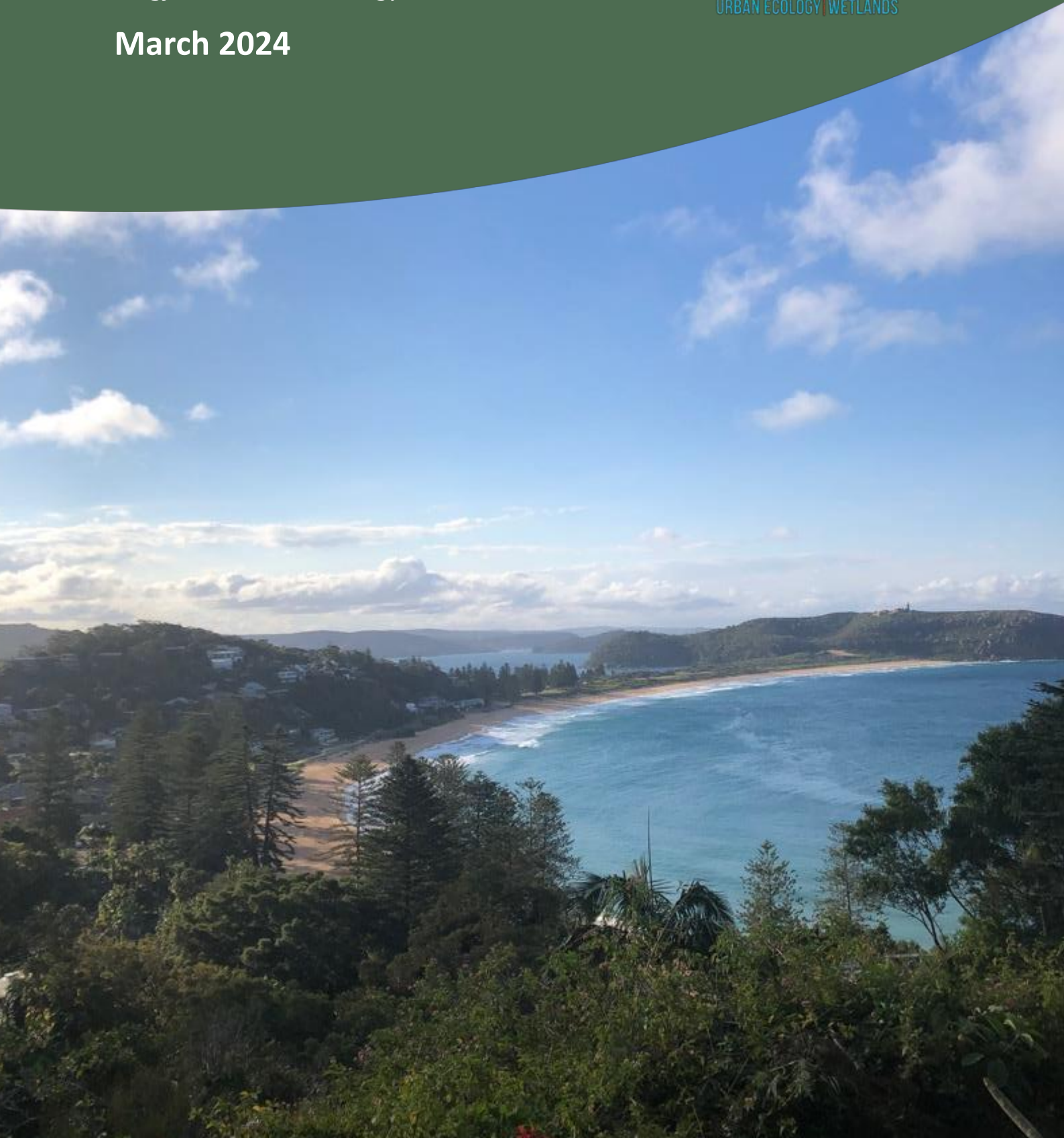


Flora and Fauna Assessment

6 Mitchell Road, Palm Beach

*By Ecological Consultants Australia Pty Ltd TA
Kingfisher Urban Ecology and Wetlands*

March 2024





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Statement of Authorship

This study and report was undertaken by Ecological Consultants Australia at Studio 1/33 Avalon Parade, Avalon. The author of the report is Geraldene Dalby-Ball with qualifications BSc. majoring in Ecology and Botany with over 20 years of experience in this field.

Limitations Statement

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

Document tracking

Date	Rev	Details	Prepared by	Approved by	Distribution
Sep 2020	01	Final for DA submission	Geraldene Dalby-Ball Jack Hastings	GDB	Stephen Lesiuk
May 2022	02	Northern Beaches Council RFI	Geraldene Dalby-Ball Jack Hastings	GDB	Shaw Reynolds c/o Roger Bain
Mar 2024	03	Updated development plans, site inspection, and photos.	Brooke Thompson	GDB	Housed Architects c/o Roger Bain

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

A handwritten signature in black ink, appearing to read "G Dalby Ball", is positioned to the right of the signed text.

Summary

Introduction

- This Flora and Fauna was prepared for the Planning Proposal and proposed development at 6 Mitchell Road Palm Beach, Northern Beaches Council LGA.
- The proposed development involves the modification of the existing building.
- Recommendations have been provided to reduce the likelihood of impact and mitigate loss if the proposal is approved.

Methods

- On-ground survey took place in August and September 2019, June 2020, May 2022 and March 2024 by Senior Ecologist Geraldene Dalby-Ball.
- Flora and fauna observations were recorded on-site using binoculars. Notes, photos and samples of flora species were taken to assess the ecological health and value of the site.
- Bionet searches were performed for flora, fauna and endangered populations to identify if there were previous records of threatened species occurring within the local area using a 10km radius around the site.
- Review of the Planning Proposal and the proposed development it seeks to enable was evaluated for potential environmental impacts

Results

- No threatened flora or fauna species were recorded on-site during the survey or previously recorded via Bionet.
- Trees on site are a mix of exotic and native *Eucalyptus* and *Corymbia* spp. See Arborist Report.
- No significant habitat features, values or landscape corridors will be impacted by the proposed development.
- The proposal does not trigger entry into the BOS.
- Trees 8 and 11 are located within the development footprint and will require removal. Mexican Palm and an Illawarra Flame Tree.
- Tree protection will be consistent with the Arborist report (Beecher 2024) or any updates from Alex Austin (ArborSaw June 2022). The main trees to be managed are trees within proximity to building works. NB: see the final arborist report for details of works and tree numbers.
- The adjoining Bible garden/public recreation area will remain open to the public and unaffected by the proposal.
- All 5-part tests have concluded that the proposal is not likely to significantly affect Large Forest Owls, Grey-headed Flying-foxes or microbats and will not be likely to put the local populations at risk of extinction.

Mitigation measures

Should the Planning Proposal be approved, and the development that it seeks to enable also be approved and proceed, the below mitigation works will be required:

Before works:

- Tree Protection as per Arborist report.
- Removal of weeds to prevent the spread of seed.

During works:

- Preserve and protect sandstone outcrops
- Bush hygiene protocols are to be followed to prevent the spread of pathogens including *Phytophthora*.

After completion of works:

- Landscaping works will be conducted, native species recommended from Sydney Sandstone Coastal Communities.
- Management of the site's interface with the Bible Garden– to be detailed in a VMP.

Legislation: Various pieces of legislation apply to this location and the proposed works are in keeping with the objective of the Acts. Key Acts are listed below.

- *Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*.
- *Environmental Planning and Assessment Act 1979 (EP&A Act)*.
- *Biodiversity Conservation Act 2016 (BC Act)*.
- *Fisheries Management Act 1994 (FM Act)*.
- *National Parks & Wildlife Act 1974 (NP&W Act)*.
- *Biosecurity Act (superseding the Noxious Weed Act 1993) (NW Act)*.

Table of Contents

About this document	i
Document tracking	i
Summary	ii
1 Introduction	1
1.1 Scope of works	1
1.2 Limitations of the study	1
1.3 Subject site	1
1.3.1 Current condition	3
1.4 Proposed actions	1
1.5 Proposed development	1
1.6 Legislation and policy	1
1.7 Biodiversity Offsets Scheme	1
2 Methods	2
2.1 Site inspections	2
2.2 Site photos	2
2.3 Previous studies	7
3 Flora	8
3.1 Plant community types	8
3.2 Threatened flora	9
3.3 Flora findings from on-site inspections	9
3.3.1 Threatened plant species findings	9
3.3.2 Arborist report findings	9
4 Fauna	10
4.1 Threatened fauna	10
4.1.1 Likelihood of occurrence.....	11
4.1.2 Assessment of Significance (5-part tests) Summary	11
4.1.3 Endangered populations.....	11
5 Impacts	13
5.1 Direct impacts	13
5.1.1 Vegetation removal	13
5.2 Indirect impacts	14
5.2.1 Weed growth	14
5.2.2 Introduction of pathogens	14
5.2.1 Runoff	14
6 Recommendations	15
6.1 Mitigation measures	15
6.1.1 Delineation of work areas and tree protection	15
6.1.1 Erosion and runoff	15

6.1.2	Weed management, bush regeneration and planting.....	15
6.1.3	Weed Removal Techniques.....	15
6.1.4	Pathogen prevention	15
7	Appendices	16
7.1	Appendix I – Likelihood of occurrence.....	16
7.2	Appendix II – Weed removal techniques.....	26
7.3	Appendix III– Bushland hygiene protocols for Phytophthora	29
7.4	Appendix IV– Tests of Significance	31
7.4.1	Large Forest Owls.....	31
7.4.2	Microbats	33
7.4.3	Grey-headed Flying-Fox (<i>Pteropus poliocephalus</i>).....	35
7.5	Appendix V – Tree schedule (AIA)	37
7.6	Appendix VI – Local native plant nurseries.....	38

1 Introduction

1.1 Scope of works

Ecological Consultants Australia Pty Ltd (ECA) has been engaged to provide a Flora and Fauna Assessment to assess potential direct and indirect impacts on any threatened species, populations, and communities as per section 5A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), for the Planning Proposal and the proposed development it seeks to enable.

The 'test of significance' has been undertaken in accordance with the NSW Department of Planning and Environment (DPE) 'threatened species test of significance'. The test of significance is set out in s. 7.3 of the *Biodiversity Conservation Act 2016* (BC Act).

1.2 Limitations of the study

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

Surveys have occurred within 3 different seasons – the author has been on this site over 50 times in the past 20 years. Hence the data here has a high level of accuracy in terms of species occurring, or likely to occur, in the study area. Some species may be missed because they: (a) occur seasonally, (b) utilise different areas periodically (as a component of a more extensive home range), or (c) become dormant during specific periods of the year.

Rather, the survey provides the opportunity to sample the area, search specifically for species likely to be encountered within the available time frame and assess the suitability of habitat for particular species.

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

1.3 Subject site

The subject site is legally identified as Lot 1 of DP 1086858 (refer to site details in Table 1.1).

