Division 1 of the Threatened Species Conservation Act 1995.

The Recovery Plan for Bush Stone-curlew (*Burhinus grallarius*) (OEH, 2006) has been prepared. The site is not considered to be core breeding or unique foraging habitat, therefore the proposed development is not inconsistent with the objectives and actions of the recovery plan

Threat Abatement Plans are prepared under the provisions of Part 5, Division 1 of the Threatened Species Conservation Act 1995. In relation to this species the Threat Abatement Plan – Predation by the Red Fox (*Vulpes vulpes*) is relevant. The proposed development is not inconsistent with the objectives and actions of the threat abatement plan.

(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."

Currently there are 37 Key Threatening Processes listed in the Threatened Species Conservation Act 1995. Key Threatening Processes relevant for the species include:

- Clearing of Native Vegetation
- Predation by the European red fox (*Vulpes vulpes*)

Clearing of Native Vegetation is listed as a threatening process, however it is considered that the proposed development will not increase these threats in relation to this species in this situation.

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Predation by the European red fox (*Vulpes vulpes*) is listed as a threatening process, however it is considered that the proposed development will not increase these threats in relation to this species in this situation.

Summary: Species - Bush Stone-curlew *(Burhinus grallarius)*

The species was not recorded on the site. Based upon the nature and scope of the proposed development (refer section 5) and this assessment, it is considered that the proposed development is unlikely to have a significant impact on the species – Bush Stone-curlew (*Burhinus grallarius*).

Species - Gang-gang Cockatoo (Callocephalon fimbriatum)

(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 viable local population of the species is likely to be placed at risk of extinction. "

Gang Gang Cockatoos have a relatively restricted distribution in South-eastern Australia and are mainly found in the higher altitude old growth eucalypt forests. In winter the species is known to move down into lower altitude woodlands and are regularly seen in the Australian Capital Territory.

A population of Gang-gang Cockatoos persists in the Hornsby and Ku-ring-gai Local Government Areas. This population is bounded by Beecroft – Cheltenham in the west, Epping – North Epping in the south, Turramurra – South Turramurra in the east, and Thornleigh – Wahroonga to the north. The population encompasses, but is not restricted to, Pennant Hills Park and parts of Lane Cove National Park. Individual birds are likely on occasion to move across the population boundary. This population is estimated to be between 18 and 40 pairs. Birds have been observed nesting in hollows in large, old trees, and breeding has been documented at least since 1994. The species shows strong nest site fidelity.

The population previously extended across Baulkham Hills, Castle Hill, Cherrybrook and Dural, but due to initial clearing for farmland and more recently to urban releases and road construction, the habitat of the population has been greatly reduced. The species is considered to be a vagrant within Pittwater.

Loss of habitat, particularly core food and breeding trees, continues to be a major threat to the population. Other threats include competition for nest hollows with other species.

The species breed in large tree hollows in late spring to early summer and are commonly seen in flocks of up to 20 individuals. Their diet consists of seeds of eucalyptus and acacias, supplemented by other plant material and insects and they are known to feed on Cotoneaster and Hawthorn berries in winter.

The species was not recorded on the site as part of the field surveys and none of the trees within the subject site contain suitable breeding hollows. Taking into account the nature and scope of the proposed development (refer section 5), and the foraging range of the species, it is unlikely that a viable local population of the species is to be placed at risk of extinction.

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(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 viable local population of the species is likely to be placed at risk of extinction. "

The endangered Population - Gang-gang Cockatoo, *Callocephalon fimbriatum* (Grant), population in the Hornsby and Ku-ring-gai Local Government Areas is also listed in the Schedule 1 Part 2 of the Threatened Species Conservation Act 1995. The population is not known to extend to the Pittwater Local Government Area.

(c) " in the case of an endangered ecological community 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 be substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Endangered ecological communities are listed in Schedule 1 Part 3 of the Threatened Species Conservation Act 1995 and critically endangered ecological communities are listed in Schedule 1a Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(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 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".

