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25 July 2018

In response to 'Natural Environment Referral Response – Biodiversity'
Application number DA2017/1274
Updated Biodiversity Referral Response – 19/07/2018
Biodiversity on the Bayview Golf Club land (52 Cabbage Tree Road and 1825 Pittwater Road, Bayview)

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Appendix from Clements *et al.* (2018) – Not included in this report

1.0 Introduction

This report provides additional information to address Northern Beaches Council's Updated Biodiversity Referral Response – 19 July 2018 received on 23 July 2018 (Appendix 1).

Council Issues	Addressed in
1. Non-compliance with Section 5a of the Environmental Planning and Assessment Act 1979 (EP&A Act).	Section 2.0
The initial development application was submitted under Part 4 of the EP&A Act 1979 in December 2017…. the application should have included Assessments of Significance prepared in accordance with the former planning provisions	Section 2.1 with Assessment of Significance of the proposal on the two plant species, 26 fauna species and two endangered ecological communities have been assessed using the 7 part test in Appendix 2.
Assessment of *Rhodamnia rubescens* – Scrub Turpentine – Preliminary listing as Critically Endangered. Council staff have recently identified the occurrence of habitat and an individual plant within the development footprint, close to the proposed maintenance facility shed and associated infrastructure. The recorded individual appeared to be suffering from myrtle rust; however, the trunk was alive at the time of observation.	Section 2.2 with further assessment of the *Rhodamnia rubescens* distribution and health and Assessment of Significance in Appendix 2.
2. Planning Instruments	Section 3.0
The proposal does not comply with Pittwater LEP 2014 Part 7.6 Biodiversity Protection.	Section 3.1
On balance, the proposal is considered to be inconsistent with Pittwater 21 DCP parts Control B4.6 Flora and Fauna Enhancement Category 2 and Wildlife Corridor	Section 3.2

2.0 Section 5A of the EP&A Act

2.1 Application of Relevant Planning Provisions

ISSUE RAISED

The initial development application was submitted under Part 4 of the EP&A Act 1979 in December 2017. The application was therefore submitted prior to commencement of the new Biodiversity Conservation Act 2016 (BC Act 2016) and constitutes a 'pending or interim planning application' as defined under Part 7, Clause 27 (1) (e) of the Biodiversity Conservation (Savings and Transitional) Regulation 2017. Part 7, Clause 28 of the regulation identifies that the application is to be assessed under the former planning provisions which include Section 5a of the EP&A Act 1979.

Additional information submitted by the applicant in July 2018 includes a comparison (refer to Clements et al 2018, section 2B.1) between the legislative requirements for the 'Assessment of Significance' under Section 5a of the EP&A Act 1979 and the new assessment requirements

under Section 7.3 of the BC Act 2016. Appendix 4 of the additional information (Clements et al 2018) includes assessments of impacts upon threatened species prepared in accordance with Section 7.3 of the BC Act 2016. As identified above, the application should have included Assessments of Significance prepared in accordance with the former planning provisions and therefore, the impact assessments in Appendix 4 of the additional information are not valid.

As identified by Clements et al 2018, the main difference between the relevant planning provisions is that Section 5a of the EP&A Act 1979 requires that the assessment consider 'whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.' The approved Recovery Plan for Large Forest Owls (DECC 2006) is considered relevant to the application given usage of the site by Powerful Owls and proximity of the development site to an active nest. The National Recovery Plan for Magenta Lilly Pilly *Syzygium paniculatum* (OEH 2012) is also applicable to the proposal given the occurrence of this species in proximity to the site. Of further relevance are the more recently published threatened species recovery strategies and actions identified online within the NSW Office of Environment and Heritage threatened species profiles and as part of the associated Saving our Species program.

On the basis of the above, the impact assessments provided as additional information do not adequately address the former planning provisions including Section 5a of the EP&A Act.

RESPONSE

The application was lodged on 19 December 2017 under the legislation at that time.

The proposal on the approximately 38.45 ha Bayview Golf Club (BGC) at 52 Cabbage Tree Road and 1825 Pittwater Road, Bayview is for:

- upgrading of the existing 18 hole golf course consisting of highly modified landform, vegetation and drainage pattern;
- the construction of Seniors' Housing consisting of 95 units on approximately 2 ha, impacting approximately 0.43 ha of between-fairway canopy trees with mown understorey and approximately 1.57 ha of mown fairways; and
- associated infrastructure including a roundabout in Cabbage Tree Road and buggy ways for improved safety.

Part 7, Clause 28 of the Biodiversity Conservation (Savings and Transitional) Regulation 2017 states that:

> *28 Former planning provisions continue to apply to pending or interim planning applications*
>
> *(1) The former planning provisions continue to apply (and Part 7 of the new Act does not apply) to the determination of a pending or interim planning application.*
>
> *(2) However, Part 7 of the new Act applies to the determination of a pending or interim planning application referred to in paragraph (b), (c) or (d) of the definition of pending or interim planning application in clause 27 (1) if the applicant or proponent and the planning approval body for the application agree in writing that Part 7 of the new Act is to apply to the determination of the application instead of the former planning provisions.*

In terms of the Assessment of Significance under the NSW former *Threatened Species Conservation Act 1995* and the current *Biodiversity Conservation Act 2016*, the main difference is that the assessment under the former legislation considers 'whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.'

The requirement under the *Biodiversity Conservation Act 2016* is that the "Biodiversity Conservation Program and associated Saving our Species strategies have replaced the need for recovery plans" (Office of Environment & Heritage website, http://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/programs-legislation-and-framework/recovery-plans, accessed on 23 July 2018). It is noted that:

> *Recovery plans helped us safeguard the future survival of threatened species. Although they are no longer being developed, existing recovery plans must be followed by public authorities.*
> *Recovery plans outline:*
> - *a specific species' life history, distribution and habitat*
> - *threats to a species*
> - *actions that can be taken to recover a species including the cost, time frame and agency responsible for carrying out these actions.*

The Assessment of Significance of the proposal on the 2 plant species, 26 fauna species and 2 endangered ecological communities have been assessed using the 7 part test (see Appendix 2). In Clements *et al.* (REF 2018) these species and communities were assessed using the current 5 Part Test.

In relation to the two plant species, 26 fauna species and two endangered ecological communities:

For the 28 species, there are:

- only eight relevant Recovery Plans for *Syzygium paniculatum*, Spotted-tailed Quoll, Grey-headed Flying Fox, Large-eared Pied Bat, Barking Owl, Powerful Owl, Swift Parrot, Green and Golden Bell Frog and a general recovery plan for Australian bats. There is also a draft Action Plan for Myrtle Rust in Australia; and
- species profiles for all species, except *Rhodamnia rubescens;* All of the species profiles under the heading Recovery Strategies refers to either:
  - *A targeted strategy for managing this species has been developed under the Saving Our Species program. or*
  - *A Saving Our Species conservation project is currently being developed for this species and will be available soon.*

For the two communities, Coastal floodplain community consisting of listed communities and their intergrades, and *Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion*, there are:

- no Recovery plans;
- community profiles for the communities; and
- "Help Save the Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion"; and "Help save the River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions".

In the Recovery Strategies section in the Community profiles for endangered ecological Coastal Floodplain communities, it is stated that:

- "A Saving Our Species conservation project is currently being developed for this species and will be available soon" for three of the four Coastal Floodplain communities that are likely to occur on BGC land; and
- For *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*, a targeted strategy has been developed.

Under the Saving our Species strategies, it was found that:

- the plant species, *Syzygium paniculatum* was a Site-managed species and *Rhodamnia rubescens* was not listed;
- all of the listed mammal species assessed were Landscape-managed species, except the Large-eared Pied Bat. This bat species was assessed to be a Data deficient species;
- all of the listed Bird species were Landscape-managed species, except the Glossy-black Cockatoo was a Feature project species and the Superb Fruit-Dove was a Partnership Species;
- the Amphibian Green and Golden Bell Frog was a managed species;
- for the endangered ecological communities, there is one of the Coastal floodplain communities with a Save our Species Strategy developed, with the other three under development; and Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion Save our Strategy has been developed.

For the 28 species and the two endangered ecological communities, 7 part tests under the former legislation are presented in Appendix 2.

2.2 Assessment of additional recorded individual of *Rhodamnia rubescens*

ISSUE RAISED

Assessment of *Rhodamnia rubescens* – Scrub Turpentine – Preliminary listing as Critically Endangered

The additional information and impact assessment (Clements *et al* 2018, appendix 4) completed for *R. rubescens* identifies that the habitat of this species will not be modified or impacted by the proposal.

Council staff have recently identified the occurrence of habitat and an individual plant within the development footprint, close to the proposed maintenance facility shed and associated infrastructure.

The recorded individual appeared to be suffering from myrtle rust; however, the trunk was alive at the time of observation.

On the basis of the above, further assessment is required in relation to the occurrence of this species on site.

RESPONSE

The area within the development footprint, close to the proposed maintenance facility shed and associated infrastructure of the proposed maintenance shed were searched by Tony Rodd and Joelan Sawyer on 24 July 2018. The area of the proposed maintenance shed was identified by the

BGC maintenance staff member, Charlie Bolte. There are extensive mounds of soil, dumpings and weed growth in the area close to the proposed maintenance shed.

A thorough search failed to locate any *Rhodamnia rubescens* in this area, including a 20 m x 20 m quadrat used to record vegetation structure and species composition on the rise to the west of the existing shed, and recordings of canopy/subcanopy species between two spot locations south of the existing golf shed (Tables 1, 2, Figure 3).

The Council was contacted for more information about the location of the recorded individual. An email confirming the phone conversation was sent on 24 July 2018 to Brendan Smith and Andrew Jennings. The location of the individual was described as follows:

> *South of the existing golf maintenance shed on a slight rise, about level with the proposed roundabout adjacent to some lantana. When it was found by Andrew Jennings of Council, the leaves of the plant have dropped off but the stem is still alive.*

A further phone conversation with Andrew Jennings was helpful in locating the individual plant.

Location of *Rhodamnia rubescens* - A single plant of *Rhodamnia rubescens* was found to be outside the BGC land security fence, probably on Council's road reserve of Cabbage Tree Road. It was approximately 1 m outside (north of) the BGC security fence and approximately 2.5 m from the edge of the footpath pavement. A hand-held GPS was used to record the coordinate 341758 E, 6273291 N, error ± 7 m (Figure 1).

Environmental setting - The plant of *Rhodamnia rubescens* was in a narrow strip of remnant forest on the south verge of Cabbage Tree Road. This remnant was elevated above the footpath by about 1.5 m and appears to preserve a strip of natural soil surface beside the road, which at this point runs in a shallow cutting with a 1 m wide footpath adjoining the kerb. The dominant tree was *Angophora floribunda* to a height of 12–18 m, although just inside the BGC land. There were two more massive trees, respectively of *Eucalyptus paniculata* and *Syncarpia glomulifera,* representing the original upper canopy on the BGC land. Beneath the canopy trees was a closed subcanopy of rainforest trees, shrubs, and climbers.

Vegetation - Native species recorded immediately around the *Rhodamnia rubescens*, outside the security fence, included:
Canopy tree: *Angophora floribunda;*
Rainforest subcanopy: *Cassine australis, Cyclophyllum longipetalum, Guioa semiglauca, Myrsine variabilis, Notelaea longifolia, Wilkiea huegeliana*;
Understorey: *Pandorea pandorana, Pittosporum revolutum, Dioscorea transversa, Sarcopetalum harveyanum, Smilax australis, Smilax glyciphylla, Doodia aspera,Gymnostachys anceps.*

Several exotic species were also present, including *Asparagus aethiopicus*, *Lantana camara* and *Nephrolepis cordifolia.*

The tree was approximately 3.5 m tall and divided from ground level into two vertical stems, respectively about 3 cm and 2.5 cm in diameter. It was initially recognised by its thinly scaly, reddish-brown bark, but looking upward revealed more and more foliage with the 3-veined leaves that distinguish this species from all other local rainforest trees.

In contrast to Andrew Jennings' finding that the plant was leafless and apparently dying, it displayed many fresh green leaves, some on obvious coppice growths along the main stems though quite plentiful also at the top of the canopy. Surprisingly, the new leaves showed no sign of Myrtle Rust infection, though because of harsh light conditions it needed the aid of the camera

flash to reveal that (see photographs in Appendix 3). The previously observed infestations by Myrtle Rust are no longer present which maybe due to the current dry winter weather reducing the extent of Myrtle Rust on the leaves.

The location of the *Rhodamnia rubescens* appears not to be in the area of the proposed maintenance shed, nor appears to be on BGC land. The area immediately adjacent within the BGC land, where the proposed shed is planned, is currently highly disturbed with heavy weed cover and disturbed soil. Some of the disturbance slightly further from the fence was in the form of hummocky dumped soil mounds and rubble. Another 10 m or so to the west there are stockpiled large quantities of tree loppings.