Table 1.1. Site details.

Legal description (Lot/DP)	Lot 1 of DP 1086858
Address	6 Mitchell Road, Palm Beach NSW 2108
Area	693 sqm
LGA	Northern Beaches Council
Land zoning	C4 – Environmental Living RE1 – Public Recreation



Figure 1.1. Subject site.

Source: SIX Maps.



Figure 1.2. Land zoning.

Source: NSW Planning Portal Spatial Viewer.

1.3.1 Current condition

The site is zoned C4 environmental living and partly RE1 public creation (caused by an inconsistent zoning change during subdivision of the land).

The yellow zone shown in Figure 1.3 is the area of proposed works. The blue zone shown in Figure 1.3 is known as The Bible Garden. This report considers impacts both on-site (yellow) and off-site (blue and surrounds).

The site currently contains an existing residential dwelling surrounded by exotic gardens.

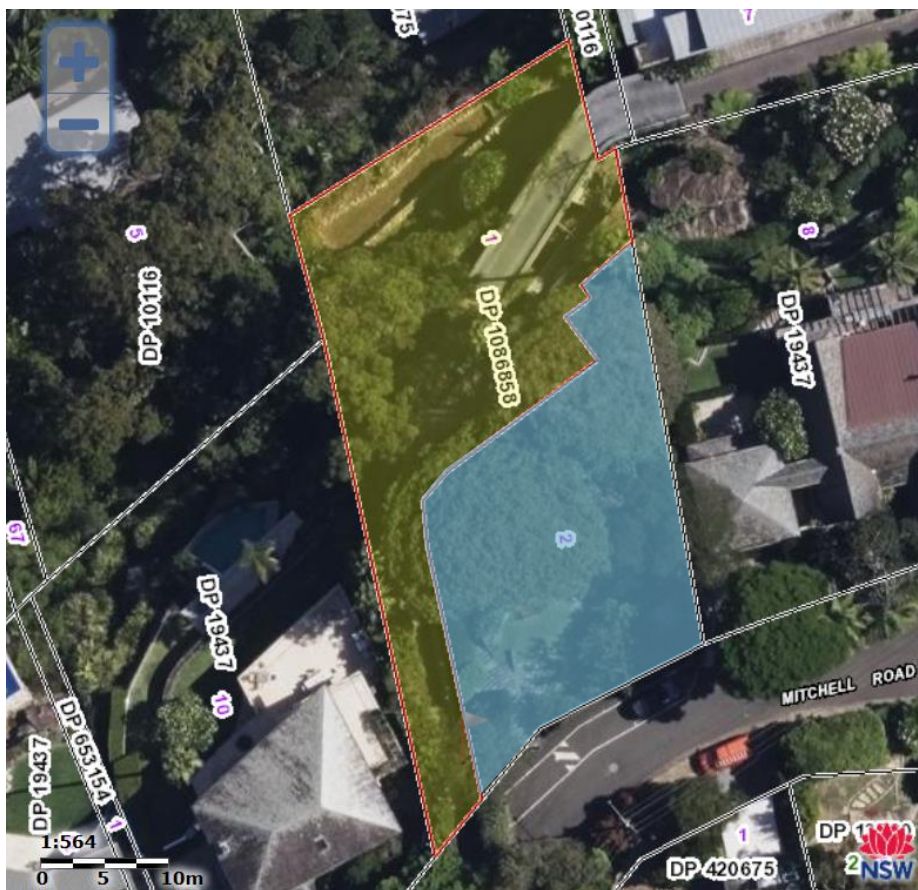


Figure 1.3. Areas of focus.

Source: SIX Maps.

1.4 Proposed actions

The proposed actions involve the amendment of the Pittwater Local Environmental Plan 2014 with the insertion of an additional permitted use for the subject site. This proposed additional permitted use is to enable the demolition of the existing dwelling and the construction of a new dwelling. The neighbouring Bible Garden will remain open to the public and unaffected by the proposal. It is noted that the Planning Proposal seeks additional permitted use of the site, and this will not affect the ecology of this area. The proposed development of the Planning Proposal seeks to enable only impacts on the ecology of the site and is the focus of this report.

1.5 Proposed development

The proposed development is for a new residential dwelling (see Figure 1.4).

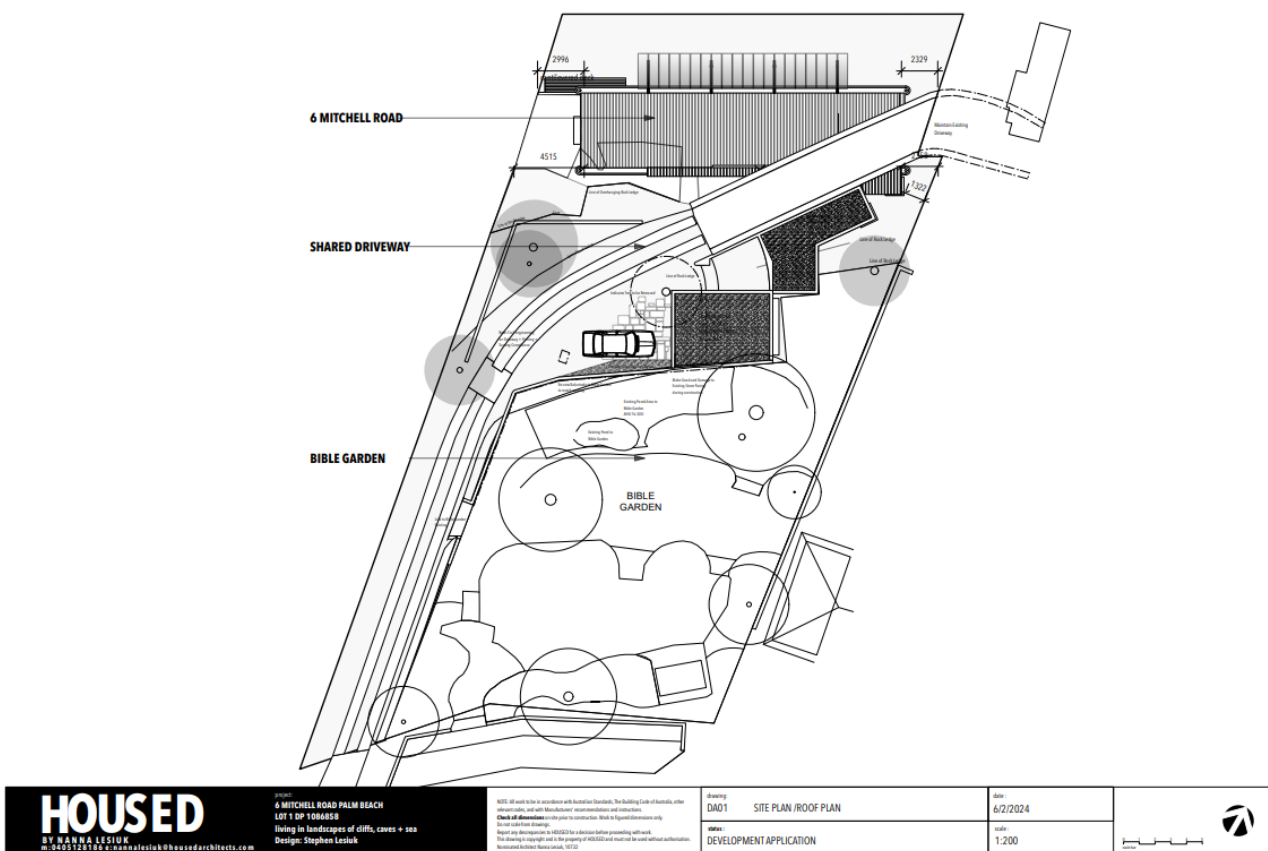


Figure 1.4. Site Plan.

Source: Housed Architects.

1.6 Legislation and policy

The implications for the proposal were assessed in relation to key biodiversity legislation and policy including:

- ***Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)***

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is applicable if it was considered that an impact on a 'matter of National Environmental Significance (NES)' was likely, thus providing a trigger for the referral of the proposal to the Department of Environment and Heritage.

Matters of national environmental significance identified in the Act are:

- world heritage properties;
- national heritage places;
- Ramsar wetlands;
- nationally threatened species and communities;
- migratory species protected under international agreements;
- the Commonwealth marine environment; and
- nuclear actions.

The site has no matters of national environmental significance.

- ***Environmental Planning and Assessment Act 1979 (EP&A Act)***

The EPA Act requires that the assessing body, in this case, the local government, consider the impact of the development on the surroundings – concerning this ecology report the impacts on the environment are assessed. The proposal indicates no significant impact on threatened species, populations or communities.

- ***Biodiversity Conservation Act 2016 (BC Act)***

Recently replacing the Threatened Species Conservation Act this includes the test of significance for impacts on threatened species and communities. The test of significance has been conducted and the proposal was found to not have a significant impact on the current ecology of the site. The proposed development is compliant with the BC Act.

- ***Biosecurity Act 2015***

The objectives of the Biosecurity Act are to manage and eradicate weeds that cause a high level of environmental, economic or social harm. With the removal of and management of weeds the proposed development will be compliant with the objectives of this Act.

- ***SEPP 19 Bushland in Urban Areas and SEPP (Vegetation in Non-rural Areas 2017)***

The proposed dwelling, garage and access have been designed to fit largely within the existing built-up areas. There are no direct impacts to bushland. One native tree and one exempt tree are proposed for removal.

- ***Pittwater LEP Zone E4 Environmental Living***

The Objectives of the E4 Environmental Living Zone are:

- To provide for low-impact residential development in areas with special ecological, scientific or aesthetic values.

- To ensure that residential development does not hurt those values.
- To provide for residential development of a low density and scale integrated with the landform and landscape.
- To encourage development that retains and enhances riparian and foreshore vegetation and wildlife corridors.

The proposed rebuild of a residential dwelling is consistent with the objectives of the C4 zone as the design is low-impact in that it is in the same location as the current dwelling keeps off the natural rock walls and sits within the landform and landscape (under the drive mainly – as per the existing dwelling).

The adjoining Bible Garden is zoned RE1 and the objectives of this zone are not compromised by the proposed build (from an ecological perspective).

- ***Pittwater DCP***

Several ecological DCP Controls apply to the land. The development is compliant with all.

In summary:

B4.6 Wildlife Corridors: the proposed development is compliant and planned in areas already disturbed and landscaping will assist with the connecting of corridors with a higher diversity of native species, currently exotics.

B4.22 Preservation of Tree and Bushland Vegetation. Low impact with two trees being removed and one of these being an exempt species. Native vegetation will be enhanced through landscaping and the conversion of weeds to natives.

C1.1 Landscaping. All canopy trays and a majority that is more than 50% of other vegetation shall be locally native species and the landscape plan shows that native species have been selected for this site. Landscaping does not include environmental weeds.