The site is not considered to be core breeding habitat but may provide some seasonal foraging potential. The extent of habitats to be removed or modified as a result of the development are summarised in section 5 of this report.

The species was not recorded on the site during field surveys and taking into account the mobility of the species and their foraging range, the proposed development will not isolate foraging habitat of the species and the habitats to be removed are not considered to be significant to the long term survival of the species in this locality.

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

The area is not listed as critical habitat under Part 3 Division 1 of the Threatened Species Conservation Act 1995. There is no critical habitat within the site or in close proximity to the proposed development.

draft

(f) " whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan".
Recovery plans are prepared under the provisions of Part 4, Division 1 of the Threatened Species Conservation Act 1995. There is no recovery or draft recovery plan prepared for the species.

Threat Abatement Plans are prepared under the provisions of Part 5, Division 1 of the Threatened Species Conservation Act 1995. There is no threat abatement or draft threat abatement plan prepared that is relevant to the species.

(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."
Key Threatening Processes are listed in Schedule 3 of the Threatened Species Conservation Act and currently there are 37 Key Threatening Processes listed. Key Threatening Processes relevant for the species include:

- Clearing of Native Vegetation
- *Psittacine circoviral* (beak and feather) Disease
- Loss of Hollow-bearing Trees

Whilst the Clearing of Native Vegetation is listed as a key threatening process, based upon the nature and scope of the proposed development (refer section 5), the proposed development will not significantly increase threats in relation to this species.

Psittacine circoviral (beak and feather) disease is a virus that infects and kills the cells of the feather and beak, as well as cells of the immune system, leaving birds vulnerable to bacterial and other infections. It is considered that the impacts of the proposed development will not increase the spread or infection of *Psittacine circoviral* disease.

None of the trees proposed to be removed contain suitable habitat hollows for this species and therefore the proposed development will not contribute to the Loss of Hollow-bearing Trees in relation to this species.

Summary: Species Gang-gang Cockatoo (*Callocephalon fimbriatum*)

Based upon the nature and scope of the proposed development (refer section 5) and this assessment, it is considered that the proposed development is unlikely to have a significant impact on the Species Gang-gang Cockatoo (*Callocephalon fimbriatum*).

draft

Species - Little Lorikeet (*Glossopsitta pusilla*);

(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 viable local population of the species is likely to be placed at risk of extinction. "
Little Lorikeets (*Glossopsitta pusilla*) occur along the east coast of Australia from Cairns to Adelaide. In New South Wales their distribution extends from the coast to the western slopes of the Great Dividing Range to Albury, Parkes, Dubbo and Narrabri (Barrett et al. 2003).They are generally considered to be nomadic and commonly occur in small flocks often with other species of lorikeet (NSW Scientific Committee, 2009). The species feeds primarily on nectar and pollen on seasonal flowering eucalypts. Little Lorikeets (*Glossopsitta pusilla*) also feed on flowering Melaleucas and Mistletoes (NSW Scientific Committee, 2009). Little Lorikeets nest in small hollows usually in live trees and nest-hollows are used "traditionally", with the same hollow known to be occupied for at least 29 years (not necessarily by the same individuals) (Courtney & Debus 2006). The breeding season extends from May to September (Higgins 1999).

The species was not recorded on the site as part of the field surveys and taking into account the nature and scope of the proposed development (refer section 5), and the foraging range of the species, it is unlikely that a viable local population of the species is to be placed at risk of extinction.

(b) " in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction. "
Endangered populations are listed in Schedule 1 Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(c) " in the case of an endangered ecological community 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 be substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Endangered ecological communities are listed in Schedule 1 Part 3 of the Threatened Species Conservation Act 1995 and critically endangered ecological communities are listed in Schedule 1a Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

draft

(c) " in the case of an endangered ecological community 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 be substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Endangered ecological communities are listed in Schedule 1 Part 3 of the Threatened Species Conservation Act 1995 and critically endangered ecological communities are listed in Schedule 1a Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(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 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".