Conserving the *Rhodamnia rubescens* insitu – Careful removal of the dumped soil and rubble and tree loppings should be undertaken to minimise the existing risk to the *Rhodamnia rubescens* on the roadside prior to the proposed works. The *Rhodamnia rubescens* is approximately 15 m from the proposed shed (Figure 2).

In conversations with Andrew Jennings, there are other populations of *Rhodamnia rubescens* in the LGA and at one location the plants were apparently uninfected by myrtle rust and had yielded good seed for propagation. There is a chance, albeit slight, that such plants are genetically less susceptible to the disease and could provide material from which the plants could be raised for use in rehabilitating vegetation in some parts of the proposed conservation area.

3.0 Planning Instruments

3.1 Pittwater LEP 2014 Part 7.6 Biodiversity Protection

ISSUE RAISED

2. Planning Instruments
Pittwater LEP 2014 Part 7.6 Biodiversity Protection
The proposal does not comply with Pittwater LEP 2014 Part 7.6 Biodiversity Protection with reference to the following:
Before determining a development application for development on land to which this clause applies, the consent authority must consider:
(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or
(b) if that impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise that impact, or
(c) if that impact cannot be minimised - the development will be managed to mitigate that impact.

It is acknowledged that, based on the revised Bushfire Report and RFS requirements, no trees are proposed for removal within the required bushfire 'Asset Protection Zones' (APZs). In relation to siting of the proposal and impacts upon biodiversity, it is located within a heavily modified environment (golf course fairway as opposed to natural bushland); however, a large number of significant mature trees require removal within the development footprint. Large trees on this site are considered to have a high ecological value and contribute to canopy connectivity within a mapped wildlife corridor. Measures including the proposed conservation works and replanting of trees are noted but considered a very long term investment which does not sufficiently mitigate the impacts resulting from the proposal. The loss of significant canopy trees onsite is therefore

considered to be inconsistent with Part 7.6 Biodiversity Protection of the Pittwater LEP 2014.

RESPONSE

In response to the Planning Instrument, Pittwater LEP 2014 Part 7.6 Biodiversity Protection

(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or

The development has been sited to avoid any significant adverse environmental impact of the threatened species and ecological communities as shown from the Assessment of Significance (Appendix 2).

(b) if that impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise that impact, or

Alternate locations have been considered. The location of the proposed Seniors' Housing, maintenance shed and associated infrastructure have been carefully considered to minimise impacts on the threatened species and ecological communities, with the removal of no trees with large tree hollows in the development areas (see Figure A-4 in Clements *et al.* 2018).

(c) if that impact cannot be minimised - the development will be managed to mitigate that impact.

The development has been sited to minimise environmental impacts and avoid significant adverse environmental impacts.

In addition, in section 2C.1 Amelioration the existing threats of Clements *et al.* (2018, pages 10-12), it was pointed out that there are likely to be some possible non-significant indirect impacts from the proposal on some bats and birds through loss of some foraging habitat but the impacts were found to not be significant, namely:

Species	Recorded on BGC land	Likely increase in direct or indirect adverse impacts from the proposal
Mammals - Bats		
Grey-headed Flying-fox	Yes	Some possible indirect impacts through loss of some foraging habitat. Not a significant impact.
Large-eared Pied Bat		
Eastern Bentwing-bat		
Southern Myotis		
Little Bentwing-bat		
Eastern False Pipistrelle		
Eastern Freetail-bat		
Yellow-bellied Sheathtail-bat	No	
Greater Broad-nosed Bat		
Birds		
Powerful Owl	Yes	Some possible indirect impacts on the prey species

Species	Recorded on BGC land	Likely increase in direct or indirect adverse impacts from the proposal
		through loss of some foraging habitat. Not a significant impact.
Little Lorikeet	No	Some possible indirect impacts through loss of some foraging habitat. Not a significant impact.
Swift Parrot		
Little Eagle		
Square-tailed Kite	Yes	

In section 2C.2 (Clements *et al.* 2018, pages 13-16) measures to address the existing threats, both direct and indirect specific non-significant impacts from the proposal, on the threatened species and ecological communities, are as follows:

- existing fauna habitats of the remnants in conservation areas are to be protected, especially as the Powerful Owl has been observed to nest and raise young in the relative intact forest in the north-west of the BGC land;
- re-establishment of the fauna corridors on the BGC land to assist in the movement of arboreal fauna through the landscape;
- installation of both artificial hollows and nest boxes, especially for prey species for the Powerful Owl, with ongoing maintenance and monitoring;
- planting local native feed trees such as *Acmena smithii, Elaeocarpus reticulatus, Ficus* spp., *Eucalyptus* spp. and *Syzygium paniculatum*, consistent with Objective 8 of the VMP (see Part B of Clements *et al.* 2017);
- propagation of *Syzygium paniculatum* from the existing trees onsite to increase population size;
- retain and plant additional winter flowering feed trees such as *Eucalyptus robusta;*
- artificial lighting on the exterior of the complex should be subdued and directed so that it lights only areas such as pathways to minimise impacts on nocturnal species where it is required; and
- precautions to limit the spread of myrtle rust as well as monitor readily accessible plants of *Rhodamnia rubescens* on a monthly basis for Myrtle Rust and see if there is a correlation with recorded rainfall.

Lack of high conservation

The trees on the proposed location of the Seniors' Housing have no large tree hollows (see Figure A-4 in Clements *et al.* 2018).

The trees to be removed for the proposal are within a highly fragmented golf course landscape. The loss of 13 of the 84 identified hollow-bearing trees north of Cabbage Tree Road for the proposal does not include any of the 15 trees with large hollows, but does include 5 of 30 with medium hollows, 7 of 31 with small hollows and one of 8 trees with indeterminate hollows.

The trees in this area include Ironbark eucalypts which are slow to develop hollows. Large hollows are required for species such as the Powerful Owl.

These trees to be removed for the proposal are not of equal ecological value to that of the remnant stand of fully structured vegetation of high ecological value in the north west of the BGC land.

Lack of canopy connectivity for a wildlife corridor

The BGC land includes an 18 hole golf course. The landform, vegetation and drainage have been historically highly modified for playing golf, with the only areas with remnant structured vegetation being restricted to land unsuitable for playing golf. These areas with structured vegetation are generally reduced to narrow strips and located on land too steep for playing golf, too close to road boundaries or with high watertables. These remnant patches form a reduced, depauperate and degraded wildlife corridor.

The extensively cleared golf course land is considered a blockage to fauna movement in Pittwater Council's Habitat and Wildlife Corridors Conservation Strategy (Burcher 1995, page 8 cited in Clements *et al.* 2017). The BGC land is at best a reduced, depauperate and degraded wildlife corridor. It is a 'high priority area essential to fauna movement' (see Figure 2c in Clements *et al*. 2017). It is recommended in Burcher that thickening of the fairway vegetation is required to improve wildlife connectivity. This would not have been recommended if there was an existing wildlife corridor was not reduced, depauperate and degraded.

Mitigation of loss of trees by the proposal

The proposal aims to increase the size and connectivity of the conservation linkages and the ecological sustainability of the golf course.

The loss of 0.43 ha of between-fairway vegetation with mown understorey is being offset by an increase of native flora and habitat from approximately 6.86 ha to more than 15 ha. Most of the proposed increase in the natural vegetation is from the restoration and re-establishment of the listed endangered Coastal Floodplain communities under the NSW *Threatened Species Conservation Act 1995*.

There is a proposed increase in area from approximately 4.44 ha of degraded patches as well as the fragmented strips of historically planted *Casuarina glauca* to 11.9 ha of connected, restored and re-established fresh and brackish ecosystems of the listed Coastal Floodplain communities. The existing trees are to be largely retained as islands within the re-established watercourse. The increased tree numbers (estimated from degraded patches sampled in Transects 2 with density estimate of 450 trees/ha, Transect 3 with density estimate of 640 trees /ha) is in the order of 3,300 to 5,000 trees.

It is agreed that trees take years to grow. The trees in the between fairway vegetation have reduced potential for natural regeneration due to the ongoing golf management of mowing, topdressing and exotic grasses. The life span of these canopy trees also reduced by golf management. The new plantings are not in fairways and are to have co-occurring native vegetation, rather than managed exotic grasses.

The environmental sustainability of the BGC land is to be increased by re-establishing local native flora and fauna habitat including along the watercourses. The loss of 13 trees with hollows is proposed to be offset by the installation of nest boxes and constructed hollows. For the species such as the Powerful Owl, the limiting factor is the supply of preferred food – prey species. The preferred prey are possums that thrive on species including rainforest understorey species such as *Acmena smithii* and *Syzygium paniculatum*.

3.2 Pittwater 21 DCP parts Control B4.6 Flora and Fauna Enhancement Category 2 and Wildlife Corridor

ISSUE RAISED

Pittwater 21 DCP parts Control B4.6 Flora and Fauna Enhancement Category 2 and Wildlife Corridor
It is acknowledged that tree-covered slopes immediately south and west of the development are no longer proposed to be designated as APZs (Building Code & Bushfire Hazard Solutions Pty Limited, 9 July 2018). Furthermore, it is acknowledged that no trees are proposed to be removed for the APZs adjoining the proposal (Clements et al, 2018, section 3B.1). On this basis, the additional information has clarified some inconsistencies between the bushfire protection requirements and proposed retention of trees identified in the arborist report adjacent to the development.

Due to the bulk and scale of the proposed development, approximately 50% of the width (measured from north-east to south-west) of the mapped high priority wildlife corridor will be blocked by infrastructure, diminishing connectivity within the local landscape. Uncertainty remains about the proposed 'thickening' of fairway vegetation within the required APZs close to the development and how the proposed conservation areas surrounding the development area are able to be managed and still be an APZ. On balance, the proposal is considered to be inconsistent with Pittwater 21 DCP Control B4.6 Flora and Fauna Enhancement Category 2 and Wildlife Corridor.

Clause B4.6 of Pittwater DCP is specifically about *wildlife corridors*, with:

> *Outcomes*
> *Retention and enhancement of wildlife corridors ensuring/providing the connection of flora and fauna habitats.*

The BGC land has an historically highly modified landform, vegetation and drainage pattern for maximising its use as an 18 hole golf course. Native vegetation is largely restricted to reduced, depauperate and degraded patches with the exception of the steep land in the north-west.

These remnant native vegetation patches generally occur as narrow strips adversely impacted by the adjoining residential development close to the BGC property boundaries.

The extensively cleared golf course land is considered a blockage to fauna movement in Pittwater Council's Habitat and Wildlife Corridors Conservation Strategy (Burcher 1995, page 8 cited in Clements *et al.* 2017). The BGC land is at best a reduced, depauperate and degraded wildlife corridor. It is a 'high priority area essential to fauna movement' (see Figure 2c in Clements *et al*. 2017). It is recommended in Burcher that thickening of the fairway vegetation is required to improve wildlife connectivity.

The proposed outcomes are consistent with controls for Clause B4.6 of Pittwater DCP (details in section 3.0 of Clements *et al*. 2018). The outcomes relate to habitat improvements and providing potential niches for local native plant species as well as frog, bats, bird species and their populations. These measures are to form part of the increased environmental sustainability of the BGC land (ESDSC 1992). The project represents 'best practice' and its application should be carefully monitored and reported in peer-reviewed journals and community presentations.