1.7 Biodiversity Offsets Scheme

The Biodiversity Conservation Act 2016 (BC Act 2016) is the key legislation that enables the conservation of biodiversity within the state of NSW. The BC Act 2016 facilitates the assessment and ongoing protection of flora and fauna, including threatened species and ecological communities. The BC Act 2016 outlines assessment and offsetting requirements for activities with the potential to impact threatened species and ecological communities in NSW, and the clearing of native vegetation.

The Biodiversity Conservation Regulation 2017 (BC Reg.) sets out the threshold level for when the Biodiversity Offsets Scheme (BOS) will be triggered. The threshold has two elements:

1. Whether the amount of native vegetation being cleared exceeds an area threshold

The proposal does not trigger the area clearing threshold as per the BOS entry requirements as the impact area does not exceed the threshold for clearing, above which BAM and offsets scheme apply (0.25 ha or more).

2. Whether the impacts occur on an area mapped on the Biodiversity Values Map published by the Environment Agency Head

The BV Map identifies land of high biodiversity value, as defined by clause 7.3(3) of the BC Reg. The BOS applies to the clearing of native vegetation and other biodiversity impacts prescribed by clause 6.1 of the BC Reg. on land identified on the BV Map. The proposed development footprint is not located on land identified on the BV Map and therefore does not trigger the BV Map threshold (Figure 1.5).

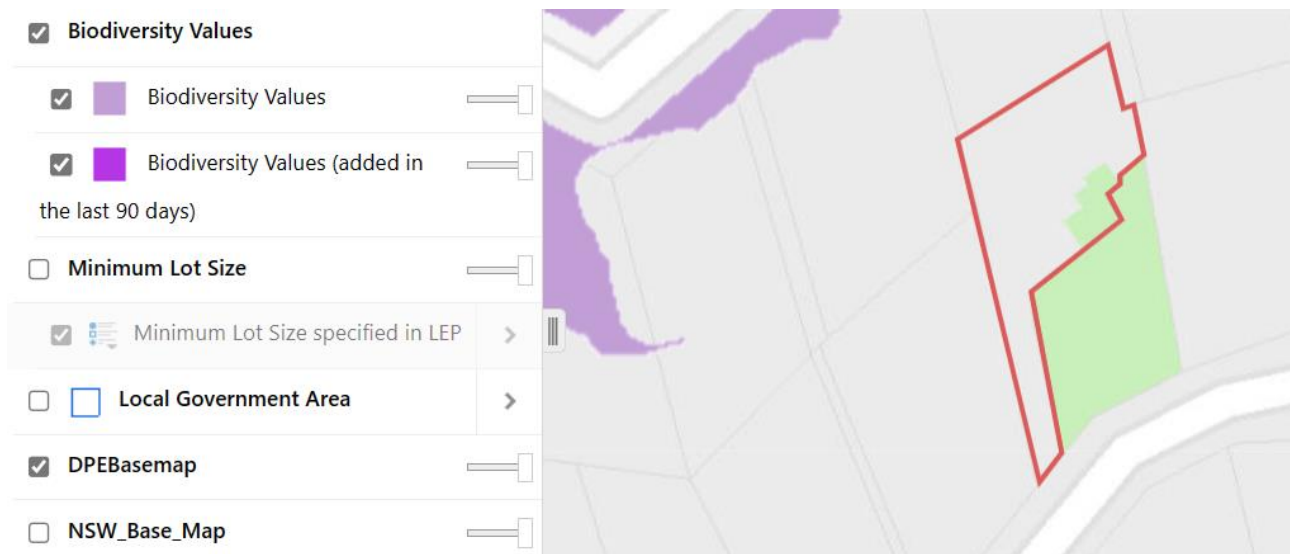


Figure 1.5. Biodiversity Values Map.

2 Methods

2.1 Site inspections

Senior Ecologist Geraldene Dalby-Ball assessed the site in August and September 2019, June 2020, May 2022 and March 2024.

During site visits, notes and photos were taken of the vegetation types, flora and fauna present. Due to the small area of proposed impacts, detailed or systematic surveys were not performed. Surveys were general and opportunistic in nature and were performed by traversing the site. Surveys included one diurnal bird and fauna survey, a single vegetation survey and a general habitat survey in which fauna habitat resources were identified.

2.2 Site photos

2020 site photos



Plate 1. Landscaped gardens across the site.



Plate 2.

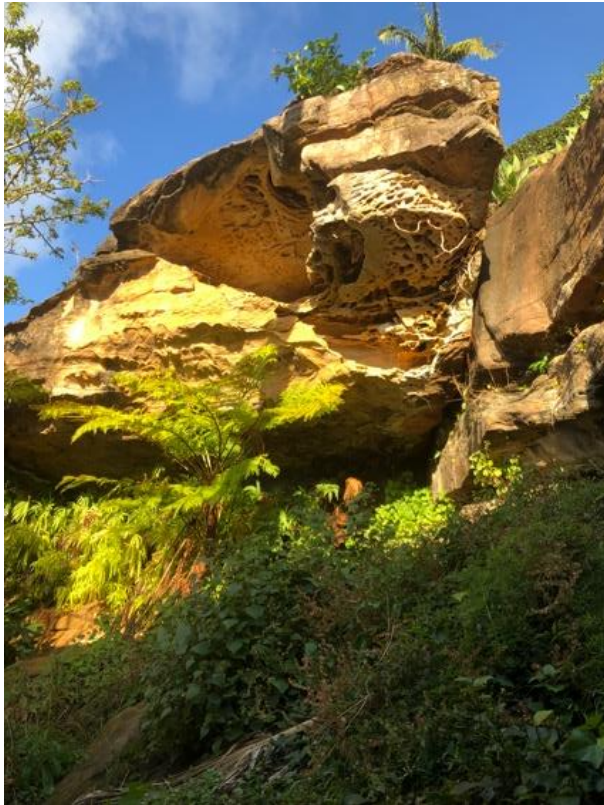


Plate 3. Rock overhang on the SW of the house.



Plate 4. Landscaped garden at the entrance of the property.



Plate 5. Asparagus fern to be removed.

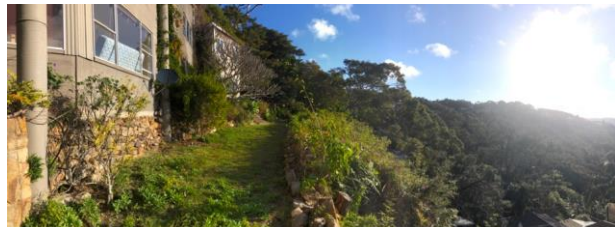
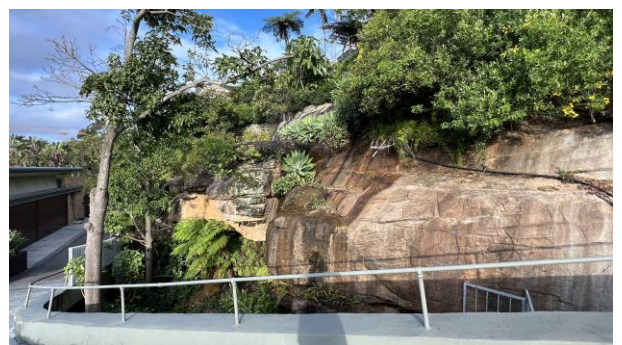
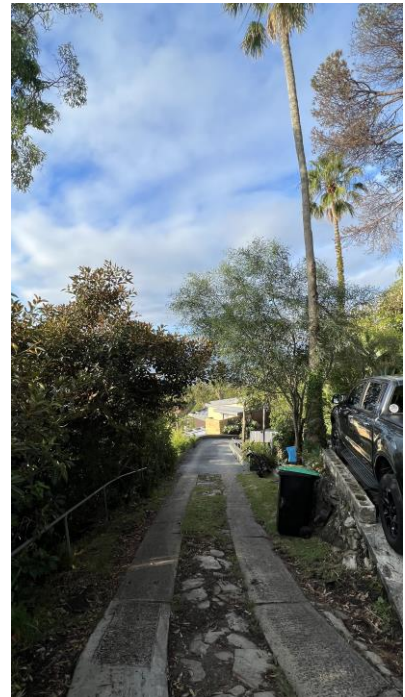
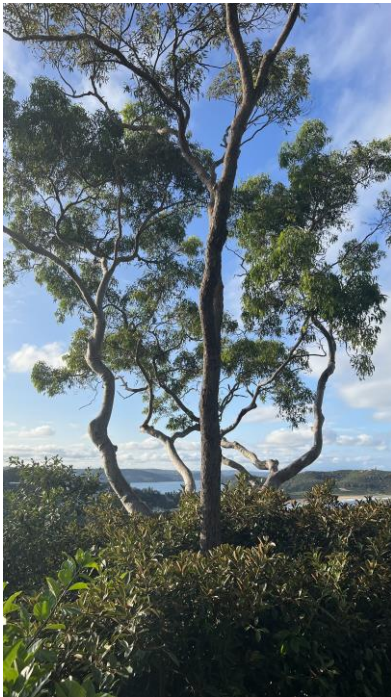


Plate 6. Front (northeast facing) aspect of the site. Exotic plants and weed species dominate. The slope is steep and the soil is shallow.

2024 site photos







2.3 Previous studies

Bionet, previous studies and the author's knowledge of the local area were used to determine the possible occurrence of endangered ecological communities and threatened plant species on-site. The Bionet records accessed covered an area of 10 km² extending from the site and include recordings from 1993 to the present day.

Records from the following databases were collated and reviewed:

- Atlas of NSW Wildlife (Bionet). New South Wales, Office of Environment and Heritage (OEH).
- NSW Threatened Species Information (DPIE).
- The Native Vegetation of the Sydney Metropolitan Area - Version 3.1 (OEH, 2016) VIS_ID 4489.
- PlantNET (The Royal Botanic Gardens and Domain Trust 2014).
- Protected Matters Search Tool of the Australian Government Department of the Environment (DoE) for matters protected by the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

Plans and drawings specific to this development;

- Development Application Plans, prepared by Housed by Nanna Lesuik, dated 6/02/2024, Drawings DA0, DA00, DA01, DA02, DA03, DA04, DA08, DA09, DA10, DA13, DA14, DA15 and DA21.
- Arboricultural Impact Assessment prepared by ECA, dated March 2024.

3 Flora

The purpose of the flora work was an investigation to determine the flora composition of the site, particularly vulnerable and endangered species. It also included an assessment of the flora as a habitat. Furthermore, an assessment of the potential impact of the development with a determination of native ground and shrubs was conducted.