The site is not considered to be core breeding habitat but may provide some seasonal foraging potential. The extent of habitats to be removed or modified as a result of the development are summarised in section 5 of this report.

The species was not recorded on the site during field surveys and taking into account the mobility of the species and their foraging range, the proposed development will not isolate foraging habitat of the species and the habitats to be removed are not considered to be significant to the long term survival of the species in this locality.

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

The area is not listed as critical habitat under Part 3 Division 1 of the Threatened Species Conservation Act 1995. There is no critical habitat within the site or in close proximity to the proposed development.

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

Recovery plans are prepared under the provisions of Part 4, Division 1 of the Threatened Species Conservation Act 1995. There is no recovery or draft recovery plan prepared for the species.

Threat Abatement Plans are prepared under the provisions of Part 5, Division 1 of the Threatened Species Conservation Act 1995. There is no threat abatement or draft threat abatement plan prepared for the species.

(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."

Key Threatening Processes are listed in Schedule 3 of the Threatened Species Conservation Act and currently there are 37 Key Threatening Processes listed. Key Threatening Processes relevant for the species include:

- Clearing of Native Vegetation
- Loss of Hollow-bearing Trees

Whilst the Clearing of Native Vegetation is listed as a key threatening process, based upon the nature and scope of the proposed development (refer section 5), the proposed development will not significantly increase threats in relation to this species.

The Loss of Hollow-bearing Trees is a key threatening process for this species. Whilst approximately 10 trees that contain small hollows are proposed to be removed, these tree hollows appear to be utilised by the resident colony of Rainbow Lorikeet (*Trichoglossus haematodus*) on the site.

draft

Summary: Species Little Lorikeets *(Glossopsitta pusilla*)
Based upon the nature and scope of the proposed development (refer section 5) and this assessment, it is considered that the proposed development is unlikely to have a significant impact on the Species Little Lorikeets (*Glossopsitta pusilla*).

Species - *Ninox connivens* (Barking Owl)

(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 viable local population of the species is likely to be placed at risk of extinction. "
The Barking Owl (*Ninox connivens*) breeds in late winter / spring and nest in hollows, typically in live Eucalypts, 20-35 m above ground. Hollow entrances of 20-46 cm in diameter and hollow depths of 200-300cm are typically used by the species.

Barking Owl (*Ninox connivens*) typically roost in or under dense foliage in large trees including rainforest species of streamside gallery forests often near watercourses or wetlands (OEH, 2003)

The species occupies traditional permanent territories, and forage opportunistically for terrestrial, arboreal and aerial prey between dusk and dawn and occasionally in daylight (Higgins 1999). The species prey on a variety of birds, mammals and large insects including common native and introduced birds such as rosellas and starlings (Kavanagh 1995) (Debus 1997), (Debus et al. 1998, 1999) (Higgins,1999). During the late spring and summer months, post breeding, the diet of the species includes many insects. Vertebrates seem to be important in its diet during winter and breeding seasons.

The species was not recorded on the site during field surveys and the site is not considered to be core breeding habitat. The site may provide some limited foraging opportunities and marginal roosting habitat in the gully area within the golf course to the north west of the subject site that is to be retained.

Taking into account the nature and scope of the proposed development (refer section 5), and the foraging range of the species, it is unlikely that a viable local population of the species is to be placed at risk of extinction.

(b) " in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction. "
Endangered populations are listed in Schedule 1 Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(c) " in the case of an endangered ecological community 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 be substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Endangered ecological communities are listed in Schedule 1 Part 3 of the Threatened Species Conservation Act 1995 and critically endangered ecological communities are listed in Schedule 1a Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

draft

(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 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".