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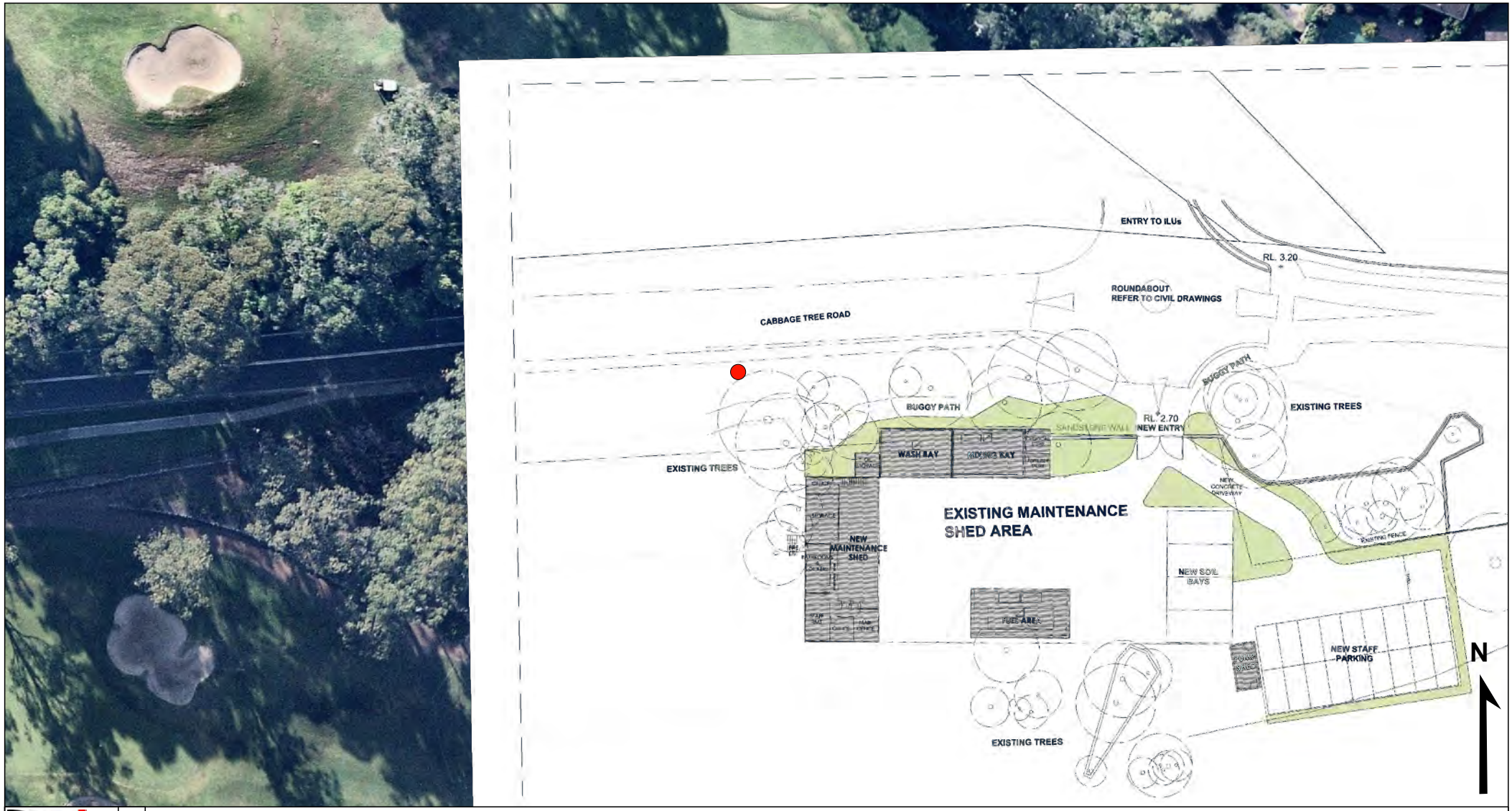
Figures

Figure 1.
Location of additional Rhodamnia rubescens searched for on 24 July 2018 overlaid Nearmap aerial photograph dated 13 June 2018



ANNE CLEMENTS & ASSOCIATES PTY. LIMITED
Environmental and Botanical Consultants

Date created: 25-07-2018

Confirmed Location of Rhodamnia Rubescens

0 15 30 m

Geocentric Datum of Australia 1994

Figure 2.
Location of additional Rhodamnia rubescens searched for on 24 July 2018 overlaid on 'New Maintenance Shed Area' by Marchese Partners dated 17 of November 2017

ANNE CLEMENTS & ASSOCIATES PTY. LIMITED
Environmental and Botanical Consultants

Date created: 25-07-2018

Quadrat 20

Spot locations U and V

Confirmed Location of Rhodamnia rubescens

0 15 30 m

Geocentric Datum of Australia 1994

Figure 3.
Quadrat 20, Spot locations and confirmed location of *Rhodamnia rubescens* overlaid Nearmap aerial photograph dated 13 June 2018

Figures referred to from Clements *et al. (2017)* – 2c
Figures referred to from Clements *et al.* (2018) – A4

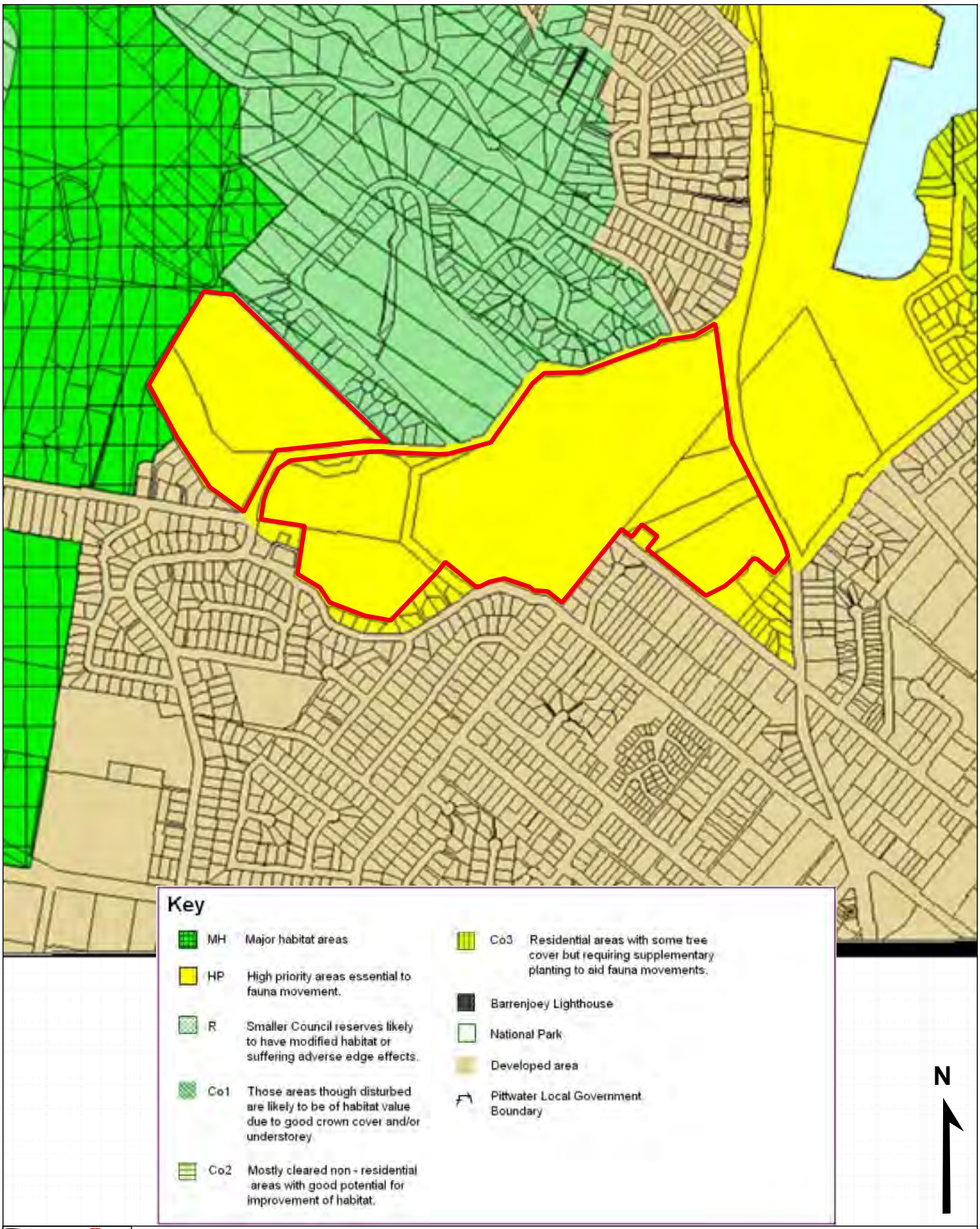


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Figure 2c.
Site boundary overlaid on extract of
Wildlife Corridor Location Map 9 from Pittwater Council

Figure A-4.
Locations of hollow bearing trees overlaid on the Nearmap aerial photograph dated 20 January 2018

Tables

Table 1
Percent of projected foliage cover and abundance of species recorded in the four 10 m x10 m sub-quadrats of Quadrat 20 – recorded 24 July 2018

Exotic	Species	20-1c	20-1a	20-2c	20-2a	20-3c	20-3a	20-4a	20-4c	U-V
*	*Acetosa sagittata*			0.1	1	0.2	1			
	Angophora floribunda			15	2	20	5	5	1	
*	*Araujia sericifera*	0.2	1			0.1	1			
*	*Asparagus aethiopicus*	3	5	5	10	1	3	2	5	
*	*Asparagus falcatus*			0.2	1					
*	*Bidens pilosa*	20	200			20	200			
*	*Brassica fruticulosa*					0.3	5	1	10	
	Casuarina glauca									X
	Cayratia clematidea			0.1	1	0.5	3	0.1	2	
*	*Cenchrus clandestinus*			20	50					
	Centella asiatica			0.5	5					
*	*Cinnamomum camphora*			5	1					
*	*Cissus alata 'Ellen Danica'*			5	1					
*	*Conyza sumatrensis*					1	30			
*	*Crassocephalum crepidioides*	0.1	20							
	Cryptocarya microneura			5	1					
	Cupaniopsis anacardioides	0.5	5			0.3	1	0.5	2	
#	*Cyathea cooperi*									X
	Cyclophyllum longipetalum	10	3							
	Dichondra repens					1				
	Dioscorea transversa	0.1	1							
*	*Ehrharta erecta*	40	100	3	20	10	50	12	200	
	Eucalyptus paniculata			40	1					
	Eucalyptus robusta									X
*	*Euphorbia peplus*	1	20			2	100	1	30	
	Ficus coronata									X
	Geitonoplesium cymosum					0.1	1			
	Geranium antrorsum									
*	*Lantana camara*			2	1					
	Livistona australis	10	1	10	1					
	Lomandra longifolia			2	4	0.2	1			
	Notelaea longifolia	1	3	0.1	1					
*	*Ochna serrulata*			0.2	1					
*	*Olea europaea subsp. cuspidata*	1	1							

Exotic	Species	20-1c	20-1a	20-2c	20-2a	20-3c	20-3a	20-4a	20-4c	U-V
	Pandorea pandorana			0.2	2	1	1			
*	*Parietaria judaica*					1	10			
	Persoonia stradbrokensis	2	2	2	1					
	Pittosporum revolutum			1	2					
	Pittosporum undulatum					3	2			
*	*Plantago lanceolata*					1	30			
*	*Plantago major*					0.1	1			
	Pteridium esculentum	0.5	3			0.1	1			
	Sarcopetalum harveyanum	0.1		3	3					
*	*Setaria palmifolia*	0.1	5	2	1	0.2	2			
*	*Solanum lycopersicum*	0.1	1							
*	*Solanum nigrum*	1	5			2	50			
*	*Stellaria media*					0.1	10			
	Stephania japonica	3	2	3	3	1	1			
	Syncarpia glomulifera	60	1							
*	*Verbena quadrangularis*					1	5	0.2	3	

Table 2
The number of individuals (#), maximum height (H in metres) and percent projected foliage cover (%) for species greater than 2 m in height in the four 10 m x 10 m subquadrats (1 to 4) in the 20 m x 20 m quadrat.

Quadrat 20 (24 July 2018)												
Subquadrat	**1**			**2**			**3**			**4**		
Species	**#**	**H**	**%**	**#**	**H**	**%**	**#**	**H**	**%**	**#**	**H**	**%**
Angophora floribunda				2	7	15	5	15	20	1	8	5
* *Cinnamomum camphora*				2	9	5						
Cryptocarya microneura				1	6	5						
Cyclophyllum longipetalum	10	5	3									
Eucalyptus paniculata				1	20	40						
Livistona australis	1	4	10	1	4	10						
* *Olea europaea* subsp. *cuspidata*	1	3	1									
Pittosporum undulatum							2	4	3			
Syncarpia glomulifora	1	16	60									

Appendices

Appendix 1: Northern Beaches Council's Updated Biodiversity Referral Response – 19 July 2018

Natural Environment Referral Response - Biodiversity

Application Number:	DA2017/1274

Responsible Officer	Lashta Haidari
Land to be developed (Address):	Lot 1 DP 662920 , 52 Cabbage Tree Road BAYVIEW NSW 2104 Lot 1 DP 19161 , 52 Cabbage Tree Road BAYVIEW NSW 2104 Lot A DP 339874 , 1825 Pittwater Road BAYVIEW NSW 2104 Lot 1 DP 986894 , 1825 Pittwater Road BAYVIEW NSW 2104 Lot 2 DP 986894 , 1825 Pittwater Road BAYVIEW NSW 2104 Lot 3 DP 986894 , 1825 Pittwater Road BAYVIEW NSW 2104 Lot 150 DP 1003518 , 1825 Pittwater Road BAYVIEW NSW 2104 Lot 191 DP 1039481 , 1825 Pittwater Road BAYVIEW NSW 2104 Lot 300 DP 1139238 , 1825 Pittwater Road BAYVIEW NSW 2104

Reasons for referral

This application seeks consent development on land, or within 40m of land, containing:

- All Development Applications on
- Actual or potential threatened species, populations, ecological communities, or their habitats;
- Wildlife corridors;
- Vegetation query stipulating that a Flora and Fauna Assessment is required;
- Vegetation query - X type located in both A & C Wards;

And as such, Council's Natural Environment Unit officers are required to consider the likely potential environmental impacts.