3.1 Plant community types

The site and surrounding landscape of the Barrenjoey Peninsula have been heavily modified and is now a discontinuous patchy landscape of plant community types (PCTs). Bionet and SEED mapping have identified the site as having no associated PCT. It is difficult to conclude which PCT would have originally been found on-site; however, using PCT mapping and species surveyed in the Arborist report it was concluded that PCT 1776 (Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast) may have been found on-site. Some canopy species of this PCT remain on-site and there is a patch of this PCT present within 250m of the site (Figure 3.1)

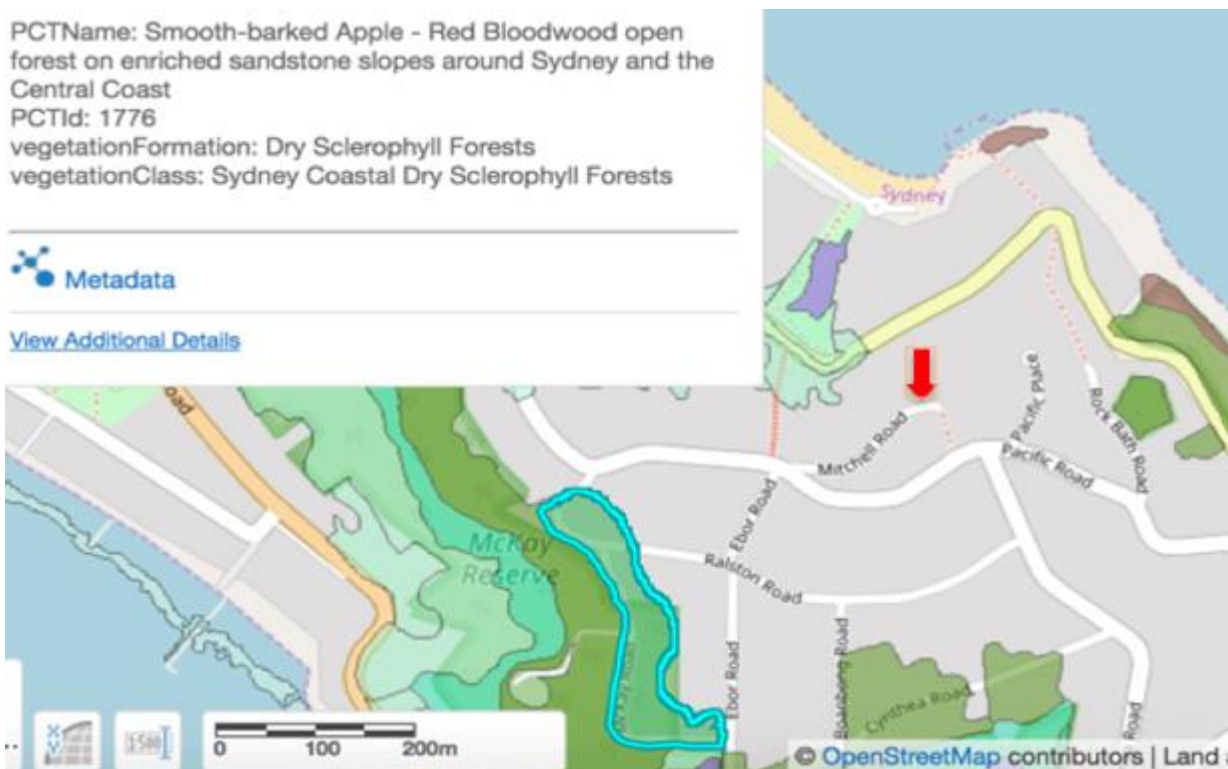


Figure 3.1. The site (red marker) has no associated PCT however PCT 1776 may have been found on-site before modification.

3.2 Threatened flora

Bionet records within a 10km radius of the site returned a total of six threatened flora currently listed as vulnerable or endangered under state and/or Commonwealth legislation (see Table 3.1).

Table 3.1. Bionet threatened flora recorded with a 10 km radius of the site.

Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Myrtaceae	<i>Callistemon linearifolius</i>	Netted Bottle Brush	V		22
Myrtaceae	<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	V	V	1
Myrtaceae	<i>Rhodamnia rubescens</i>	Scrub Turpentine	CE		2
Myrtaceae	<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	E	V	11
Proteaceae	<i>Persoonia hirsuta</i>	Hairy Geebung	E	E	3
Rutaceae	<i>Asterolasia elegans</i>		E	E	1

Note: CE = Critically Endangered, E = Endangered, V = Vulnerable, P = Protected.

3.3 Flora findings from on-site inspections

3.3.1 Threatened plant species findings

No threatened plant species were found during site assessments. The site does not contain an Endangered Ecological Community.

3.3.2 Arborist report findings

A total of eleven trees were surveyed as part of the Arborist report. They consist of a mixture of native and exotic species arranged in a formalized landscape planting around the existing driveway and dwelling. Trees were found to be in good condition. Species found on-site can be found below, and compressive tree data can be found within the tree assessment schedule Appendix V (Beecher 2020).

4 Fauna

4.1 Threatened fauna

Forty-four (44) fauna species are currently Bionet listed as vulnerable or endangered under state and/or commonwealth legislation within a 10km radius of the activity sight. The vulnerable and endangered species to focus on-site searches for can be seen in Table 2 below, this is based on likelihood of occurrence.

Table 4.1. Bionet threatened fauna recorded with a 10 km radius of the site.

Class	Scientific Name	Common Name	NSW status	Comm. status	Records
Amphibia	<i>Heleioporus australiacus</i>	Giant Burrowing Frog	V	V	40
Amphibia	<i>Pseudophryne australis</i>	Red-crowned Toadlet	V		49
Reptilia	<i>Caretta caretta</i>	Loggerhead Turtle	E	E	2
Reptilia	<i>Chelonia mydas</i>	Green Turtle	V	V	5
Reptilia	<i>Eretmochelys imbricata</i>	Hawksbill Turtle		V	2
Reptilia	<i>Varanus rosenbergi</i>	Rosenberg's Goanna	V		3
Aves	<i>Ptilinopus regina</i>	Rose-crowned Fruit-Dove	V		1
Aves	<i>Diomedea exulans</i>	Wandering Albatross	E	M	1
Aves	<i>Diomedea gibsoni</i>	Gibson's Albatross	V	V	1
Aves	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V	C	30
Aves	<i>Hieraaetus morphnoides</i>	Little Eagle	V		2
Aves	<i>Pandion cristatus</i>	Eastern Osprey	V		2
Aves	<i>Burhinus grallarius</i>	Bush Stone-curlew	E		36
Aves	<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	V		5
Aves	<i>Numenius madagascariensis</i>	Eastern Curlew		M	7
Aves	<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V		1
Aves	<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	V		28
Aves	<i>Glossopsitta pusilla</i>	Little Lorikeet	V		2
Aves	<i>Ninox connivens</i>	Barking Owl	V		12
Aves	<i>Ninox strenua</i>	Powerful Owl	V		152
Aves	<i>Tyto novaehollandiae</i>	Masked Owl	V		2
Aves	<i>Dasyornis brachypterus</i>	Eastern Bristlebird	E	E	1
Aves	<i>Petroica boodang</i>	Scarlet Robin	V		1
Mammalia	<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	E	3
Mammalia	<i>Isoodon obesulus obesulus</i>	Southern Brown Bandicoot (eastern)	E	E	8
Mammalia	<i>Phascolarctos cinereus</i>	Koala	E	V	20
Mammalia	<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V		6

Class	Scientific Name	Common Name	NSW status	Comm. status	Records
Mammalia	<i>Petaurus norfolcensis</i>	Squirrel Glider	V		1
Mammalia	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	60
Mammalia	<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V		1
Mammalia	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	2
Mammalia	<i>Myotis macropus</i>	Southern Myotis	V		2
Mammalia	<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V		2
Mammalia	<i>Vespadelus troughtoni</i>	Eastern Cave Bat	V		1
Mammalia	<i>Pseudomys novaehollandiae</i>	New Holland Mouse		V	1
Mammalia	<i>Arctocephalus forsteri</i>	New Zealand Fur-seal	V		2
Mammalia	<i>Arctocephalus pusillus doriferus</i>	Australian Fur-seal	V		2
Mammalia	<i>Eubalaena australis</i>	Southern Right Whale	E	E	4
Mammalia	<i>Megaptera novaeangliae</i>	Humpback Whale	V	V	11
Mammalia	<i>Physeter macrocephalus</i>	Sperm Whale	V		1
Mammalia	<i>Miniopterus australis</i>	Little Bent-winged Bat	V		8
Mammalia	<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V		11

Note: CE = Critically Endangered, E = Endangered, V = Vulnerable, P = Protected, Mig = Migratory.

4.1.1 Likelihood of occurrence

The likelihood of occurrence is a broad categorisation used by ECA to indicate the potential for a species to occur within the study area. It is based on expert opinion and implies the relative value of a study area for a species. See Appendix I for the rationale of the likelihood of occurrence.

4.1.2 Assessment of Significance (5-part tests) Summary

During the survey, no threatened species were observed on-site. Marginal foraging habitat is present on the study site for Grey-headed flying foxes, Microbats (various species) and Large Forest Owls. These highly mobile species would be expected to utilize the vegetation canopy for invertebrate foraging resources.

All 5-part tests have concluded that the proposal is not likely to significantly affect Large Forest Owls, Grey-headed Flying-foxes or microbats and will not be likely to put the local populations at risk of extinction.

Full 5-part tests can be found in Appendix IV.

4.1.3 Endangered populations

Two endangered populations have been recorded to occur within 10km of the site. Table 3 outlines these populations.

Squirrel Gliders on the Barrenjoey Peninsula and Koalas on the Barrenjoey Peninsula. Neither are within the study site or a corridor linking populations to those communities. No further assessment is required for these communities. Squirrel Gliders could be in the vegetation of McKay Reserve and the ridge-top woodland. This

site is discontinuous with habitat that may be used by Squirrel Gliders. The most recent glider records are from Chisholm Avenue in Avalon 2018.

Table 4.2. Endangered populations recorded within a 10 km radius of the site.