The site is not considered to be core roosting or breeding habitat but may provide some seasonal foraging potential and marginal roosting habitat in the gully area off site which is to be retained. The extent of habitats to be removed or modified as a result of the development are summarised in section 5 of this report.

The species was not recorded on the site during field surveys and taking into account the mobility of the species and their foraging range, the proposed development will not isolate foraging habitat of the species and the habitats to be removed are not considered to be significant to the long term survival of the species in this locality.

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

The area is not listed as critical habitat under Part 3 Division 1 of the Threatened Species Conservation Act 1995. There is no critical habitat within the site or in close proximity to the proposed development.

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

The Recovery Plan for Barking Owl (*Ninox connivens*) (OEH, 2003) has been prepared and although the site is not considered to be core breeding habitat, the proposed development is not inconsistent with the objectives and actions of the recovery plan.

Threat Abatement Plans are prepared under the provisions of Part 5, Division 1 of the Threatened Species Conservation Act 1995. There is no final or draft Threat Abatement Plans relevant to this species.

(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."

Currently there are 37 Key Threatening Processes listed in the Threatened Species Conservation Act 1995. Key Threatening Processes relevant for the species include:

- Clearing of Native Vegetation
- Loss of Hollow-bearing Trees

draft

Whilst the Clearing of Native Vegetation is listed as a key threatening process, based upon the nature and scope of the proposed development (refer section 5) the proposed development will not significantly increase threatening processes in relation to this species.

None of the trees proposed to be removed contain suitable habitat hollows and therefore the proposed development will not contribute to the Loss of Hollow-bearing Trees in relation to this species.

Summary Species – Barking Owl (*Ninox connivens*)
Based upon the nature and scope of the proposed development (refer section 5) and this assessment, it is considered that the proposed development is unlikely to have a significant impact on the species – Barking Owl (*Ninox connivens*).

Species - *Ninox strenua* (Powerful Owl)

(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 viable local population of the species is likely to be placed at risk of extinction. "
The Powerful Owl (*Ninox strenua*) breeds in late autumn / mid winter and nest in large hollows in Eucalypts with trunk diameters of at least 0.8-2.4m. Male owls are known to roost within trees within 100-200m of the nest tree during the breeding season. *Ninox strenua* has a foraging range of 400 -1500ha (Davey 1993) and feed on medium sized mammals such as gliders, possums, flying-foxes and rabbits.

The species was not recorded on the site during field surveys and the site is not considered to be core breeding habitat. The site may provide some limited foraging opportunities and marginal roosting habitat in the gully area that is proposed to be retained.

The species is highly mobile and forages over a wide area. The vegetation being retained will provide some limited habitat for its prey such as Common Ringtail Possum (*Pseudocheirus peregrinus)*, Pied Currawongs (*Strepera graculina*) and Rainbow Lorikeet (*Trichoglossus haematodus)*.

The species was not recorded on the site during field surveys and the site is not considered to be core breeding habitat. The site may provide some limited foraging opportunities and marginal roosting habitat in the gully area within the golf course to the north west of the subject site that is to be retained.

Taking into account the nature and scope of the proposed development (refer section 5), and the foraging range of the species, it is unlikely that a viable local population of the species is to be placed at risk of extinction.

(b) " in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction. "
Endangered populations are listed in Schedule 1 Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(c) " in the case of an endangered ecological community 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 be substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Endangered ecological communities are listed in Schedule 1 Part 3 of the Threatened Species Conservation Act 1995 and critically endangered ecological communities are listed in Schedule 1a Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

draft

(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 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".

The site is not considered to be core roosting or breeding habitat but may provide some seasonal foraging potential. The extent of habitats to be removed or modified as a result of the development are summarised in section 5 of this report. Taking into account the mobility of the species and their foraging range, the proposed development will not isolate foraging habitat of the species and the habitats to be removed are not considered to be significant to the long term survival of the species in this locality.