Officer comments

Updated Biodiversity Referral Response – 19/07/2018
This referral response has been prepared to address additional information and submissions in relation to DA2017/1274 at 52 Cabbage Tree Bay Rd, Bayview.

Summary
With consideration of the additional information submitted to Council (Clements et al 2018), Council's Natural Environment and Climate Change – Biodiversity section recommends refusal of the Development Application (DA) based on non-compliance with Section 5a of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The proposal is also inconsistent with the Pittwater LEP Part 7.6 Biodiversity Protection and Pittwater

21 Development Control Plan 2014 Control B4.6 Flora and Fauna Enhancement Category 2 and Wildlife Corridor.

Detailed Assessment

1. Section 5A of the EP&A Act

Application of Relevant Planning Provisions

The initial development application was submitted under Part 4 of the EP&A Act 1979 in December 2017. The application was therefore submitted prior to commencement of the new *Biodiversity Conservation Act 2016* (BC Act 2016) and constitutes a 'pending or interim planning application' as defined under Part 7, Clause 27 (1) (e) of the *Biodiversity Conservation (Savings and Transitional) Regulation 2017*. Part 7, Clause 28 of the regulation identifies that the application is to be assessed under the former planning provisions which include Section 5a of the EP&A Act 1979.

Additional information submitted by the applicant in July 2018 includes a comparison (refer to Clements et al 2018, section 2B.1) between the legislative requirements for the 'Assessment of Significance' under Section 5a of the EP&A Act 1979 and the new assessment requirements under Section 7.3 of the BC Act 2016. Appendix 4 of the additional information (Clements et al 2018) includes assessments of impacts upon threatened species prepared in accordance with Section 7.3 of the BC Act 2016. As identified above, the application should have included Assessments of Significance prepared in accordance with the former planning provisions and therefore, the impact assessments in Appendix 4 of the additional information are not valid.

As identified by Clements et al 2018, the main difference between the relevant planning provisions is that Section 5a of the EP&A Act 1979 requires that the assessment consider 'whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.' The approved Recovery Plan for Large Forest Owls (DECC 2006) is considered relevant to the application given usage of the site by Powerful Owls and proximity of the development site to an active nest. The National Recovery Plan for Magenta Lilly Pilly Syzygium paniculatum (OEH 2012) is also applicable to the proposal given the occurrence of this species in proximity to the site. Of further relevance are the more recently published threatened species recovery strategies and actions identified online within the NSW Office of Environment and Heritage threatened species profiles and as part of the associated Saving our Species program.

On the basis of the above, the impact assessments provided as additional information do not adequately address the former planning provisions including Section 5a of the EP&A Act.

Assessment of Rhodamnia rubescens – Scrub Turpentine – Preliminary listing as Critically Endangered

The additional information and impact assessment (Clements et al 2018, appendix 4) completed for *R. rubescens* identifies that the habitat of this species will not be modified or impacted by the proposal. Council staff have recently identified the occurrence of habitat and an individual plant within the development footprint, close to the proposed maintenance facility shed and associated infrastructure. The recorded individual appeared to be suffering from myrtle rust; however, the trunk was alive at the time of observation.

On the basis of the above, further assessment is required in relation to the occurrence of this species on site.

2. Planning Instruments

Pittwater LEP 2014 Part 7.6 Biodiversity Protection

The proposal does not comply with Pittwater LEP 2014 Part 7.6 Biodiversity Protection with reference to the following:

Before determining a development application for development on land to which this clause applies, the consent authority must consider:

(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or

(b) if that impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise that impact, or

(c) if that impact cannot be minimised - the development will be managed to mitigate that impact.

It is acknowledged that, based on the revised Bushfire Report and RFS requirements, no trees are proposed for removal within the required bushfire 'Asset Protection Zones' (APZs). In relation to siting of the proposal and impacts upon biodiversity, it is located within a heavily modified environment (golf course fairway as opposed to natural bushland); however, a large number of significant mature trees require removal within the development footprint. Large trees on this site are considered to have a high ecological value and contribute to canopy connectivity within a mapped wildlife corridor. Measures including the proposed conservation works and replanting of trees are noted but considered a very long term investment which does not sufficiently mitigate the impacts resulting from the proposal. The loss of significant canopy trees onsite is therefore considered to be inconsistent with Part 7.6 Biodiversity Protection of the Pittwater LEP 2014.

Pittwater 21 DCP parts Control B4.6 Flora and Fauna Enhancement Category 2 and Wildlife Corridor
It is acknowledged that tree-covered slopes immediately south and west of the development are no longer proposed to be designated as APZs (Building Code & Bushfire Hazard Solutions Pty Limited, 9 July 2018). Furthermore, it is acknowledged that no trees are proposed to be removed for the APZs adjoining the proposal (Clements et al, 2018, section 3B.1). On this basis, the additional information has clarified some inconsistencies between the bushfire protection requirements and proposed retention of trees identified in the arborist report adjacent to the development.

Due to the bulk and scale of the proposed development, approximately 50% of the width (measured from north-east to south-west) of the mapped high priority wildlife corridor will be blocked by infrastructure, diminishing connectivity within the local landscape. Uncertainty remains about the proposed 'thickening' of fairway vegetation within the required APZs close to the development and how the proposed conservation areas surrounding the development area are able to be managed and still be an APZ. On balance, the proposal is considered to be inconsistent with Pittwater 21 DCP Control B4.6 Flora and Fauna Enhancement Category 2 and Wildlife Corridor.

Initial Biodiversity Referral Response - 26/04/18

Recommendation
Council's Natural Environment and Climate Change (NECC) - Biodiversity section recommends refusal of the Development Application (DA) based on non-compliance with the *Environmental Planning and Assessment Act 1979* (EP&A Act) and Pittwater 21 Development Control Plan 2014 (DCP) Controls.

These are as follows:

1. Section 5A of the EP&A Act
2. DCP control B4.6 Flora and Fauna Enhancement Category 2 and Wildlife Corridor
3. DCP control C1.1 Landscaping

Details

1. Section 5A of the EP&A Act

Documents reviewed:

Part A Assessment of flora and fauna environmental constraints and opportunities, Part B Vegetation Management Plan and Part C Assessment of the significance of the proposal (including all associated appendices and maps) prepared by Ann Clements & Associates Pty Ltd 5 December 2017 (ecology report).

The DA did not provide sufficient information for the Council to assess the impact of the development on threatened species under Section 5A of the EP&A Act.

The ecological report did not provide the following information:

a) Assessment of the likelihood of occurrence for threatened and migratory species identified in database searches (i.e. NSW Bionet search and Commonwealth Protected Matters Search Tool).
b) Assessment of Significance (7-part test) for known/likely/potential threatened species to determine whether the development will have a significant effect on threatened species, populations or ecological communities or their habitats under Section 5A of the Environmental Planning and Assessment Act 1979.
c) Conclusions summarising the results of the assessment and the need for a Species Impact Statement.

In particular, the ecology report did not assess the impacts of the development on *Ninox strenua* (Powerful Owl) and threatened microbat species known to occur in the site.

Therefore, the DA does not comply with Section 5A of the EP&A Act.

2. DCP Control B4.6 Flora and Fauna Enhancement Category 2 and Wildlife Corridor

Documents reviewed:

• Waterbrook Landscape DA Report prepared by Site Design and Studios November 2017 (landscape plan)
• Vegetation Management Plan prepared by Ann Clements & Associates Pty Ltd 5 December 2017 (VMP)
• Arboricultural Impact Assessment prepared by Footprint Green Pty Ltd November 2017 (arborist report)
• Planning for Bushfire Protection Rural Fire Service 2006 (PBP)
• Standards for Asset Protection Zones, Rural Fire Service (APZ standards)
• RFS correspondence re APZ conditions for DA2017/1274 dated 30/01/2018 ref D18/100 DA18011011219CC

The DA does not comply with DCP Control B4.6:

a. Inconsistencies between the landscape plan, VMP, and the bushfire report, RFS APZ conditions 30/01/2018, PBP and APZ Standards.
b. Insufficient information provided in the arborist report with regards to the extent of tree removal required in the IPA.

a. Inconsistencies between the landscape plan, VMP, and the bushfire report, RFS APZ conditions 30/01/2018, PBP and APZ Standards.

The RFS APZ conditions 30/01/2018 provided the following conditions for APZs:

At the commencement of building works, and in perpetuity, the area around the proposed buildings shall be managed as outlined within section 4.1.3 and Appendix 5 of Planning for Bushfire Protection 2006, and the NSW Rural Fire Service's document Standards for Asset Protection Zones as follows:

• West: inner Protection Area (IPA) for a distance of 80m
• North West: IPA for a distance of 100m from building D
• South West: IPA for a distance of 80m
• All other directions: IPA to the property boundary

The bushfire report (section 7.05 pg. 13) provides the following recommendations regarding management and extent of the APZ:

The proposal will rely on management of the area within the Golf Course Grounds adjacent the development area as an Asset Protection Zone to the northern boundary, for a minimum distance of 100 metres to the northwest south and southeast and 80 metres to the west and southwest of the proposed development. This can include the retention and embellishment of vegetation including that along Cabbage Tree Road, however, management is to ensure that the area is maintained as either an Asset Protection Zone / Inner Protection Area.

The landscape plan and VMP have designated conservation areas, revegetation areas and bush regeneration areas within the APZ IPA directly adjacent to, and surrounding all dwellings (refer to External landscape strategy 13/11/18 and VMP). This includes management and enhancement of all vegetation designated as part of the APZ IPA to a distance of up to 40 metres from the subject site boundary, directly adjacent to the proposed villas.

The APZ standards provide the following guidance on the management and structural composition of an APZ:

Fuels can be controlled by:

1. Raking or manual removal of fine fuels Ground fuels such as fallen leaves, twigs (less than 6 mm in diameter) and bark should be removed on a regular basis. This is the fuel that burns quickly and increases the intensity of a fire. Fine fuels can be removed by hand or with tools such as rakes, hoes and shovels.
2. Mowing or grazing of grass. Grass needs to be kept short and, where possible, green.
3. Removal or pruning of trees, shrubs and understorey. The control of existing vegetation involves both selective fuel reduction (removal, thinning and pruning) and the retention of vegetation. Prune or remove trees so that you do not have a continuous tree canopy leading from the hazard to the asset. Separate tree crowns by two to five metres. A canopy should not overhang within two to five metres of a dwelling. Native trees and shrubs should be retained as clumps or islands and should maintain a covering of no more than 20% of the area.

Designating conservation and bush regeneration areas within an IPA is inconsistent with the APZ standards: these areas must be managed by manual removal of fine fuels/mowing, pruning and removal of trees, maintaining a canopy tree separation of 2-5 m, and maintaining native trees and shrub cover to a system of clumps or islands with an overall cover of 20% of the APZ. It is a contradiction to propose a managed APZ be maintained as a bushland conservation area to minimise the impacts of removal of wildlife corridor vegetation within the subject site: the intended structure and function of the APZ is a simplified form of unmanaged bushland. Whilst it is recognised that retained vegetation within the APZ can provide some benefits and protection to wildlife, the vegetation must be maintained reduced structure and function and subject to ongoing management in perpetuity and cannot function as a conservation area.

The VMP does not provide any specific detail on how the proposed conservation areas surrounding the development area to be managed. Management objectives appear to be captured broadly in the overall vegetation management objectives provided for the revegetation and enhancement within the retained golf course area to the east of the development site. These objectives refer to techniques such as direct seeding of ground cover and mid storey native species and are generally in direct conflict with management techniques required to achieve APZ standards.

b. Insufficient information provided in the arborist report with regards to the extent of tree removal required in the IPA.

The report does provide information that 16 trees (out of 159) will be required to be removed as part of the APZ. However, an assessment of all trees within the APZ IPA has not been provided in the arborist report and therefore it is not clear how many additional trees will require removal/thinning to comply the RFS APZ standards.. Therefore, to understand the full extent of tree removal required for the provision of the APZ, the APZ must be assessed in its entirety and all trees requiring removal to comply with the RFS APZ standards need to be identified.

3. DCP Control C1.1 Landscaping

The DA does not comply with the DCP Control C1.1: All canopy trees and a majority (more than 50%) of other vegetation shall be locally native species. It is noted the landscape plan provides recommendations to plant primarily non-native species and cultivated native varieties.

Referral Body Recommendation

Recommended for refusal

Recommended Natural Environment Conditions:

Nil.

Appendix 2: Assessment of Significance using 7 part tests

Appendix 2
Tests of Assessment of Significance of the proposal on the threatened species and communities using 7 part tests

Table of Contents

1.0 Introduction

The Assessment of Significance has been undertaken using a 7 part test in this response.