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Mammalia	Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala in the Pittwater Local Government Area	V	V	73
Mammalia	Petauridae	<i>Petaurus norfolcensis</i>	Squirrel Glider on Barrenjoey Peninsula, north of Bushrangers Hill	V		1

Note: E = Endangered, V = Vulnerable, P = Protected

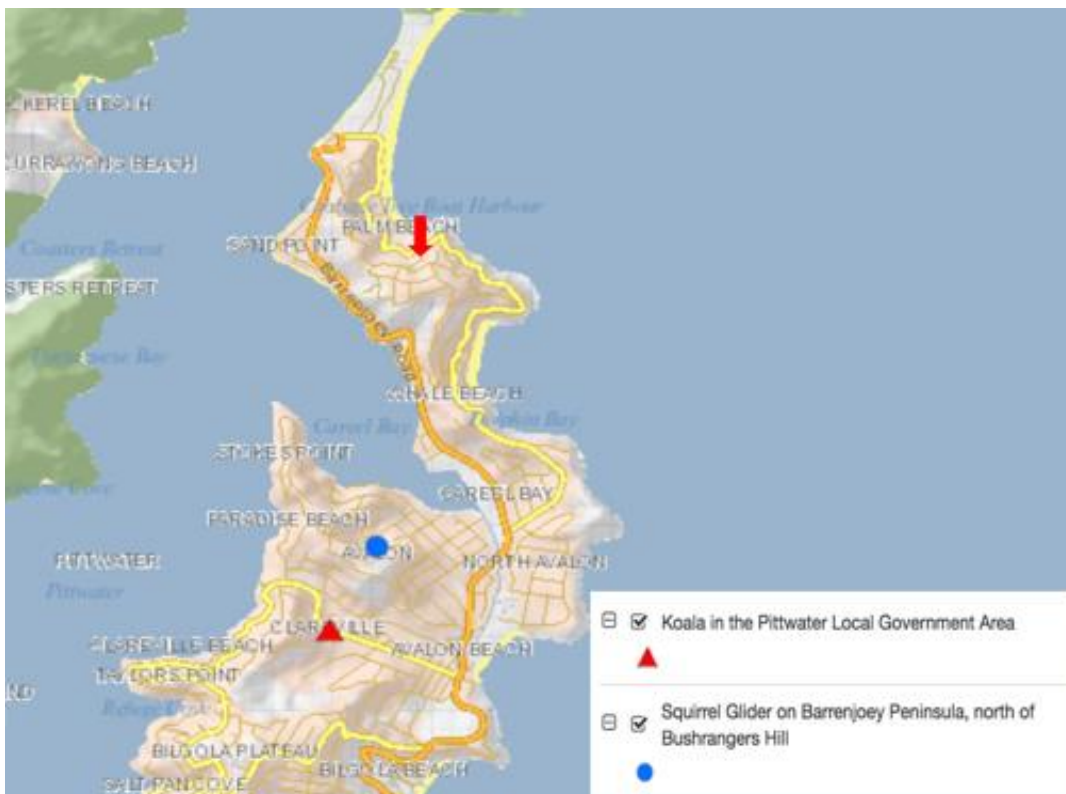


Figure 4.1. Site (red marker) and proximity to the endangered populations.

5 Impacts

5.1 Direct impacts

5.1.1 Vegetation removal

Trees 8 and 11 are located within the development footprint and shall require removal. Tree 11 is regarded as an exempt tree species under local tree preservation conditions.

No tree pruning works were identified as being required as part of the proposed development.

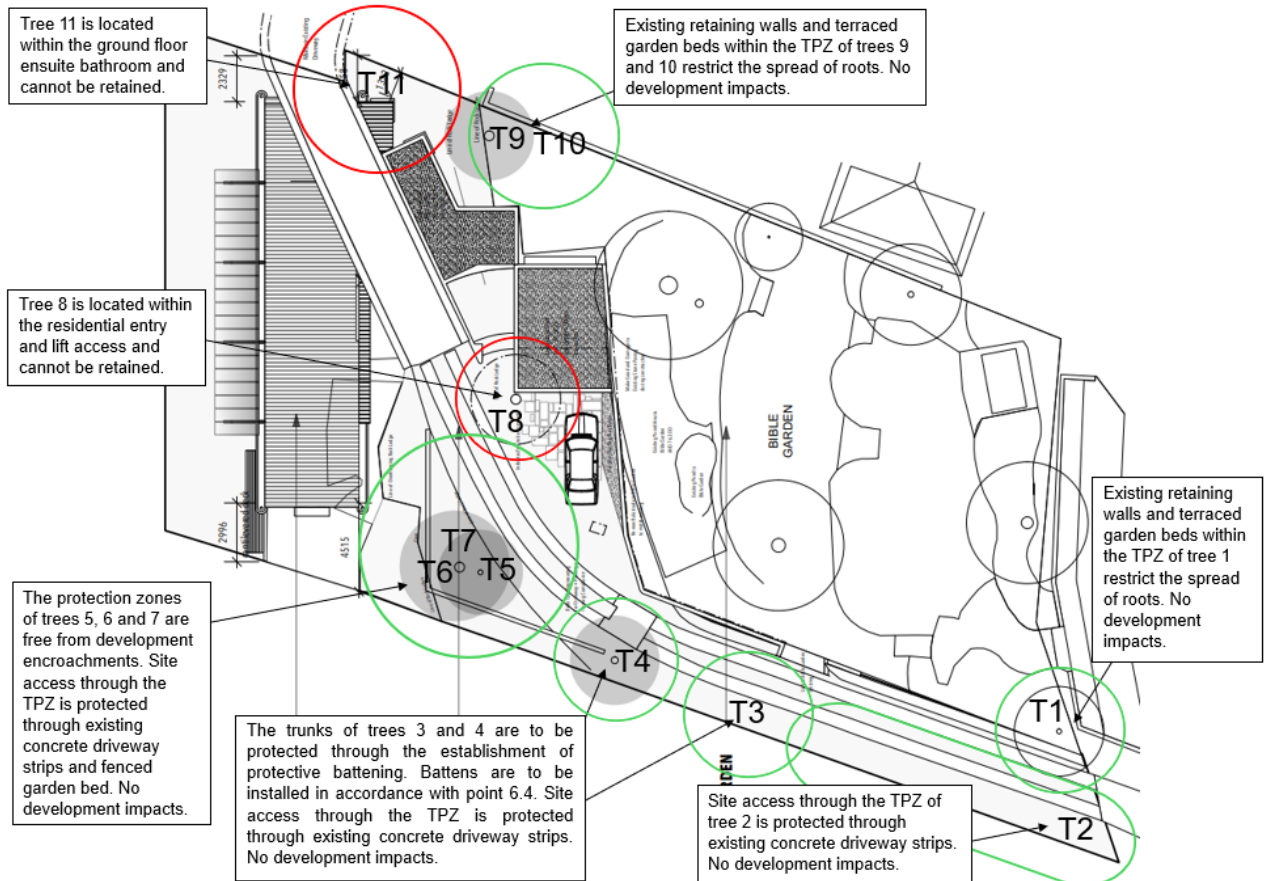


Figure 5.1. Tree locations.

Source: Arboricultural Impact Assessment.

5.2 Indirect impacts

Indirect impacts affecting species or communities will be insignificant as the site is already developed and the works will include staged weed removal and recreation of native flora of this community.

5.2.1 Weed growth

Weed species are already present and, if not treated, will grow in the direct works zone and surrounding landscaped areas through soil disturbance or by being brought in as seed on work machinery, tools, equipment and worker clothes (e.g. boots).

5.2.2 Introduction of pathogens

The introduction of pathogens may occur into the site, via machinery, tools, equipment and worker clothing (e.g. boots). Diseases to watch out for include Phytophthora (also known as Root Rot – a type of water mold) and Myrtle Rust (*Puccinia psidii* – a type of fungus). See the Appendix for methods to control selected pathogens.

5.2.1 Runoff

The proposed actions may result in the transport of sediment from the work zones as the site is steep. Sediment management will be essential along the northern boundary.

6 Recommendations

6.1 Mitigation measures

The following mitigation measures have been suggested if the development is approved.

6.1.1 Delineation of work areas and tree protection

During construction delineate works zones so that the area opened is minimised.

Implement protective measures (bunting/signage etc for rock faces.

Tree protection will be consistent with the Arborist report (Beecher 2024). The main trees to be managed are trees within proximity to building works. NB: see the final arborist report for details of works and tree numbers.

6.1.1 Erosion and runoff

Where required, sediment controls will be put in place. These will include, but not be limited to sediment fences, jute matting and crushed sandstone. Sediment controls will be reviewed during site inspections and/or after significant rainfall (more than 10mm in 24 hours resulting in site runoff).

6.1.2 Weed management, bush regeneration and planting

Weed management is required at all stages of the work. A weed management plan is being implemented for staged weed removal and native species landscaping is planned. No areas on the site had native species resilience and are not expected to naturally regenerate. Planting is required and a list of native nurseries has been included in the Appendices.

6.1.3 Weed Removal Techniques

Weed removal proposed for the site will consist of hand removal techniques, manual/mechanical removal using bush regenerator tools and winter thermal (flame) weeding. This approach will reduce the amount of herbicide used and reduce the amount of off-target damage through spot-on application.

Woody perennial weeds less than 2 metres in height will require cut and paint or scrape and paint bush regenerator techniques based on the germinating/epicormic behaviour of the plant (especially plants that tend to coppice or sucker).

It is recommended that seed heads are removed before the commencement of primary works. This would be best performed carefully by hand with secateurs to avoid the spread of flowers or seeds into planting zones.

See Appendix III for further details. For a key weed photo guide see Appendix VIII.

6.1.4 Pathogen prevention

To prevent the introduction of pathogens, Bushland Hygiene Protocols outlined in Appendix V should be followed. The site is considered to be an area that may promote the spread of Phytophthora (a group of fungus-like diseases affecting plants) due to its moist soil and proximity to water. It is recommended that Bushland Hygiene Protocols be followed closely.

7 Appendices

7.1 Appendix I – Likelihood of occurrence

Flora

Scientific Name	Common Name	Habitat Requirements	Likelihood of occurrence
<i>Callistemon linearifolius</i>	Netted Bottle Brush	For the Sydney area, recent records are limited to the Hornsby Plateau area near the Hawkesbury River. Was more widespread across its distribution in the past. There are currently only 5-6 populations in the Sydney area, of the 22 populations recorded in the past. Three of these are reserved in Ku-ring-gai Chase National Park, Lion Island Nature Reserve, and Spectacle Island Nature Reserve. Further north it has been recorded from Yengo National Park. Grows in dry sclerophyll forest on the coast and adjacent ranges.	No flora bearing the key identifying features of this species was seen within the site. No likelihood of occurrence.
<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	A medium-sized tree 15 - 20 m tall with rough, thick, grey-brown bark which extends to the larger branches. This species is widely planted as an urban street tree and in gardens but is quite rare in the wild	No flora bearing the key identifying features of this species was seen within the site. No likelihood of occurrence.
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	A tree to 15 m tall, but is generally 3–8 m high and shrubby in form. Found in rainforests on sandy soils or stabilised Quaternary dunes at low altitudes in coastal areas. Rainforests are often remnant stands of littoral or gallery rainforests.	No flora bearing the key identifying features of this species was seen within the site. No likelihood of occurrence.
<i>Persoonia hirsuta</i>	Hairy Geebung	The Hairy Geebung is found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone from near sea level to 600m altitude. It is usually present as isolated individuals or very small populations	No flora bearing the key identifying features of this species was seen within the site. No likelihood of occurrence.
<i>Rhodamnia rubescens</i>	Scrub Turpentine	Occurs in coastal districts north of Batemans Bay in New South Wales, approximately 280 km south of Sydney, to areas inland of Bundaberg in Queensland. Populations of <i>R. rubescens</i> typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000-1,600 mm. Found in littoral, warm temperate	No flora bearing the key identifying features of this species was seen within the site. No likelihood of occurrence.

		and subtropical rainforests and wet sclerophyll forests usually on volcanic and sedimentary soils. This species is characterised as highly to extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	
<i>Asterolasia elegans</i>		Occurs north of Sydney, in the Baulkham Hills, Hawkesbury and Hornsby local government areas. Found in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies that support sheltered forests.	No flora bearing the key identifying features of this species was seen within the site. No likelihood of occurrence.