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

The area is not listed as critical habitat under Part 3 Division 1 of the Threatened Species Conservation Act 1995. There is no critical habitat within the site or in close proximity to the proposed development.

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

The Recovery Plan for Large Forest Owls (OEH, 2006) has been prepared and although the site is not considered to be core breeding habitat, the proposed development is not inconsistent with the objectives and actions of the recovery plan.

Threat Abatement Plans are prepared under the provisions of Part 5, Division 1 of the Threatened Species Conservation Act 1995. There is no final or draft Threat Abatement Plans relevant to this species.

(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."

Currently there are 37 Key Threatening Processes listed in the Threatened Species Conservation Act 1995. Key Threatening Processes relevant for the species include:

- Clearing of Native Vegetation
- Loss of Hollow-bearing Trees

draft

Whilst the Clearing of Native Vegetation is listed as a key threatening process, based upon the nature and scope of the proposed development (refer section 6) the proposed development will not significantly increase threatening processes in relation to this species.

None of the trees proposed to be removed contain suitable habitat hollows and therefore the proposed development will not contribute to the Loss of Hollow-bearing Trees in relation to this species.

Summary Species – Powerful Owl (*Ninox strenua*)
Based upon the nature and scope of the proposed development (refer section 6) and this assessment, it is considered that the proposed development is unlikely to have a significant impact on the species – Powerful Owl (*Ninox strenua*).

Species - Eastern Bent-wing Bat (*Miniopterus schreibersii*)

(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 viable local population of the species is likely to be placed at risk of extinction. "
Eastern Bent-wing Bat (*Miniopterus schreibersii*) has been recorded along the north coast of Australia from Queensland to Victoria and parts of northern Western Australia and Northern Territory. The species has been recorded in a variety of habitats and is typically found in well-timbered valleys. It roosts during the daylight hours in caves and has been recorded roosting in large storm water pipes within urban areas.

This species uses a broad range of habitats including rainforest, wet and dry sclerophyll forest, open woodland and grassland and paperbark forests. They are a cave dwelling bat but will also roost in mines, road culverts and storm water drains. In southern Australia this species hibernates during the winter, while in the 'tropical' winter, they remain active and continue foraging.

This species usually eats moths and in the north will also feed on grasshoppers. Depending on the habitat, they can forage from 6 m above the ground to many metres above the canopy and flight speed has been estimated to be approximately 50 km/hr. In NSW, mating typically occurs between June - August and the birth of a single young occurs in December and January. Young can fly at 7 weeks and are weaned by10 weeks.

Taking into account the nature and scope of the proposed development (refer section 5), and the foraging range of the species, the site is not considered to be roosting or breeding habitat and it is unlikely that a viable local population of the species is to be placed at risk of extinction.

(b) " in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction. "
Endangered populations are listed in Schedule 1 Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(c) " in the case of an endangered ecological community 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 be substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Endangered ecological communities are listed in Schedule 1 Part 3 of the Threatened Species Conservation Act 1995 and critically endangered ecological communities are listed in Schedule 1a Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

Draft

(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 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".

The extent of habitat removal and/or modification is summarised in section 5 of this report. The site is not considered to be core roosting or breeding habitat but may provide some seasonal foraging potential. The extent of habitats to be removed or modified as a result of the development are summarised in section 5 of this report.

Taking into account the mobility of the species and their foraging range, the proposed development will not isolate foraging habitat of the species and the habitats to be removed are not considered to be significant to the long term survival of the species in this locality.

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

The area is not listed as critical habitat under Part 3 Division 1 of the Threatened Species Conservation Act 1995. There is no critical habitat within the site or in close proximity to the proposed development.

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

Recovery plans are prepared under the provisions of Part 4, Division 1 of the Threatened Species Conservation Act 1995. There is no recovery or draft recovery plan prepared for the species.