The terms being used in the test are defined in the *Threatened Species Assessment Guidelines: The Assessment of Significance* (DECC 2007). These terms have been considered for the proposal on the BGC land:

Defined terms (page 3 of DECC 2007)	As applied to the assessment
Direct impacts *are those that directly affect the habitat and individuals. They include, but are not limited to, death through predation, trampling, poisoning of the animal/plant itself and the removal of suitable habitat. When applying each factor, consideration must be given to all of the likely direct impacts of the proposed activity or development.*	Direct impacts include: • clearing of 0.43 ha of between fairway vegetation, consisting of exotic and native trees with golf course managed understorey of mainly exotic grass; • construction of the access road from Cabbage Tree Road along the existing golf vehicle path with clearing of trees; and • loss of 13 of 84 identified hollow-bearing trees north of Cabbage Tree Road (none of 15 trees with large hollows, 5 of 30 with medium hollows, 7 of 31 with small hollows and 1 of 8 with indeterminate hollows).
Indirect impacts *occur when project-related activities affect species, populations or ecological communities in a manner other than direct loss. Indirect impacts can include loss of individuals through starvation, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas. As with direct impacts, consideration must be given, when applying each factor, to all of the likely indirect impacts of the proposed activity or development.*	Indirect impacts include: • increased night lights on the golf course from the Seniors Housing buildings; • Increased vehicle traffic from Cabbage Tree Road to the Seniors Housing; • possible hydrological changes; • possible changes in nutrient runoff; • sediment and erosion risks; and • potential increase in acid sulfate risks.
Interpretation of key terms (page 7 of DECC 2007)	
Local occurrence*: the ecological community that occurs within the study area* (areas directly or indirectly affected by the proposal). *However the local occurrence may include adjacent areas if the ecological community on the study area forms part of a larger contiguous area of that ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated.*	The local occurrence includes: a. Coastal Floodplain community on the low lying land which is connected to the estuarine environment offsite along Cahills Creek; b. occurrences of wet sclerophyll forest with rainforest/ mesic understorey with emergent eucalypts – possible *Pittwater Wagstaffe Spotted Gum Forest,* with restricted occurrence on the BGC land but more widespread to the north and north-east. Exchange of genetic material between the canopy trees in the locality is likely to occur by highly mobile species such as birds and bats, as well as seed showers from trees adjoining BGC land.

Defined terms (page 3 of DECC 2007)	As applied to the assessment
(page 8 of DECC 2007)	
Locality: the same meaning as ascribed to local population of a species or local occurrence of an ecological community.	As given above.

2.0 Applying the 7 part test for threatened plant species

The tests have been undertaken for the two threatened plant species.

Scientific name	Common name	Conservation status		Recorded on BGC land	Likely increase in direct or indirect adverse impacts from the proposal
		NSW *BC Act*	Commonwealth *EPBC Act*		
Syzygium paniculatum	Magenta Lilly Pilly	E	V	Yes	No.
*Rhodamnia rubescens**	Scrub Turpentine, Brown Malletwood	Preliminary listing as CE		Yes	No.

Note: NSW *BC Act* - NSW Biodiversity Conservation Act 2016, Commonwealth *EPBC Act* - Environment Protection and Biodiversity Conservation Act 1999. E1 or E – Endangered, E2 - Endangered Population, E4A – Critically Endangered, P – Protected, V – Vulnerable

2.1 S*yzygium paniculatum* (Magenta Lilly Pilly)

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

Syzygium paniculatum was recorded as Tree 28 by Footprint Green (2018). This tree is proposed to be retained. It was described as being in good foliage condition with 9 m height, 9 m canopy spread, 460 mm Diameter at Breast Height (DBH).

On 28 June 2018, the previously recorded tree (Tree 28) was inspected and photographed by Tony Rodd. It appeared to be in poor health, probably in large part due to having a gravel buggy path forking around its base (see photographs in Attachment 2-B of Additional Biodiversity Appendix 2 in Clements *et al.* 2018). Its poor, very asymmetrical shape and relatively small size (for the species) are consistent with a tree of considerable age, such that it is very likely to be remnant rather than planted. Additionally, it is located at the edge of a former creek flat (since filled and levelled to make the existing Fairway 7) at only a short distance upstream from the tidal limit, which is one of the species' characteristic habitats. All areas of remnant vegetation on the creek flat and banks upstream from Cabbage Tree Road were searched for occurrences of the species but no further occurrences were found.

The proposed action is not likely to have an adverse effect on the local population being the existing tree of *Syzygium paniculatum* (Tree 28) on the BGC land. It is anticipated that there will be opportunities to expand the habitat with propagation from this tree and planting in the nearby vegetation managed for conservation such as between the *Livistona* palm grove and creekline.

The proposed development or activity is not 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.

(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

The species is not an endangered population, but a threatened species.

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

The species is not an ecological community, but a threatened species.

(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

(i) The proposal does not remove or modify any potential habitat of *Syzygium paniculatum* on the BGC land, as it does not directly or indirectly adversely impact the creek flat area. The areas south of Cabbage Tree Road may have some potential habitat on minor rises. No individuals have been recorded on this area.

(ii) The habitat present on the BGC land is not likely to become more fragmented or isolated by the proposal.

(iii) The proposal does not remove or modify any potential habitat of *Syzygium paniculatum* on the BGC land.

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

No declared areas of critical habitat will be impacted (either directly or indirectly).

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

The overall objective of the National Recovery Plan for *Syzygium paniculatum* (Magenta Lilly

Pilly*)* (OEH 2012 from http://www.environment.gov.au/biodiversity/threatened/recovery-plans/national-recovery-plan-magenta-lilly-pilly-syzygium-paniculatum, accessed 24 July 2018) is to protect known subpopulations of Magenta Lilly Pilly from decline and to ensure that wild populations of the species remain viable in the long term.

Specific Recovery Objectives include:

National Recovery Plan Objectives (OEH 2012)	Applicable to the project
1. To ensure a coordinated and efficient approach to the implementation of recovery efforts	The onsite conservation works related to Syzygium *paniculatum* are to be discussed with Council's bushland officers, especially the planned propagation and subsequent planting in the conservation areas on the BGC land.
2. To establish the full extent of the distribution of Magenta Lilly Pilly	Yes. At a site specific level. The extent of *Syzygium paniculatum* onsite and nearby by has been searched and the occurrence recorded.
3. To increase the understanding of Magenta Lilly Pilly biology and ecology	Research by Payne (1991, 1997), Thurby 2010, Thurby *et al.* 2011 cited in the Recovery Plan, and work referred to in Hazelton and Clements (2009) were directed to increasing the understanding of Magenta Lilly Pilly biology and ecology of the population.
4. To minimise the decline of Magenta Lilly Pilly through in situ habitat protection and management	Yes. The proposal is to protect the existing individual insitu and planting of tubestock grown from cutting or seeds from the single individual recorded onsite.
5. To reduce impacts of Myrtle Rust on Magenta Lilly Pilly and its habitat.	Yes. Myrtle Rust has been observed to infest *Rhodamnia rubescens* on and near the BGC land. The *Syzygium paniculatum* onsite was not observed to be infested by Myrtle Rust. Hygiene protocols for management of pathogens are outlined in Objective 4 of the VMP.
6. To maintain a representative ex situ collection of Magenta Lilly Pilly	N/A. Except during the propagation of tubestock from the *Syzygium paniculatum* onsite.
7. To raise awareness of the conservation significance of Magenta Lilly Pilly and involving the broader community in the recovery program.	Yes. Increasing environmental awareness is consistent with Objective 1 of the VMP.

The proposal is consistent at a site specific level with objectives of the Recovery Plan for *Syzygium paniculatum.*

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

The proposed development or activity is not likely to significantly increase the impact of key threatening processes on *Syzygium paniculatum*, as:

Existing key threatening processes	Existing threat	Increased threat from the proposal
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	Yes. Natural watercourses historically relocated as excavated drains close to boundary, with filling of original	No. Proposal to re-establish watercourses across the golf course.

Existing key threatening processes	Existing threat	Increased threat from the proposal
	watercourses.	
Bushrock removal	No.	No. Proposal is not likely to increase the threat.
Clearing of native vegetation	Yes. Ongoing golf course management.	Yes. Clearing of approximately 0.43 ha of between-fairway vegetation, consisting of native and exotic trees with a golf course managed understorey (mainly mown existing grasses and frequently with soil topdressing).
Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus* (L.)	No. Rabbit not observed on the golf course, though expected.	No. Proposal is not likely to increase the threat.
Competition and habitat degradation by Feral Goats, *Capra hircus* Linnaeus 1758	No. No goats recorded nor observed on the BGC land.	No. Goats not proposed to be introduced by the proposal.
Competition from feral honey bees, *Apis mellifera* L.	No. Seed set of *Syzygium paniculatum* not adversely impacted by honey bees.	No.
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	No. Fire frequency low.	No. No increase in fire frequency proposed.
Infection of native plants by *Phytophthora cinnamomi*	No. *Phytophthora cinnamomi* not recorded on the BGC land.	No. Proposal is not likely to increase the threat.
Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae	Yes. Recorded in the north-west on the highly susceptible *Rhodamnia rubescens.* Recorded tree of *Syzygium paniculatum* possibly infected but species has low susceptibility (Pegg *et al.* 2012, page 7).	No. Proposal is not likely to increase the threat.
Invasion and establishment of exotic vines and scramblers	Yes. Widespread due to nutrient runoff.	No. Proposal is not likely to increase the threat.
Invasion of native plant communities by African Olive *Olea europaea* subsp. *cuspidata* (Wall. ex G. Don) Cif.	No. Not recorded on the BGC land.	No. Proposal is not likely to increase the threat.
Invasion of native plant communities by *Chrysanthemoides monilifera*	No. Not recorded on the BGC land.	No. Proposal is not likely to increase the threat.
Invasion of native plant communities by exotic perennial grasses	Yes. The golf course supports fertilised and mown exotic grass.	No. Proposal is not likely to increase the threat.
Invasion, establishment and spread of Lantana (*Lantana camara* L. *sens. lat.*)	Yes. Lantana widespread, including recorded in the remnant in the north-west.	No. Proposal is not likely to increase the threat.
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	Yes. BGC land bounded by urban land.	No. Proposal is not likely to increase the threat.
Removal of dead wood and dead trees	Yes. Ongoing as part the golf course management.	No. Proposal is not likely to increase the threat.

In conclusion, the proposal is not likely to significantly impact on *Syzygium paniculatum.* No species impact statement is required.

Recommendations to minimise risk of impacts to *Syzygium paniculatum:*

- the site specific Vegetation Management Plan (VMP) (Conservation/Biodiversity Management Plan) for the proposed development presented in Part B of Clements *et al.* (2017) with the associated Implementation and Compliance Table in Table 4 of Clements *et al.* (2017) should be applied; and
- propagation of *Syzygium paniculatum* from the tree onsite and additional planting in the riparian zone of the conservation area, consistent with Objective 8 of the VMP and National Recovery Plan for Magenta Lilly Pilly.

2.2 *Rhodamnia rubescens* (Scrub Turpentine, Brown Malletwood)

The Scientific Committee, (now the NSW Threatened Species Scientific Committee) has made a Preliminary Determination to support a proposal to list the shrub or small tree *Rhodamnia rubescens* (Benth.) Miq. as a CRITICALLY ENDANGERED SPECIES in Part 1 of Schedule 1A of the Act. Listing of Critically Endangered species is provided for by Part 2 of the Act (Exhibition period: 18/08/17 – 13/10/17, Proposed Gazettal date: 18/08/17) (http://www.environment.nsw.gov.au/resources/threatenedspecies/determinations/PDRhodrubesCR.pdf, accessed May 2018)

There has not been a final determination made for the species. See http://www.environment.nsw.gov.au/committee/FinalDeterminations.htm, accessed May 2018).

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

Rhodamnia rubescens has been recorded in the mesophyllous understorey of the patch of undisturbed forest in the north-west of the BGC land, in Transects 18 and 19 as 3–4 m tall shrubs. The leaves of these plants were observed on 17 May 2018 to be infested with Myrtle Rust.

One 3.5 m high individual was recorded outside the golf security fencing, probably on the Council's road reserve of Cabbage Tree Road.

The plant was observed to have healthy growth on 24 July with no sign of leaves being infested with Myrtle Rust, despite the Council officer observing the plant to be leafless and heavily infested with Myrtle Rust in recent past month(s).

The adjoining area within the BGC land, where the proposed shed is planned, is currently highly disturbed with heavy weed cover, disturbed soil, hummocky dumped soil mounds and rubble as well as large quantities of tree loppings. Careful removal of the dumped soil, rubble and tree loppings should be undertaken to minimise the existing risk to the *Rhodamnia rubescens* on the roadside prior to the proposed works. The *Rhodamnia rubescens* is at least 10 m from the proposed shed.

The habitat is unlikely to be modified or impacted by the proposed development provided that there is careful management of the existing weeds, soil mounds and other dumpings. Therefore it is not 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.

It should be noted that currently, viability of the local population is greatly in doubt, due to the depredation of Myrtle Rust (*Austropuccinia psidii*). In fact all known populations of *Rhodamnia*

rubescens are threatened with extinction from this cause, which is the reason for the Scientific Committee's preliminary determination for the species as critically endangered – as explained in Paragraphs 7, 8 and 9.