Fauna

Scientific Name	Common Name	Habitat Preferences	Site Suitability
<i>Burhinus galleries</i>	Bush Stone-curlew	Inhabits open forests and grassy woodlands. Fallen branches and logs are key habitat features that provide camouflage for the bird as well as areas for foraging. It is found in all states, except for Tasmania. Feeds at night on insects and small vertebrates including frogs, lizards, snakes and mice.	The site presents low quality and low potential for the species to occur within the site. No further assessment or consideration is required.
<i>Isoodon obesulus obesulus</i>	Southern Brown Bandicoot (eastern)	Species found in heath or open forest with a healthy understorey on sandy or friable soils. They feed on a variety of ground-dwelling invertebrates and the fruit bodies of hypogeous (underground-fruiting) fungi.	The site presents low quality and low potential for the species to occur within the site. No further assessment or consideration is required.
<i>Heleioporus australiacus</i>	Giant Burrowing Frog	Sites must have native vegetation. The species has not been found on cleared land. Occurs in hanging swamps on sandstone shelves and along perennial creeks. The species is not restricted to watercourses.	The site presents low quality and no potential habitat within the site or in the immediate vicinity. Low potential for the species to occur within the site. No further assessment or consideration is required.

<i>Pseudophryne australis</i>	Red-crowned Toadlet	Occurs in open forests on Hawkesbury and Narrabeen Sandstones. Inhabits ephemeral drainage lines below sandstone ridges. Requires shelter in the form of rocks, dense vegetation and thick leaf litter.	Low potential for the species to occur within the site due to the low quality of the site. No further assessment or consideration is required.
<i>Varanus rosenbergi</i>	Rosenberg's Goanna	Found in heath, open forest and woodland. Associated with termites, the mounds of which this species nests in; termite mounds are a critical habitat component. Individuals require large areas of habitat. Feeds on carrion, birds, eggs, reptiles and small mammals. Shelters in hollow logs, rock crevices and burrows, which they may dig for themselves, or they may use other species' burrows, such as rabbit warrens.	The site presents low quality and no potential habitat within the site or in the immediate vicinity. Low potential for the species to occur within the site. No further assessment or consideration is required.
<i>Ptilinopus superbis</i>	Superb Fruit-Dove	The species is found in rainforests, rainforest margins, mangroves, wooded stream margins, and even isolated figs, lilly pillies and pittosporums. The Superb Fruit-Dove may migrate to New Guinea in winter, but little is known of its movements, or the reasons for its sometimes southerly flights as far as Tasmania. Feeds almost exclusively on fruit, mainly in large trees.	There is a low potential for the species to occur within the site. No further assessment is required.
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Occurs along the coastline and occasionally larger waterways.	Records of this species were recorded > 3 km away. Low potential for the species to occur within the site due to limited foraging. No further assessment or consideration is required.
<i>Hieraetus morphnoides</i>	Little Eagle	Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Lays two or three eggs during spring, and young fledge	Records of this species were recorded > 3 km away. Moderate potential for the species to occur within the site. No further assessment or consideration is required.

		in early summer. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion.	
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	Inhabits rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries. Forages on exposed rock or coral at low tide for foods such as limpets and mussels. Breeds in spring and summer, almost exclusively on offshore islands, and occasionally on isolated promontories.	The site presents low quality and low potential for the species to occur within the site. No further assessment or consideration is required.
<i>Glossopsitta pusilla</i>	Little Lorikeet	Prefers open Eucalypt forest and woodlands. Primarily feeds within the canopy of Eucalyptus, Angophora and Melaleuca trees. Prefers riparian areas but may visit isolated trees in open or cleared land.	The site presents low quality and low potential for the species to occur within the site. No further assessment or consideration is required.
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky cliff faces as den sites. Mostly nocturnal animals feed on medium-sized (500g-5kg) mammals.	The site presents low quality and low potential for the species to occur within the site. No further assessment or consideration is required.
<i>Phascolarctos cinereus</i>	Koala	Inhabit eucalypt woodlands and forests. Feeds on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.	The site presents no potential for the species to occur within the site. No further assessment or consideration is required.
<i>Cercartetus nanus</i>	Eastern Pygmy-possum	Found in rainforest communities to sclerophyll (including Box-Ironbark) forests, woodland and heath. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes, soft fruits are eaten when flowers are unavailable and insects.	The site presents no potential for the species to occur within the site. No further assessment or consideration is required.

<i>Petaurus norfolcensis</i>	Squirrel Glider	Inhabits mature or old-growth Blackbutt-Bloodwood forests with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstory. Requires abundant tree hollows for refuge and nest sites. Diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.	The site presents no potential for the species to occur within the site. No further assessment or consideration is required.
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Occurs within tall sclerophyll forests and woodlands, heath, swamp subtropical and temperate rainforests, and urban areas. Occurs within 20km of a significant food source. May be found close to gullies and water within vegetation with a dense canopy.	Potential habitat occurs within the site and in the surrounding areas. The species may utilize the remnant vegetation within the site as a foraging habitat. Specifically, the species would be expected to utilize the vegetation canopy for invertebrate foraging resources. (5 part test appendices IV)
<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	Prefers to roost in tree hollows but may roost under flaking bark or in man-made structures. Occurs east of the Great Dividing Range throughout dry sclerophyll forests, woodlands, swamp forests and mangrove forests.	Potential habitat occurs within the site and in the surrounding areas. The species may utilize the remnant vegetation within the site as a foraging habitat. Specifically, the species would be expected to utilize the vegetation canopy for invertebrate foraging resources. (5 part test appendices IV)
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Roosts in caves, cliff crevices, mine shafts and in old nests of the Fairy Martin. Typically inhabits low to mid-elevation well-timbered dry open forests and woodlands near suitable nesting. Prefers areas containing gullies.	Potential habitat occurs within the site and in the surrounding areas. The species may utilize the remnant vegetation within the site as a foraging habitat. Specifically, the species would be expected to utilize

			the vegetation canopy for invertebrate foraging resources. (5 part test appendices IV)
<i>Miniopterus australis</i>	Little Bentwing-bat	Roosts in tree hollows, caves, tunnels, mine shafts, stormwater drains, culverts, bridges and buildings. Forages for insects in the tree canopy in densely vegetated areas. Prefers moist eucalyptus forests, rainforests, vine thickets, wet and dry sclerophyll forests, Melaleuca swamps, dense coastal forests and banksia scrub. Prefers well-timbered areas.	Potential habitat occurs within the site and in the surrounding areas. The species may utilize the remnant vegetation within the site as a foraging habitat. Specifically, the species would be expected to utilize the vegetation canopy for invertebrate foraging resources. (5 part test appendices IV)
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	Primarily roosts in caves but will utilise mine shafts, storm-water tunnels, buildings and other man-made structures. Forms colonies within a maternity cave and disperses within a 300km range. Forage in forested areas in the tree canopy.	Potential habitat occurs within the site and in the surrounding areas. The species may utilize the remnant vegetation within the site as a foraging habitat. Specifically, the species would be expected to utilize the vegetation canopy for invertebrate foraging resources. (5 part test appendices IV)
<i>Myotis macropus</i>	Southern Myotis	Roosts in groups of 10-15 in areas close to water. Will utilise caves, mine shafts, tree hollows, storm water drains, buildings, bridges and dense foliage. Forages over water bodies catching insects and small fish.	Potential habitat occurs within the site and in the surrounding areas. The species may utilize the remnant vegetation within the site as a foraging habitat. Specifically, the species would be expected to utilize the vegetation canopy for invertebrate

			foraging resources. (5 part test appendices IV)
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	Roosts in tree hollows may be found in buildings. Primarily found in gullies and river systems that drain the Great Dividing Range. Occurs in a range of habitats including woodlands to moist or dry eucalypt forests, and rainforest with the greatest preference for tall wet forests. Forages along creeks and river corridors.	Potential habitat occurs within the site and in the surrounding areas. The species may utilize the remnant vegetation within the site as foraging habitat. Specifically, the species would be expected to utilize the vegetation canopy for invertebrate foraging resources. (5 part test appendices IV)
<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	Lives in coastal woodlands and drier forest areas, open inland woodlands or timbered watercourses where casuarinas (or sheoaks), its main food trees, are common. Glossy black cockatoos occasionally eat seeds from eucalypts, angophoras, acacias and hakeas, as well as eating insect larvae.	The site presents low-quality and low-potential habitat within the site or in the immediate vicinity. Low potential for the species to occur within the site. No further assessment or consideration is required.
<i>Pandion cristatus</i>	Eastern Osprey	Inhabits coastal areas, especially the mouths of large rivers, lagoons and lakes. Feeds on fish over clear, open water. Breed from July to September in NSW. Nests are made high up in dead trees or dead crowns of live trees, usually within one kilometre of the sea.	The site presents low-quality and low-potential habitat within the site or in the immediate vicinity. Low potential for the species to occur within the site. No further assessment or consideration is required.
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forests in coastal areas and often	The site presents low-quality and low-potential habitat within the site or in the immediate vicinity. Low potential for the species to occur within the site. No further assessment or consideration is required.