Threat Abatement Plans are prepared under the provisions of Part 5, Division 1 of the Threatened Species Conservation Act 1995. There is no threat abatement or draft threat abatement plan prepared for the species.

(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."

Currently there are 37 Key Threatening Processes listed in the Threatened Species Conservation Act 1995. Key Threatening Processes relevant for the species include:

- Clearing of Native Vegetation

Whilst the Clearing of Native Vegetation is listed as a key threatening process, based upon the nature and scope of the proposed development (refer section 5), the proposed development will not significantly contribute to this threatening process in relation to this species.

draft

Summary Species – Eastern Bent-wing Bat (*Miniopterus schreibersii*)

Based upon the nature and scope of the proposed development (refer section 5) and this assessment, it is considered that the proposed development is unlikely to have a significant impact on the species – Eastern Bent-wing Bat (*Miniopterus schreibersii*).

Species – Eastern Freetail-bat (*Mormopterus norfolkensis*)

(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 viable local population of the species is likely to be placed at risk of extinction. "
The East Coast Freetail-bat (*Mormopterus norfolkensis*) occurs east of the Great Dividing Range from south of Sydney to south eastern Queensland (Churchill, 1989).

East Coast Freetail-bat (*Mormopterus norfolkensis*) have generally been recorded as solitary animals (Allison & Hoye, 1995). There are 19 records of the species occurring in the Sydney area with: 1 record of the species occurring in Warringah, 1 record in Pittwater, 1 record in Ku-ring-gai and 3 in Hornsby (OEH 2012). East Coast Freetail-bats (*Mormopterus norfolkensis*) are also known to occur in maternal colonies in mangroves in the Hunter Estuary where they have been recorded in their hundreds (McConville, 2010).

East Coast Freetail-bat (*Mormopterus norfolkensis*) is known to occur in a variety of habitats including sclerophyll forest, woodland and mangroves. The species has a life span of approximately 5-7 years (Richards & Pennay, 2008).

The species has a greater forearm length than other Australian species of *Mormopterus* (Allison & Hoye 1995) and its morphology indicates that the species is a fast flyer adapted to foraging for insects in open areas. They are known to forage above the tops of forest trees, along the edges of forests, along tracks and trails and along more open riparian areas and have been recorded as regularly travelling up to 8km to forage (McConville, 2010).

The species roosts in tree hollows and or under the loose bark of trees and has been recorded roosting in the roof of a hut with several Gould's Wattle Bats (*Chalinolobus gouldii*) (Allison, & Hoye 1995) and the species was also found roosting in the roof of Picton Primary School again with a colony of Gould's Wattle Bats (*Chalinolobus gouldii*) (Robinson 1985). The species is also known to utilise artificial nest boxes.

The species was not recorded on the site and the site is not considered to be core breeding habitat. Taking into account the nature and scope of the proposed development (refer section 5) and the foraging range of the species it is unlikely that a viable local population of the species is to be placed at risk of extinction.

(b) " in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction. "
Endangered populations are listed in Schedule 1 Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

draft

(c) " in the case of an endangered ecological community 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 be substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Endangered ecological communities are listed in Schedule 1 Part 3 of the Threatened Species Conservation Act 1995 and critically endangered ecological

communities are listed in Schedule 1a Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(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 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".

The extent of habitat removal and/or modification is summarised in section 5 of this report. The site is not considered to be core roosting or breeding habitat but may provide some seasonal or temporary roosting habitat. The extent of habitats to be removed or modified as a result of the development are summarised in section 5 of this report

Taking into account the mobility of the species and their foraging range, the proposed development will not isolate foraging habitat of the species and the suitable foraging and roosting habitat will remain within the golf course, on site and within the local area.

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

The area is not listed as critical habitat under Part 3 Division 1 of the Threatened Species Conservation Act 1995. There is no critical habitat within the site or in close proximity to the proposed development.

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

Recovery plans are prepared under the provisions of Part 4, Division 1 of the Threatened Species Conservation Act 1995. There is no recovery or draft recovery plan prepared for the species.