> *7. The survival of* Rhodamnia rubescens *is severely threatened by infection from the exotic rust fungus* Austropuccinia psidii *(Myrtle Rust).* Austropuccinia psidii *was first detected in Australia on the NSW Central Coast in April 2010 and has since established in natural ecosystems throughout coastal NSW, south-east Qld and far north Qld (Carnegie and Lidbetter 2012; Pegg et al. 2014). . . .*
>
> *8.* Rhodamnia rubescens *is a known host of* Austropuccinia psidii *(Zauza et al. 2010) and is characterised as 'Highly to Extremely Susceptible' to A. psidii infection (Pegg et al. 2014). All plant parts have been documented as being affected by* A. psidii *infection, including leaves, stems, flowers and fruits (Pegg et al. 2014; Carnegie et al. 2016). . . .*
>
> *9. Extensive field assessments of* Austropuccinia psidii *infection on* Rhodamnia rubescens *across its entire NSW range show infection is widespread and severe (Carnegie et al. 2016). . . .*

And concluding in Paragraph 18:

> 18. Rhodamnia rubescens *(Benth.) Miq. is eligible to be listed as a Critically Endangered species as, in the opinion of the Scientific Committee, it is* ***facing an extremely high risk of extinction*** *in New South Wales in the immediate future . . . .*

The plants of *Rhodamnia rubescens* recorded in Transects 18 and 19 in the undisturbed vegetation in the north-west (see Figure A-5 of Clements *et al*. 2018) and the additional individual outside the security fence and probably on the road reserve near the proposed maintenance shed. This plant was observed recently by the Council officer as infected by Myrtle Rust. In the north-west on 17 May 2018 almost all of the plants of *Rhodamnia rubescens* were quite evidently in declining health except for one individual.

Interestingly during the dry winter, the additional individual outside the security fence and probably on the road reserve near the proposed maintenance shed had healthy new growth (see photographs in Appendix 3).

If this local population is placed at risk, it will only likely be by the Myrtle Rust, not by the proposed development.

(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

The species is not an endangered population, but Preliminary Determined as a Critically Endangered Species.

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

The species is not an ecological community, but Preliminary Determined as a Critically Endangered Species.

(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

(i) *Rhodamnia rubescens* occurs in warmer rainforest and on rainforest margins. The current habitat of *Rhodamnia rubescens* on the BGC land is the undisturbed vegetation in the north-west and one individual outside the Golf Course security fencing probably on the Council road reserve. None of the current habitat will be removed or modified as a result of the proposed development.

There are areas of what may have been potential habitat adjacent to Cabbage Tree Road (sampled in the lower half of Transect 4, Transects 5, 8 see Clements *et al.* 2017) some of which may be impacted by the proposed development, but in view of the species' endangerment of extinction from Myrtle Rust as explained in the response to (a), the potential for re-establishment may currently be almost zero, except there may be natural resistance in the plants to Myrtle Rust and ability for plants to recover from infestation as observed in the individual outside the security fence and probably on the road reserve.

(ii) In view of the foregoing response to (i), the area of habitat for the species will not become fragmented or isolated as a result of the proposed action.

(iii) Again, in view of the response to (i), the importance of the habitat being removed is not significant.

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

No declared areas of critical habitat will be impacted (either directly or indirectly). The BGC land and its immediate surrounds are not known to include any area declared or mapped as being of 'critical habitat'.

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

There is no prepared Recovery Plan nor species profile for *Rhodamnia rubescens.*

Myrtle Rust in Australia - A draft Action Plan - May 2018 (Makinson (2018) is publically available on
(https://www.pbcrc.com.au/publications/pbcrc2235, accessed 24 July 2018).

There is also readily available literature from CRC Plant Biosecurity such as Taking action against Myrtle Rust dated 17 December 2017 (https://www.pbcrc.com.au/news/pbcrc/taking-action-against-myrtle-rust-fight-against-fungus, accessed 24 July 2018), Managing myrtle rust and its impacts in Australia dated February 2018

(http://www.pbcrc.com.au/sites/default/files/managedfiles/2063%20Final%20Report%20CRC%202063%20Pegg%20etal%202017.pdf, accessed 24 July 2018).

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

The only key threatening process likely to impact the local population of *Rhodamnia rubescens* that might be considered as even possible to result from this development is "Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae". But,

- the impact of this process has already occurred with great severity and will thus have preceded any conceivable effect arising from the proposed development; and
- as explained in response to (a) above, the area of known habitat of *Rhodamnia rubsecens* in the north-west and the additional individual will not be impacted by the proposed development.

In conclusion, there appears to be no likelihood of the proposed development having any foreseeable impact on the local population of *Rhodamnia rubescens,* provisionally listed as Critically Endangered in NSW.

Although none of the paragraphs of the Scientific Committee's preliminary determination seem to hold out much hope of this species' recovery from the Myrtle Rust epidemic, there is a possibility that in the future, rare surviving plants showing resistance to the disease may be found and propagated in research institutions such as the Australian Botanic Garden at Mount Annan. If such plants then become available, there will be opportunities to re-establish the species in suitable habitats in some of the proposed Conservation areas on the BGC land, as part of the Vegetation Management Plan (Part B of Clements *et al.* 2017).

From observations on and near the BGC land, and discussion with Andrew Jennings of the Northern Beaches Council, there may be some resistance in the population to Myrtle Rust as well as the ability for individuals to recover from infestations of Myrtle Rust.

Recommendations to minimise risk of impacts to *Rhodamnia rubescens:*

- the site specific Vegetation Management Plan (Conservation/Biodiversity Management Plan) for the proposed development presented in Part B of Clements *et al.* (2017) with the associated Implementation and Compliance Table in Table 4 of Clements *et al.* (2017) should be applied;
- precautions to limit the spread of myrtle rust should be taken by people carrying out activities where there is potential to spread myrtle rust to vulnerable species or plant communities (https://www.dpi.nsw.gov.au/biosecurity/plant/established-plant-pests-and-diseases/myrtle-rust, accessed 26 June 2018); and
- the readily accessible individual near the roadside should be monitored for changes in health to determine if there is a relationship with humidity and rainfall, and infestation by Myrtle Rust.

3.0 Applying the test for threatened fauna species

The tests have been undertaken for the 26 threatened fauna species.

Common name	Scientific name	Conservation status		Recorded on BGC land	Likely increase in direct or indirect adverse impacts from the proposal
		NSW *BC Act*	Common-wealth *EPBC Act*		
Mammals					
*Eastern Pygmy-possum	*Cercartetus nanus*	V		No	No.
Spotted-tailed Quoll	*Dasyurus maculatus*	V	E	No	No.
Mammals - Bats					
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	V	Yes	Some possible indirect impacts through loss of some foraging habitat. Not a significant impact.
Roost requirements - caves (plus man-made structures)					
Large-eared Pied Bat	*Chalinolobus dwyeri*	V	V	Yes	Some possible indirect impacts through loss of some foraging habitat. Not a significant impact.
*Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	V		Yes	Some possible indirect impacts through loss of some foraging habitat. Not a significant impact.
Roost requirements - caves and tree hollows (plus man-made structures)					
*Southern Myotis	*Myotis macropus*	V		Yes	Some possible indirect impacts through loss of some potential roosting habitat. Not a significant impact.
*Little Bentwing-bat	*Miniopterus australis*	V		Yes	Some possible indirect impacts through loss of some foraging habitat. Not a significant impact.
Roost requirements - tree hollows and some under bark (plus man-made structures)					
*Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V		Yes	Some possible indirect impacts through loss of some foraging habitat. Not a significant impact.
*Eastern Freetail-bat	*Mormopterus norfolkensis*	V		Yes	Some possible indirect impacts through loss of

Common name	Scientific name	Conservation status		Recorded on BGC land	Likely increase in direct or indirect adverse impacts from the proposal
		NSW *BC Act*	Common-wealth *EPBC Act*		
					some foraging habitat. Not a significant impact.
*Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V		No	Some possible indirect impacts through loss of some foraging habitat. Not a significant impact.
*Greater Broad-nosed Bat	*Scoteanax rueppellii*	V		No	Some possible indirect impacts through loss of some foraging habitat. Not a significant impact.
Birds					
Hollow dependent large birds					
Glossy-black Cockatoo	*Calyptorhynchus lathami*	V		No	No.
Barking Owl	*Ninox connivens*	V		No	No.
Powerful Owl	*Ninox strenua*	V		Yes	Some possible indirect impacts on the prey species through loss of some foraging habitat. Not a significant impact.
Migratory and nomadic					
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	V		No	No.
Little Lorikeet	*Glossopsitta pusila*	V		No	Some possible indirect impacts through loss of some foraging habitat. Not a significant impact.
Swift Parrot	*Lathamus discolor*	E1	CE	No	Some possible indirect impacts through loss of some foraging habitat. Not a significant impact.
Wetland dependent					
Australasian Bittern	*Botaurus poiciloptilus*	E1	E	No	No.
Black Bittern	*Ixobrychus*	V		No	No.

Common name	Scientific name	Conservation status		Recorded on BGC land	Likely increase in direct or indirect adverse impacts from the proposal
		NSW *BC Act*	Common-wealth *EPBC Act*		
	flavicollis				
Australian Painted Snipe	*Rostratula australis*	E1	E	No	No.
Raptors					
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	V		No	No.
Little Eagle	*Hieraaetus morphnoides*	V		No	Some possible indirect impacts through loss of some foraging habitat. Not a significant impact.
Eastern Osprey	*Pandion cristatus*	V		No	No.
Square-tailed Kite	*Lophoictinia isura*	V		Yes	Some possible indirect impacts through loss of some foraging habitat. Not a significant impact.
Fruit eating bird known in rainforests and wet sclerophyll forests or mangroves					
Superb Fruit-Dove	*Ptilinopus superbus*	V		No	No.
Amphibians					
Green and Golden Bell Frog	*Ranoidea aurea* (formerly *Litoria aurea)*	E1	V	No	No.

Note: NSW *BC Act* - NSW Biodiversity Conservation Act 2016, Commonwealth *EPBC Act* - Environment Protection and Biodiversity Conservation Act 1999. E1 or E – Endangered, E2 - Endangered Population, E4A – Critically Endangered, P – Protected, V – Vulnerable

3.1 Mammals

3.1.1 Eastern Pygmy-possum (*Cercartetus nanus)*

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

Eastern Pygmy Possum is found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. The Eastern Pygmy Possum feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes and is an important pollinator of heathland plants. The Eastern Pygmy Possum will consume soft fruits when flowers are unavailable and is known to feed on insects throughout the year; this feed source may be more

important in habitats where flowers are less abundant such as wet forests (OEH species profile).

The species was not detected on the BGC land, and if present is likely to be confined to the north-west vegetation which is in good condition (and not on golf fairways).

The nearest records are from approximately 1 km to the north west in Minkara Reserve and records extend from south of Cabbage Tree Road along Warriewood escarpment.

No impact would be expected to the species as the habitat in the north-west is not being modified for the proposal. The habitat to be modified for the proposal is highly degraded and unstructured (between fairway trees with little/absent understorey vegetation) and is not expected to be utilised by the Eastern Pygmy-possum.

The proposed action is not likely to have an adverse effect on the species such that a local population is likely 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

This species is not an endangered population, but a threatened species.

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

This species is not an ecological community, but a threatened species.

(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

(i) An area of 0.43 ha of highly modified 'between fairway vegetation' will be removed for the proposed development. Due to the degraded nature and open vegetation structure of the 'between fairway vegetation', it is not considered important habitat for the Eastern Pygmy-possum.

(ii) The habitat for the Eastern Pygmy Possum is likely to be confined to the north-west vegetation which is in good condition, and this area is not being modified for the proposal. Currently, the habitat on the BGC land is fragmented from the surrounding bushland creating a blockage for fauna movement through the landscape (Burcher 1995). The proposal will

increase connectivity within the site and restore the wildlife corridor across the golf course into the surrounding bushland.

(iii) The long term survival of the Eastern Pygmy-possum in the locality will not be affected by the proposed removal of highly modified habitat on the BGC land. The patch of degraded vegetation identified for removal is not considered high habitat value, due to lack of structure and soil modifications. Additionally, there is an abundance of intact bushland in the locality of the BGC land. Currently, the vegetation on the Golf Course is highly modified and isolated; the proposal will enhance the potential habitat of the Eastern Pygmy-possum and potentially secure local occurrences of the species in the long term.

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

No declared areas of critical habitat will be impacted (either directly or indirectly). The BGC land and its immediate surrounds are not known to include any area declared or mapped as being of 'critical habitat'.

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

There is no Recovery Plan or Threat Abatement Plan for Eastern Pymgy-Possum.