		found in urban areas. Favours old-growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts.	
<i>Ninox connivens</i>	Barking Owl	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend into closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey on these fertile soils. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. During nesting season, the male perches in a nearby tree overlooking the hollow entrance. Preferentially hunts small arboreal mammals such as Squirrel Gliders and Ringtail Possums, but when the loss of tree hollows decreases these prey populations the owl becomes more reliant on birds, invertebrates and terrestrial mammals such as rodents and rabbits.	Potential foraging habitat occurs within the site and in the surrounding areas. Specifically, the species would be expected to hunt small mammals from the outer canopy. There is moderate potential for the species to occur within the site. Further assessment is required. (5 part test appendices IV)
<i>Ninox strenua</i>	Powerful Owl	The species requires large tracts of forest or woodland, however fragmented landscapes can contribute to their range. Breeds in forests and woodlands but may forage in open areas. Mainly preys upon medium sized arboreal mammals. Requires tree hollows for breeding.	Potential foraging habitat occurs within the site and in the surrounding areas. Specifically, the species would be expected to hunt small mammals from the outer canopy. There is moderate potential for the species to occur within the site. Further assessment is required. (5 part test appendices IV)
<i>Tyto novaehollandiae</i>	Masked Owl	The species prefers dry eucalypt forests and woodlands and hunts along the edges and forests and roadsides. Mainly preys upon arboreal and	Potential foraging habitat occurs within the site and in the surrounding areas. Specifically, the species would be




		ground mammals, primarily rats. Requires tree hollows in moist gullies for breeding.	expected to hunt small mammals from the outer canopy. There is moderate potential for the species to occur within the site. Further assessment is required. (5 part test appendices IV)
<i>Phascolarctos cinereus</i>	Koala in the Pittwater Local Government Area	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Inactive for most of the day, feeding and moving mostly at night. Spend most of their time in trees, but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.	No kola has been seen within the site. Low potential for the species to occur within the site. No further assessment or consideration is required
<i>Petaurus norfolcensis</i>	Squirrel Glider on Barrenjoey Peninsula, north of Bushrangers Hill	The availability of a year-round supply of carbohydrates (nectar, sap, gum, and honeydew) appears to be an important habitat feature. In NSW, this corresponds to a high diversity of tree and shrub species, including a high nectar producing species and one or more winter flowering species. In Pittwater, important food sources are likely to be the winter flowering Coast Banksia (<i>Banksia integrifolia</i>) and Spotted Gum (<i>Corymbia maculata</i>) and the summer flowering Old Man Banksia (<i>B. serrata</i>) and Grey Ironbark (<i>Eucalyptus paniculata</i>). Other likely food sources include <i>Angophora costata</i> , <i>Banksia spinulosa</i> , <i>Corymbia gummifera</i> , <i>Eucalyptus botryoides</i> , <i>E. punctata</i> , <i>E. robusta</i> , <i>Melaleuca quinquernervia</i> , mistletoes and <i>Xanthorrhoea</i> species. This animal will gouge and lick incisions on the trunks and main branches of <i>Eucalyptus</i> , <i>Corymbia</i> and <i>Angophora</i> trees to feed on sap and on <i>Acacia</i> trees and shrubs to feed on gum, especially when nectar is in short supply.	No sightings nor markings were present on the trunks of foraging trees. No further assessment or consideration is required
<i>Petroica boodang</i>	Scarlet Robin	The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally	The site presents low quality and low potential habitat within the site or in the immediate vicinity. Low potential for the

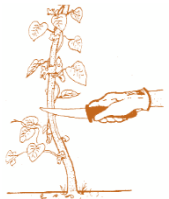

		occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat.	species to occur within the site. No further assessment or consideration is required
<i>Dasyornis brachypterus</i>	Eastern Bristlebird	Habitat for central and southern populations is characterised by dense, low vegetation including heath and open woodland with a heathy understorey. In northern NSW the habitat occurs in open forest with dense tussocky grass understorey and sparse mid-storey near rainforest ecotone; all of these vegetation types are fire prone.	The site presents low quality and low potential habitat within the site or in the immediate vicinity. Low potential for the species to occur within the site. No further assessment or consideration is required
<i>Numenius madagascariensis</i>	Eastern Curlew	The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. The Eastern Curlew mainly forages on soft sheltered intertidal sandflats or mudflats, open and without vegetation or covered with seagrass, often near mangroves, on saltflats and in saltmarsh.	The site presents low quality and low potential habitat within the site or in the immediate vicinity. Low potential for the species to occur within the site. No further assessment or consideration is required
<i>Vespadelus troughtoni</i>	Eastern Cave Bat	The Eastern Cave Bat is found in a broad band on both sides of the Great Dividing Range from Cape York to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT. Very little is known about the biology of this uncommon species	Potential habitat occurs within the site and in the surrounding areas. The species may utilize the remnant vegetation within the site as foraging habitat. Specifically, the species would be expected to utilize the vegetation canopy for invertebrate foraging resources. (5 part test appendices IV)
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	The New Holland Mouse has a fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Known to inhabit open heathlands, open woodlands with a heathland understorey and vegetated sand dunes. Lives predominantly in burrows shared with other individuals	The site presents low quality and low potential habitat within the site or in the immediate vicinity. Low potential for the species to occur within the site. No further assessment or consideration is required

Note: Species in **bold** have been assumed as having appropriate habitat present on-site.

7.2 Appendix II – Weed removal techniques

Physical removal

Technique	Method	Equipment
<p>Hand Removal</p> 	<p>Seedlings and smaller weed species where appropriate will be pulled out by hand, without risk of injury to workers. The size that this can occur varies throughout the treatment area. Generally, it ranges from post seed to approximately 300mm in height.</p> <p>Rolling and raking is suitable for larger infestations of Wandering Jew. The weed can be raked and stems and plants parts rolled. The clump of weed material can then be bagged and removed from site.</p>	<p>Tools: Gloves, Rakes, Knife and Weed Bags</p>
<p>Crowning</p> 	<p>Plants that possess rhizomes or bulbs might not respond to various removal techniques and may need to be treated with crowning.</p> <p>A knife, mattock or trowel is to be driven into the soil surrounding the bulb or rhizome at an angle of approximately 45 degrees with surrounding soil, so as to cut any roots that may be running off. This is to occur in 360 degrees around the bulb/rhizome. The rhizome or bulb is to be bagged and removed from the site and disposed of at an appropriate waste recycling facility</p> <p>Soil disturbance is to be kept to a minimum when using this technique.</p>	<p>Tools: Knife, mattock, trowel, impervious gloves, and all other required P.P.E.</p>
<p>Cut and Paint Stems</p> 	<p>Weed species deemed unsuitable for hand removal shall be cut. Those that have persistent or vigorous growth will be cut and painted with Roundup® Biactive Herbicide or equivalent.</p> <p>Juvenile and smaller weed species will be cut with secateurs at base of plant, and herbicide applied via applicator bottle. Stem to be cut horizontally as close to the ground as possible, using secateurs, loppers or a pruning saw. Horizontal cuts to be made on top of stem to prevent the herbicide running off the stump.</p> <p>Apply herbicide to the cut stem immediately, within 10-20 seconds, before the plant cells close and the translocation of the herbicide is limited. Herbicide is not to reach sediment or surrounding non-targeting plants.</p>	<p>Tools: loppers, secateurs, pruning saw, herbicide applicator/sprayer, impervious gloves, Roundup® Biactive Herbicide and all other required P.P.E.</p>

Technique	Method	Equipment
<p>Scrape and Painting</p> 	<p>More resilient weed species, where other techniques are less reliable are to be scraped with a knife or chisel and painted with undiluted Roundup® Biactive Herbicide. Works to be carried out by a contractor with a current herbicide license.</p> <p>Weed species will be scraped with a knife or chisel up the length of the trunk, and herbicide applied via applicator bottle. Scrape the trunk from as close to the ground as possible to approximately ¾ of the plants height. Where trunk diameters exceed approximately 5 cm a second scrape shall be made on the other side of the trunk.</p> <p>Apply undiluted herbicide to the cut trunk immediately, within 10-20 seconds, before the plant cells close and the translocation of the herbicide is limited. All care must be taken by the contractor not to spill herbicide onto sediment or surrounding non-targeting plants.</p> <p>Follow up treatment may be required. If plants resprout, scrape and paint the shoots using the same method after sufficient regrowth has occurred.</p>	<p>Tools: knife, chisel, protective clothing, safety glasses herbicide applicator/sprayer, impervious gloves, Roundup® Biactive Herbicide, and all other required P.P.E.</p>
<p>Cut with a Chainsaw and Paint</p> 	<p>Larger size weed species, too large for cutting with hand tools, shall be cut with a chainsaw and painted with undiluted Roundup® Biactive Herbicide. Works to be carried out by a contractor with a current chainsaw and herbicide license.</p> <p>Larger weed species will be cut with a chainsaw at base of plant, and herbicide applied via applicator bottle. Cut the stem horizontally as close to the ground as possible, using the chainsaw. Remove upper branches to reduce bulk of plant.</p> <p>If cutting at the base is impractical, cut higher to get rid of the bulk of the weed, then cut again at the base and apply herbicide. Make cuts horizontal to prevent the herbicide running off the stump. Apply undiluted herbicide to the cut trunk immediately, within 10-20 seconds, before the plant cells close and the translocation of the herbicide is limited. Ensure there is no runoff of poison. All care must be taken by the contractor not to spill herbicide into water, onto sediment, or surrounding non-targeting plants.</p> <p>Follow up treatment will be required. If plants resprout, cut and paint the shoots using the same method.</p>	<p>Tools: chainsaw, ear muffs, protective clothing, safety glasses herbicide applicator/sprayer, impervious gloves, Roundup® Biactive Herbicide, and all other required P.P.E.</p>

Technique	Method	Equipment
Spot Spraying	<p>Spot spraying involves spraying non-seeding annuals and grasses, and for regrowth of weeds once an area has been cleared or brushcut. Works to be carried out by a contractor with a current herbicide license.</p> <p>Herbicide will be mixed up according to the manufacturer’s directions for the particular weed species being targeted. Mixed herbicide shall be applied to the targeted weed species with a backpack sprayer. All care must be taken by the contractor not to spill herbicide onto sediment or surrounding non-targeting plants.</p>	<p>Tools: protective clothing, safety glasses, herbicide sprayer, impervious gloves, Herbicide, and all other required P.P.E.</p>

Flame Weeding

Thermal (flame) weeding is a method where high temperatures are applied to weeds, causing the plant to die. Thermal weeding is particularly useful in situations where conservation or health considerations are high and weed density is low such as waterways where herbicide use is not permitted.

While flame weeding is not suited to most streetscapes due to the fire hazard nor can it be used on materials such as soft fall and similar playground equipment it is noted that ‘flame’ weeding in waterways allows weed management in areas where herbicides are not permitted.

Also for native vegetation areas thermal weeding, with a flame weeder, has been shown to stimulate germination of native plants while killing the seeds of annual weeds such as Devils Pitchfork, *Bidens pilosa*. Flame weeding is also effective in killing persistent weeds like Mother of Millions.

Best results are obtained when follow up weed control is undertaken 4-6 weeks after treatment. In addition, weed control should be conducted periodically after that for example to control weeds over a period of a year it is likely that between 3-5 applications will be necessary, depending on rainfall and the extent of the weed seed bank. This method is most effective on young annual weeds and least effective on older perennial weeds. In some cases, control of perennial weeds will be ineffective however this depends on the species present and its age.

7.3 Appendix III– Bushland hygiene protocols for Phytophthora

- Always assume that the area you are about to work in is free of the disease and therefore needs to be protected against infection.
- And, always assume that the activity you are about to undertake has the potential to introduce the disease.
- Arrive at site with clean shoes, i.e.: no dirt encrusted on them.
- If you arrive with shoes that are encrusted with dirt, they will have to be completely soaked in metho or disinfectant and allow a few minutes to completely soak in. NEVER scrape untreated dirt off your shoes onto the ground.
- Before you move onto the site spray the bottom of your shoes with 70 % metho. Bleach solution (1% strength) or household/commercial disinfectant (as per label) are also suitable.
- Check all tools and equipment that comes in contact with soil are clean before entering the area (they should have been cleaned on site at the end of the previous work session). If there is any dirt on them, spray them with 70% metho.
- Clean all tools at the end of each work session while still on site ensuring this is done away from drainage lines and adjacent work areas. Knock or brush off encrusted dirt and completely spray with 70 % metho. Replace in storage/transport containers.
- Preferably compost all weed material on site.
- Never drag vegetation with exposed roots and soil through bushland.
- When removing weeds from site, remove as much soil as possible from them in the immediate work area and carefully place vegetative material into plastic bags.
- Try not to get the bag itself dirty; don't put it on/in a muddy area.
- Always work from the lower part of a slope to the upper part.
- Always work in areas known to be free of the pathogen before working in infected areas.
- Minimise activities wherever possible when the soil is very wet.
- Vehicles should not be driven off track or into reserves (unless vehicle decontamination is carried out before and after entering a single work site)
- Only accredited supplies of plants/mulch to be used.