Threat Abatement Plans are prepared under the provisions of Part 5, Division 1 of the Threatened Species Conservation Act 1995. There is no threat abatement or draft threat abatement plan prepared for the species.

(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."

Currently there are 37 Key Threatening Processes listed in the Threatened Species Conservation Act 1995. Key Threatening Processes relevant for the species include:

- Clearing of Native Vegetation
- Loss of Hollow-bearing Trees

draft

Whilst the Clearing of Native Vegetation is listed as a key threatening process, based upon the nature and scope of the proposed development (refer section 5) the proposed development will not significantly increase threatening processes in relation to this species.

The Loss of Hollow-bearing Trees is a key threatening process for this species. Whilst approximately 10 trees that contain small hollows are proposed to be removed, these tree hollows appear to be utilised by the resident colony of Rainbow Lorikeet (*Trichoglossus haematodus*) on the site.

Summary Species – Eastern Freetail-bat (*Mormopterus norfolkensis*)

Based upon the nature and scope of the proposed development (refer section 5) and this assessment, it is considered that the proposed development is unlikely to have a significant impact on the species – Eastern Freetail-bat (*Mormopterus norfolkensis*).

Species - *Pteropus poliocephalus* (Grey-headed Flying-fox)

(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 viable local population of the species is likely to be placed at risk of extinction. "

The species has 2 permanent maternal colonies in Sydney at Gordon and at Cabramatta. Other temporary colonies exist at the Sydney Botanical Gardens and at Avalon in northern Sydney. The species predominately feeds on nectar and when blossoms are unavailable it feeds on fruit. Grey-headed Flying-fox (*Pteropus poliocephalus*) individuals have been recorded travelling 100's of kilometres within weeks (Eby 1991, Spencer et al 1991) and nightly foraging distances from roosting camps are commonly 20km and can be up to 50km (Eby 1996).

The site is not considered to be core breeding or roosting habitat and taking into account the nature and scope of the proposed development (refer section 5), and the foraging range of the species, it is unlikely that a viable local population of the species is to be placed at risk of extinction.

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

Endangered populations are listed in Schedule 1 Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(c) " in the case of an endangered ecological community 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 be substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Endangered ecological communities are listed in Schedule 1 Part 3 of the Threatened Species Conservation Act 1995 and critically endangered ecological communities are listed in Schedule 1a Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

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(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 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".

The extent of habitats to be removed or modified as a result of the development are summarised in section 5 of this report. Taking into account the mobility of the species and their foraging range, the proposed development will not isolate foraging habitat of the species and the suitable foraging habitat will remain on the site, on the golf course and within the local area.

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

The area is not listed as critical habitat under Part 3 Division 1 of the Threatened Species Conservation Act 1995. There is no critical habitat within the site or in close proximity to the proposed development.

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

Recovery plans are prepared under the provisions of Part 4, Division 1 of the Threatened Species Conservation Act 1995. There is no recovery or draft recovery plan prepared for the species.

Threat Abatement Plans are prepared under the provisions of Part 5, Division 1 of the Threatened Species Conservation Act 1995. There is no final or draft Threat Abatement Plans relevant to this species.

(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."

Currently there are 36 Key Threatening Processes listed in the Threatened Species Conservation Act 1995. Key Threatening Processes relevant for the species include:

- Clearing of Native Vegetation

Whilst the Clearing of Native Vegetation is listed as a key threatening process, based upon the nature and scope of the proposed development (refer section 5) the proposed development will not significantly increase threatening processes in relation to this species.

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Summary Species – Grey-headed Flying-fox (*Pteropus poliocephalus*)

Based upon the nature and scope of the proposed development (refer section 5) and this assessment, it is considered that the proposed development is unlikely to have a significant impact on the species – Grey-headed Flying-fox (P*teropus poliocephalus)*.