In the species profile for Eastern Pygmy-possum, Recovery strategies is given as:

> *A targeted strategy for managing this has been developed under the Saving Our Species program.*

Under the Save our Species (SoS) program, the Eastern Pygmy-possum (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10585 accessed 24 July 2018) has been assigned to the Landscape species management stream as its disturbances occur at landscape managed scale (e.g. habitat loss or degradation) rather than processes that affect distinct, definable locations.

In the Action Toolbox, the three Action Descriptions in "Help save the Eastern Pygmy-possum (*Cercartetus nanus*)" include:

Action Description	Scale	Applicable to the project
In known habitat and movement areas investigate options for safer road crossing options such as underpasses or overpasses.	Site	N/A. The species was not detected on the BGC land, and if present is likely to be confined to the north-west vegetation which is in good condition and not located near public roads including Cabbage Tree Road.
Negotiate conservation agreements to protect known habitat, preferably perpetual, funded mechanisms such as BioBanking agreements. Target areas with hollow-bearing trees and an abundance of flowering proteaceous and myrtaceous shrubs, particularly banksias. Include the retention of fallen timber as a standard management action.	Site	Yes. The conservation works on the BGC land are to increase the environmental sustainability of the 18 hole golf course. The proposal is to increase the connectivity and size of the existing native vegetation from 6.86 ha to more than 15 ha of potential foraging habitat. It should be noted that there is no known occurrences of the species on the BGC land, however if the species is present on Site, it will benefit from these actions.

Action Description	Scale	Applicable to the project
Develop and undertake community education strategy that reduces demand for firewood and provides/promotes alternatives.	State	Yes. Increasing environmental awareness of native flora and fauna is Objective 1 of the VMP (Clements *et al.* 2017).

The proposal is consistent with the Action Descriptions for the Eastern Pygmy-Possum in the SoS, “Help save the Eastern Pygmy-possum (*Cercartetus nanus*)”

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

The key threatening processes potentially relevant to the Eastern Pygmy-Possum likely to result from this development are listed below. The proposal is not likely to significantly increase the impact of these processes as only a small amount of native vegetation (largely modified) will be removed.

The proposed development or activity is not likely to significantly increase the impact of key threatening processes relevant to Eastern Pygmy-Possum, as:

Existing key threatening processes	Existing threat	Increased threat from the proposal
Clearing of native vegetation	Yes. Ongoing golf course management.	Yes. Clearing of approximately 0.43 ha of between-fairway vegetation, consisting of native and exotic trees with a golf course managed understorey (mainly mown existing grasses and frequently with soil topdressing).
Loss of Hollow-bearing trees	Yes. Ongoing as part the golf course management.	Yes. A loss of 13 of 84 identified hollow-bearing trees north of Cabbage Tree Road (none of 15 trees with large hollows, 5 of 30 with medium hollows, 7 of 31 with small hollows and 1 of 8 with indeterminate hollows)
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	No. Fire frequency low.	No. No increase in fire frequency proposed.
Invasion, establishment and spread of Lantana (*Lantana camara* L. *sens. lat.*)	Yes. Lantana widespread, including recorded in the possible habitat of the remnant in the north-west.	No. Proposal is not likely to increase the threat.
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	Yes. BGC land bounded by urban land.	No. Proposal is not likely to increase the threat.
Removal of dead wood and dead trees	Yes. Ongoing as part the golf course management.	No. Proposal is not likely to increase the threat.

In conclusion, the proposal is not likely to significantly impact Eastern Pygmy-Possum. No species impact statement is required.

Recommendations to minimise risk of impacts to Eastern Pygmy Possum (*Cercartetus nanus):*

- the site specific Vegetation Management Plan (Conservation/Biodiversity Management Plan) for the proposed development presented in Part B of Clements *et al.* (2017) with the associated Implementation and Compliance Table in Table 4 of Clements *et al.* (2017) should be applied.

3.1.2 Spotted-tailed Quoll (*Dasyurus maculatus*)

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

Spotted-tailed Quolls are found 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.

The species was not detected on the BGC land, and the nearest records of the species are from the Warriewood escarpment (approximately 1km to the south west) south of Mona Vale Road. These records are from the 1990s. The likelihood of a viable local population being present on site is extremely low, but considered possible due to foraging resources being present. If present it is likely to be confined to the north-west of the site where the vegetation is in good condition.

No impact would be expected on the species as the habitat in the north-west is not being modified for the proposal. The habitat to be modified for the proposal is highly degraded and unstructured (between fairway trees with little/absent understorey vegetation) and is not expected to be utilised by the Spotted-tailed Quoll.

The proposed action is not likely to have an adverse effect on the species such that a local population is likely 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

This species is not an endangered population, but a threatened species.

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

The species is not an ecological community, but a threatened species.

(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

(i) An area of 0.43 ha of highly modified 'between fairway vegetation' will be removed for the development. Due to the degraded nature of the 'between fairway vegetation', it is not considered important habitat for the Spotted-tailed Quoll.

(ii) The potential habitat for the Spotted-tailed Quoll is likely to be confined to the north-west vegetation which is in good condition, and this area is not being modified for the proposal. Currently, the habitat on the BGC land is fragmented from the surrounding bushland creating a blockage for fauna movement through the landscape (Burcher 1995). The proposal will increase connectivity within the site and restore the wildlife corridor across the golf course into the surrounding bushland.

(iii) The long term survival of the Spotted-tailed Quoll will not be affected by the proposed removal of habitat on the BGC land. The patch of degraded vegetation identified for removal is not considered high habitat value, due to lack of structure and soil modifications. Additionally, there is an abundance of intact bushland in the locality of the BGC land.

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

No declared areas of critical habitat will be impacted (either directly or indirectly). The BGC land and its immediate surrounds are not known to include any area declared or mapped as being of 'critical habitat'.

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

There is a National Recovery Plan for the Spotted-tailed Quoll prepared by Victorian Department of Environment, Land, Water and Planning and published by Australian Government Department of the Environment dated May 2016 (DELWP 2016) http://www.environment.gov.au/system/files/resources/2343110b-d2b4-4a1f-b66e-ddfae63c4aa6/files/national-recovery-plan-spotted-tailed-quoll.pdf, accessed 24 July 2018)

It is stated that:

> *The Overall Objective of recovery is to reduce the rate of decline of the Spotted - tailed Quoll, and ensure that viable populations remain throughout its current range in eastern Australia.*
>
> *Within the life span of this Recovery Plan* [5 years], *the Specific Objectives listed below have been identified as necessary to guide the recovery of the Spotted-tailed Quoll. The recovery actions and performance criteria for each of these objectives are outlined ...*

Recovery Plan Objectives (DELWP 2016)	Proposal compliance
1. Determine the distribution and status of Spotted-tailed Quoll populations throughout the range, and identify key threats and implement threat abatement management practices.	Yes. Species presence will be noted during monitoring associated with the VMP.

Recovery Plan Objectives (DELWP 2016)	Proposal compliance
2. Investigate key aspects of the biology and ecology of the Spotted-tailed Quoll to acquire targeted information to aid recovery.	N/A to the proposal.
3. Reduce the rate of habitat loss and fragmentation on private land.	Yes. Habitat onsite will be enhanced and protected in the long term as per the VMP.
4. Evaluate and manage the risk posed by silvicultural practices.	N/A to the proposal.
5. Determine and manage the threat posed by introduced predators (foxes, cats, wild dogs) and of predator control practices on Spotted-tailed Quoll populations.	Yes. Monitoring is Objective 10 of the VMP. Council Fox and wild dog baiting are likely to be occurring in the LGA and if necessary additional baiting may be required.
6. Determine and manage the impact of fire regimes on Spotted-tailed Quoll populations.	Yes. The impacts of fire are not expected to be exacerbated by the proposal.
7. Reduce deliberate killings of Spotted-tailed Quolls.	Yes. If quolls are present onsite they will be protected from deliberate killings through implementation of the VMP.
8. Reduce the frequency of Spotted-tailed Quoll road mortality.	N/A to the proposal.
9. Assess the threat Cane Toads pose to Spotted-tailed Quolls and develop threat abatement actions if necessary.	Yes. Cane toads are not present on the site and the presence can be assessed through ongoing monitoring associated with the VMP.
10. Determine the likely impact of climate change on Spotted-tailed Quoll populations.	N/A to the proposal.
11. Increase community awareness of the Spotted-tailed Quoll and involvement in the Recovery Program.	Yes. Increasing environmental awareness is consistent with Objective 1 of the VMP.

In the species profile for Spotted-tailed Quoll, Recovery strategies is given as:

> *A targeted strategy for managing this has been developed under the Saving Our Species program.*

Under the SoS program, the Spotted-tailed Quoll (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10207, accessed 24 July 2018) has been assigned to the Landscape species management stream as its disturbances occur at landscape managed scale (e.g. habitat loss or degradation) rather than processes that affect distinct, definable locations.

In the Action Toolbox, eight Action Descriptions have been identified in “Help save the Spotted-tailed Quoll (*Dasyurus maculatus*)” including:

Action Description in ‘Action toolbox’	Scale	Applicable to the project
Conserve old-growth forest stands and other areas of known habitat under perpetual, funded conservation agreements such as BioBanking agreements, conservation property vegetation plans or inclusion in the conservation reserve system.	Site	Yes. Conservation works in the area of potential habitat for the Spotted-tailed Quoll is funded as part of golf management and subject to the proposed VMP. Trees with large hollows were recorded in the vegetation in the north west corner of the BGC land and on the adjoining land.
Identify and target restoration and revegetation projects at areas where connectivity between large areas of known	Area	Yes. The aim of the proposal is to increase the width, condition and security of landscape links. The proposal is to re-establish wildlife corridor

Action Description in 'Action toolbox'	Scale	Applicable to the project
habitat is compromised, with the aim of increasing the width, condition and security of critical landscape links.		across the extensively cleared 18 hole golf course on the BGC land by thickening of the between fairway vegetation and re-establish native vegetation.
Implement (or augment coordinated), cross-tenure, landscape scale predator control programs in areas where significant populations of spotted-tailed quoll are known to occur, and monitor populations of the target introduced predator.	Area	Yes. Fox baiting is likely to be occurring in the LGA.
Monitor significant spotted-tailed quoll populations to investigate the impact of fox and wild dog baiting.	Site	Yes. Monitoring is Objective 10 of the VMP. Council Fox and wild dog baiting are likely to be occurring in the LGA and if necessary additional baiting may be required.
Design and distribute an educational brochure for designing 'quoll-proof' poultry runs and aviaries and distribute.	State	N/A. No poultry runs or aviaries and present on BGC land or planned with the proposal.
Modify poultry runs and aviaries based on best-practice guidelines.	Site	N/A. No poultry runs or aviaries and present on BGC land or planned with the proposal.
Incorporate methods to reduce the numbers of spotted-tailed quolls killed at sections of roads where road kills are frequently reported. Assess the effectiveness of different mitigation methods.	Site	N/A. The species was not detected on the BGC land, and the nearest records of the species are from the Warriewood escarpment (approximately 1km to the south west) south of Mona Vale Road. These records are from the 1990s. Road kills of Spotted-tailed Quolls on roads adjacent BGC land are unlikely.
Monitor survival of spotted-tailed quoll populations in habitat newly colonised by cane toads.	Area	Sydney is not habitat for Cane Toads and therefore not likely to colonised the site. Monitoring associated with the VMP will detect the occurrence of Cane Toads and if present they can be controlled accordingly

The proposal is consistent with the Action Descriptions for the spotted-tailed quoll in the SoS.

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

The key threatening processes potentially relevant to Spotted-tailed Quoll likely to result from this development are listed below. The proposal is not likely to significantly increase the impact of these processes as only a small amount of native vegetation (largely modified) will be removed.

The proposed development or activity is not likely to significantly increase the impact of key threatening processes relevant to Spotted-tailed Quoll, as:

Existing key threatening processes	Existing threat	Increased threat from the proposal
Clearing of native vegetation	Yes. Ongoing golf course management.	Yes. Clearing of approximately 0.43 ha of between-fairway vegetation, consisting of native and exotic trees with a golf course managed understorey (mainly mown existing

Existing key threatening processes	Existing threat	Increased threat from the proposal
		grasses and frequently with soil topdressing).

In conclusion, the proposal is not likely to significantly impact Spotted-tailed Quoll. No species impact statement is required.

Recommendations to minimise risk of impacts to the Spotted-tailed Quoll (*Dasyurus maculatus*):

- the site specific Vegetation Management Plan (Conservation/Biodiversity Management Plan) for the proposed development presented in Part B of Clements *et al.* (2017) with the associated Implementation and Compliance Table in Table 4 of Clements *et al.* (2017) should be applied.

3.2 Mammals – Bats

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

This bat roosts in trees in large camps.

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

Grey-headed Flying-fox occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.

Grey-headed Flying-fox can travel up to 50 km from the camp to forage; commuting distances are more often <20 km. They feed on the nectar and pollen of native trees, in particular *Eucalyptus, Melaleuca* and *Banksia*, and fruits of rainforest trees and vines. They also forage in cultivated gardens and fruit crops (OEH species profile).