Kit should contain: 1 bucket, 1 scrubbing brush, 1 spray bottle (metho 70% solution), 1 bottle tap water, 1 bottle methylated spirits.

Facts about Phytophthora

Phytophthora cinnamomi (Phytophthora) is a microscopic, soil borne, water-mould that has been implicated in the death of remnant trees and other plants in Australian bushland. Phytophthora is not native to Australia. It is believed to have been introduced sometime after European settlement. Phytophthora is a national problem and is listed as a key threatening process under the Commonwealth's Environmental Protection and Biodiversity Conservation Act 1999.

Symptoms including Dieback

"Dieback" simply means dying or dead plants. There are many causes of dieback; Phytophthora is just one of them. Often dieback is the result of a combination of factors such as; changed drainage patterns and nutrient loads (e.g.: increased stormwater run-off) or changed soil conditions (e.g.: dumped fill or excavation of/near root zone). Plants that are stressed are more vulnerable to Phytophthora.

Initial symptoms of Phytophthora include; wilting, yellowing and retention of dried foliage, loss of canopy and dieback. Infected roots blacken and rot and are therefore unable to take-up water and nutrients. Severely infected plants will eventually die. Symptoms can be more obvious in summer when plants may be stressed by drought. If you suspect that Phytophthora is on your site, please contact the Bushcare team to collect a soil sample to be lab tested. This is usually done in the warmer months where conditions are optimum for the disease.

Infection

There is no way of visually telling if Phytophthora is present in the soil as its structures and spores are microscopic (invisible to the naked eye). Phytophthora requires moist soil conditions and warm temperatures for infection, growth and reproduction. Spores travel through moist soil and attach to plant roots. Once Phytophthora has infected a host plant it can grow inside plant root tissue independent of external soil moisture conditions. After infection, Phytophthora grows through the root destroying the tissue which is then unable to absorb water and nutrients.

7.4 Appendix IV– Tests of Significance

Test for determining whether proposed development or activity likely to significantly affect threatened species or ecological communities, or their habitats

The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

Source: <https://legislation.nsw.gov.au/#/view/act/2016/63/part7/div1/sec7.3>



7.4.1 Large Forest Owls

Barking Owl (*Ninox connivens*)

Powerful Owl (*Ninox strenua*)

Masked Owl (*Tyto novaehollandiae*)

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

The proposed work is not expected to remove any vegetation which would be considered foraging habitat for the species. Marginal foraging habitat for owl prey species may be removed (in the form of two trees) however this is not expected to cause a significant impact for forest owls.

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

Not EEC

- (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

N/A

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

N/A

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

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

Habitat for Large Forest Owls will not be removed because of this development. Marginal foraging habitat for owl prey species may be removed (in the form of two trees) however this is not expected to cause a significant impact for forest owls.

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

No core habitat will be removed or modified as a result of the proposed development. No areas of habitat will become fragmented or isolated from other areas of habitat as a result of the proposed action.

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

Trees being removed do not host optimal habitat requirements for forest owls. It is unlikely that the proposal would impact upon the long-term survival of the species in the locality.

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

No areas of outstanding biodiversity value yet listed for this area.

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

Clearing is a KTP, although the trees being removed are not expected to be significantly contributing to the species survival in the locality.

Conclusion:

This proposal is not likely to significantly affect Large Forest Owls and will not be likely to put the local population at risk of extinction.

7.4.2 Microbats

Seven species of microbat were assessed as having the potential to occur within the study area based on Bionet records. The following species have the potential to occur in the site or surrounding bushland:

- Eastern Freetail-bat (*Mormopterus norfolkensis*)
- Large Bent-winged Bat *Miniopterus orianae oceanensis*
- Little Bent-winged Bat (*Miniopterus australis*)
- Southern Myotis (*Myotis macropus*)
- Large-eared Pied Bat (*Chalinolobus dwyeri*)
- Greater Broad-nosed Bat (*Scoteanax rueppellii*)
- Eastern Cave Bat (*Vespadelus troughtoni*)



All of the recorded species are considered to be highly mobile and would be likely to be accessing the site occasionally or opportunistically as foraging habitat across a landscape of fragmented habitat. Although these species have differing habitat requirements, they have been assessed together as the trees to be removed would be considered marginal habitat for all five species.

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

The proposed work is not expected to remove vegetation which would be considered optimal or significant foraging/breeding habitat for the species. Marginal foraging habitat for microbat species may be removed (in the form of two trees) however this is not expected to place any microbat species at risk of extinction.

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

Not EEC

- (iii) 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

N/A

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

N/A

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

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

Optimal breeding and/or foraging habitat for Microbats will not be removed because of this development. Marginal foraging habitat for microbat species may be removed (in the form of two trees) however this is not expected to place any microbat species at risk of extinction.

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

No core habitat will be removed or modified as a result of the proposed development. No areas of habitat will become fragmented or isolated from other areas of habitat as a result of the proposed action.

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

Trees being removed do not host optimal habitat requirements for microbat species. It is unlikely that the proposal would impact upon the long-term survival of the species in the locality.

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

No areas of outstanding biodiversity value yet listed for this area.

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

Clearing is a KTP, although the trees being removed are not expected to be significantly contributing to the species survival in the locality.

Conclusion:

This proposal is not likely to significantly affect Microbats and will not be likely to put the local population of microbats at risk of extinction.

Recommendations

Micro-bat boxes could be installed on-site x 2 in trees in the Bible Garden area of the site or on the house structure in a non-exposed area. Boxes to be marine ply or equivalent and installed so that there is no nailing into the tree (see best practice – hanging of boxes and using coil-springs to keep in place). Boxes to be at least 4m above the ground.

7.4.3 Grey-headed Flying-Fox (*Pteropus poliocephalus*)

Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of natural resource shortages, they may be found in unusual locations. Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Annual mating commences in January and conception occurs in April or May; a single young is born in October or November. Can travel up to 50 km to forage; commuting distances are more often <20 km. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines.



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

The proposed work is not expected to remove vegetation which would be considered optimal or significant foraging/breeding habitat for the species. Marginal foraging habitat for the GHFF may be removed (in the form of two trees) however this is not expected to place the GHFF at risk of extinction.

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

Not EEC

- (v) 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

N/A

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

N/A

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

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

Optimal breeding and/or foraging habitat for the GHFF will not be removed because of this development. Marginal foraging habitat for the GHFF may be removed (in the form of two trees) however this is not expected to place the species at risk of extinction.

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

No core habitat will be removed or modified as a result of the proposed development. No areas of habitat will become fragmented or isolated from other areas of habitat as a result of the proposed action.

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

Trees being removed do not host optimal habitat requirements for the species. It is unlikely that the proposal would impact upon the long-term survival of the species in the locality.

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

No areas of outstanding biodiversity value yet listed for this area.

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

Clearing is a KTP, although the trees being removed are not expected to be significantly contributing to the species survival in the locality.

Conclusion:

This proposal is not likely to significantly affect the GHFF and will not be likely to put the local population of at risk of extinction.

7.5 Appendix V – Tree schedule (AIA)

Tree No.	Species	Development Impacts	Controls	Proposed action
1	<i>Malus</i> sp. (Apple Tree)	TPZ free from development encroachments. Root system of tree likely to be restricted to contained and terraced areas of garden beds within the Bible Garden.	No controls required, monitor tree health and condition throughout development process. Monitor site access requirements along driveway.	Retain
2	Mixed Screening Hedge	TPZ free from development encroachments.	No controls required, monitor tree health and condition throughout development process. Monitor site access requirements along driveway.	Retain
3	<i>Washingtonia robusta</i> (Mexican Palm)	TPZ free from development encroachments.	No controls required, monitor tree health and condition throughout the development process. Install trunk protection battening around trunk to prevent potential damage from vehicle access along driveway.	Retain
4	<i>Corymbia gummifera</i> (Red Bloodwood)	TPZ is free from development encroachments.	No controls are required, monitor tree health and condition throughout the development process. Install trunk protection battening around the trunk to prevent potential damage from vehicle access along the driveway.	Retain
5	<i>Corymbia gummifera</i> (Red Bloodwood)	TPZ is free from development encroachments.	No controls are required, monitor tree health and condition throughout the development process. No building materials or stockpiling of spoil are to be placed within the TPZ.	Retain
6	<i>Angophora costata</i> subsp. <i>costata</i> (Smooth-barked Apple)	TPZ is free from development encroachments.	No controls are required, monitor tree health and condition throughout the development process. No building materials or stockpiling of spoil are to be placed within the TPZ.	Retain
7	<i>Ficus rubiginosa</i> (Port Jackson Fig)	TPZ is free from development encroachments.	No controls are required, monitor tree health and condition throughout the development process. No building materials or stockpiling of spoil are to be placed within the TPZ.	Retain
8	<i>Washingtonia robusta</i> (Mexican Palm)	The tree is located within the footprint of the proposed entry stairs and lift access.	No controls are required. The tree cannot be retained under the current design.	Remove
9	<i>Washingtonia robusta</i> (Mexican Palm)	TPZ is free from development encroachments.	No controls are required, monitor tree health and condition throughout development process.	Retain
10	<i>Seratonis siliqua</i> (Carob)	TPZ free from development encroachments.	No controls are required, monitor tree health and condition throughout the development process.	Retain
11	<i>Brachychyton acerifolius</i> (Illawarra Flame Tree)	Tree located within the footprint of ground floor ensuite bathroom.	No controls are required. The tree cannot be retained under the current design.	Remove

7.6 Appendix VI – Local native plant nurseries

Avalon Aquatics

Phone: (02) 9918 4486 or sales@dragonflyenv.com.au for enquiries

Indigo Native Nursery

Address: Lot 57 Wattle Rd, Ingleside NSW 2101

Phone: (02) 9970 8709

Powder Works Nursery

Address: 20 Wilson Ave, Ingleside NSW 2101

Phone: 0404 087 714

Foleys Nursery

Address: 16 Macpherson St, Warriewood NSW 2102

Phone: (02) 9997 8573

Ingleside Plant Growers

Address: 165A Mona Vale Rd, Ingleside NSW 2101

Phone: 0438 383 757