The species was detected on the low land of the golf course however it is likely to only use the BGC land for foraging. No breeding camps have been observed onsite.

The Grey-headed Flying-fox forages on the flowers of eucalypts, among other things. A small number of eucalypts are proposed for removal, however more individuals of the same species are present on the BGC land, ensuring the foraging resource remains in the area. The removal of 0.43 ha of vegetation should not have a negative impact on this species, as the Grey-headed Flying-fox is highly mobile and there is ample foraging habitat in the vicinity of the BGC land.

The proposed action is not likely to have an adverse effect on the species such that a local population is likely 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

This species is not an endangered population, but a threatened species.

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

This species is not an ecological community, but a threatened species.

(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

(i) An area of 0.43 ha of highly modified 'between fairway vegetation' will be removed for the development. Due to the degraded nature of the 'between fairway vegetation', it is not considered important habitat for the Grey-headed Flying-fox.

(ii) Currently, the habitat on the BGC land is fragmented and isolated from the surrounding bushland creating a blockage for fauna movement through the landscape (Burcher 1995). The proposal will increase connectivity within the site and restore the wildlife corridor across the golf course into the surrounding bushland.

(iii) The long term survival of the Grey-headed Flying-fox will not be affected by the proposed removal of habitat on BGC land. The patch of degraded vegetation identified for removal is not considered high habitat value, due to lack of structure and soil modifications. Additionally, there is an abundance of intact bushland in the locality of the BGC land.

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

No declared areas of critical habitat will be impacted (either directly or indirectly). The BGC land and its immediate surrounds are not known to include any area declared or mapped as being of 'critical habitat'.

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

The Draft Recovery Plan for the Grey-headed Flying-Fox *(Pteropus poliocephalus)* (DEE 2017, http://www.environment.gov.au/system/files/resources/78d5e396-7475-4fc0-8a64-48c86a1cb2b6/files/draft-recovery-plan-grey-headed-flying-fox.pdf) includes Recovery Objectives and actions. It is stated that:

> *Actions under this Plan aim to improve the national population trend, identify, manage and secure key foraging and roosting habitats, improve the community's capacity to coexist with flying-foxes and increase awareness about flying-foxes.*

	Recovery Plan Objectives (DEE 2017):	Applicable to the project
1.	Identify, protect and enhance native foraging habitat critical to the survival of the Grey-headed Flying-fox.	Yes. Planting of winter flowering *Eucalyptus robusta* forms part of the restoration of the Coastal Floodplain communities. The proposal is to increase the connectivity and size of the existing native vegetation from 6.86 ha to more than 15 ha of potential foraging habitat. Of the more than 15 ha, 11.9 ha are of Coastal Floodplain communities.
	Actions	
1.1	Building on the work of Eby and Law (2008), through field surveys and spatial analysis identify potential and critical foraging areas used by the Grey-headed Flying-fox and display on the Department of the Environment and Energy interactive web viewer for the National Flying-Fox Monitoring Programme.	N/A to the proposal
1.2	Building on the outcomes of Action 1.1, identify opportunities to protect important foraging resources in native vegetation communities that are poorly represented within current reserves.	Yes. The proposal is to enhance foraging habitat within the endangered ecological community of the Coastal Floodplain.
1.3	Building on the outcomes of Action 1.1, identify opportunities to protect priority foraging habitats on private land using permanent covenants.	No. A covenant is not appropriate as the current vegetation is highly degraded and fragmented. The proposed habitat improvements are part of the increased environmental sustainability of the existing 18 hole golf course.
1.4	Increase the extent and viability of foraging habitat for the Grey-headed Flying-fox that is productive during winter and spring by planting appropriate tree species (e.g Eby 2016).	Yes. Planting of winter flowering *Eucalyptus robusta* forms part of the restoration of the Coastal Floodplain communities. The proposal is to increase the connectivity and size of the existing native vegetation from 6.86 ha to more than 15 ha of potential foraging habitat. Of the more than 15 ha, 11.9 ha are of Coastal Floodplain communities.
	Performance criterion	N/A to the proposal.
2.	Identify, protect and enhance roosting habitat of Grey-headed Flying-fox camps.	Yes. The species was detected on the low land of the golf course however it is likely to only use the BGC land for foraging. No breeding camps have been observed onsite.
	Actions 2.1 to 2.4, and Performance criterion	N/A. No known roosting camps have been recorded onsite.
3.	Determine population trends in Grey-headed Flying-foxes so as to monitor the species' national distribution and conservation status.	N/A to the proposal
	Actions 3.1 to 3.3, and Performance criterion	N/A to the proposal
4.	Build community capacity to coexist with flying-foxes and minimise the impacts on urban settlements from existing camps	N/A. No breeding camps have been observed onsite. There is possible habitat for a camp in the Fig tree near the sewer inspection point.

	Recovery Plan Objectives (DEE 2017):	Applicable to the project
	without resorting to dispersal.	
	Action 4.1 to 4.4	Yes. Monitoring is proposed in the VMP (Clements *et al.* 2017) and will include identifying any existing flying-fox roosting habitat at the time of monitoring.
	Performance criterion	Yes. Increasing environmental awareness of native flora and fauna forms part of the VMP.
5.	Increase public awareness and understanding of Grey-headed Flying-foxes and the recovery program, and involve the community in the recovery program where appropriate.	Yes. Increasing environmental awareness is consistent with Objective 1 of the VMP.
	Actions 5.1 to 5.3, and Performance criterion	N/A. This relates to regional studies and not to site specific project. The proposed increase in public awareness (Objective 1 of the VMP) is consistent with the Actions and Objectives.
6	Improve the management of Grey-headed Flying-fox camps in sensitive areas.	N/A. No breeding camps have been observed onsite.
	Actions 6.1, 6.2, and Performance criterion	N/A. No camps have been recorded onsite. The proposed increase in public awareness (Objective 1 of the VMP) is consistent with the Actions and Objectives.
7	Significantly reduce levels of deliberate Grey-headed Flying-fox destruction associated with commercial horticulture.	N/A. The BGC land is not associated with commercial horticulture.
8	Support research activities that will improve the conservation status and management of Grey-headed Flying-foxes.	Yes. Objectives 1, 5, 10 of the VMP (Clements *et al.* 2017) are consistent with Objective 8 of the Recovery Plan. Grey Headed Flying-fox have been recorded flying over the site. Fauna species monitoring is consistent with Objective 10 of VMP.
9	Assess and reduce the impact on Grey-headed Flying-foxes of electrocution on power lines, and entanglement in netting and on barbed-wire.	Yes. Power lines along Cabbage Tree Road are recommended to be undergrounded. Netting and barbed-wire are not proposed on the BGC land.
10	Actions 9.1, 9.2, and Performance criterion	Yes. Damage to Grey-headed Flying-fox is to be avoided.

The proposal is consistent with the Objectives of the Recovery Plan.

Under the Save our Species (SoS) program, the Grey-headed Flying-fox (www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10697) has been assigned to the Landscape species management stream as its disturbances occur at landscape managed scale (e.g. habitat loss or degradation) rather than processes that affect distinct, definable locations.

In the Action Toolbox, six Action Descriptions have been identified in “Help save the Grey-headed Flying-fox (*Pteropus poliocephalus)”* including:

Action Description	Scale	Applicable to the project
Increase the extent and viability of foraging	Site, Area	Yes. Planting of winter flowering *Eucalyptus*

Action Description	Scale	Applicable to the project
habitat for the Grey-headed Flying-fox that is productive during winter and spring through dedicated habitat creation and restoration using guides published by OEH (in preparation).		*robusta* forms part of the restoration of the Coastal Floodplain communities. The proposal is to increase the connectivity and size of the existing native vegetation from 6.86 ha to more than 15 ha of potential foraging habitat. Of the more than 15 ha, 11.9 ha are of Coastal Floodplain communities.
Negotiate agreements with landholders, particularly in-perpetuity covenants or stewardship agreements that promote the protection and retention of high quality foraging habitat and roost sites for grey-headed flying-foxes.	Site, Area	No. A covenant is not appropriate as the current vegetation is highly degraded and fragmented. The proposed habitat improvements are part of the increased environmental sustainability of the existing 18 hole golf course. Objectives 8 and 9 of the VMP aim to promote suitable habitat and connectivity.
Rehabilitate degraded flying-fox roost sites through weed management, planting new roost trees, managing understorey vegetation to maintain suitable microclimate conditions, establishing buffers between roost camps and nearby human settlements to minimise conflict.	Site	N/A. No known roosting camps have been observed on site, however weed management will occur as per the VMP.
Conduct dedicated engagement programs in communities affected by flying-fox roost sites, building the capacity of all stakeholders to engage in the process of decision-making and developing camp management plans. Provide information about mitigating the impacts of flying-foxes on nearby residences and businesses such as strategic vegetation management, and structural modifications like double-glazing, air conditioning and shade cloths.	Site	N/A as there are no camps on the BGC land, however if local resident communities are affected by flying-fox roost sites, then increasing environmental awareness would be implemented for Grey-headed Flying-fox. This is consistent with Objective 1 of the VMP.
Distribute public education materials to land managers and local community groups working with contentious flying-fox roost sites highlighting species status, reasons for being in urban areas, reasons for decline etc.	Site	Yes. If local resident communities are affected by flying-fox roost sites, then distribution of public education materials would form part of the required increasing of environmental awareness. This is is consistent with Objective 1 of the VMP.
Develop site-based heat stress response protocols for camps likely to be affected by heat stress events. Protocols should be based on best practice guidelines (http://www.environment.nsw.gov.au/animals/flying-fox-heat.htm), and should be implemented by licensed fauna rehabilitators. Data should be recorded to inform future management of heat stress events (http://www.environment.nsw.gov.au/resources/animals/150725-flying-fox-heat-data.docx).	Site	N/A to the project.

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

The key threatening processes potentially relevant to the Grey-headed Flying fox likely to result from this development are listed below. The proposal is not likely to significantly increase the impact of these processes as only a small amount, 0.43 ha, of largely modified, 'between fairway vegetation' will be removed.

The proposed development or activity is not likely to significantly increase the impact of key threatening processes relevant to Grey-headed Flying fox, as:

Existing key threatening processes	Existing threat	Increased threat from the proposal
Clearing of native vegetation	Yes. Ongoing golf course management.	Yes. Clearing of approximately 0.43 ha of between-fairway vegetation, consisting of native and exotic trees with a golf course managed understorey (mainly mown existing grasses and frequently with soil topdressing).
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	No. Fire frequency low.	No. No increase in fire frequency proposed.

In conclusion, the proposal is not likely to significantly impact the Grey-headed Flying-fox. No species impact statement is required.

Recommendations to minimise risk of impacts to the Grey-headed Flying-fox *(Pteropus poliocephalus*):

- the site specific Vegetation Management Plan (Conservation/Biodiversity Management Plan) for the proposed development presented in Part B of Clements *et al.* (2017) with the associated Implementation and Compliance Table in Table 4 of Clements *et al.* (2017) should be applied.
- artificial lighting on the exterior of the complex should be subdued and directed so that it lights only areas such as pathways where it is required; and
- planting of fruiting feed trees such as *Acmena smithii, Elaeocarpus reticulatus, Eucalyptus* sp., *Ficus* spp. and *Syzygium paniculatum.*

3.2.2 Large-eared Pied Bat (*Chalinolobus dwyeri)* and Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*)

These bats have roost requirements of caves (plus man-made structures).

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

Large-eared Pied Bat is found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. There are scattered records from the New England Tablelands and North West Slopes (OEH species profile).

A relatively high number of passes of the Large-eared Pied Bat were recorded by Dr Glen Hoye in November 2017 on the BGC land. Roosts of this species may be present in sandstone caves in escarpment areas within 10 km of the BGC land.

The Large-eared Pied Bat may use the BGC land as a foraging resource. It has been noted that the species forages for insects at night around roost sites and will travel up to several kilometres to forage. Large-eared Pied Bat is more likely to be found in well timbered areas containing gullies. Roosting and breeding are unlikely to occur, as the species is dependent on caves which are not present on the BGC land.

Eastern Bentwing-bat occurs along the east and north-west coasts of Australia. They weigh up to 20 grams, have a head and body length of about 6 cm and a wingspan of 30 - 35 cm. They hunt in forested areas, catching moths and other flying insects above the tree tops. Their primary roosting habitat is in caves, but they also use derelict mines, storm-water tunnels, buildings and other man-made structures. They form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young (OEH species profile).

Both species are highly mobile and considering the local available foraging habitat, the proposal is unlikely to adversely impact these species. The species were detected on the site (the golf course), however they are likely to primarily utilise the BGC land for foraging. Roosting and breeding is unlikely to occur, as the species are dependent on caves (which are not present), although buildings may be used for roosting. Only a small amount of available foraging habitat will be removed, an insignificant amount of the potential foraging habitat both on the BGC land and in the locality. The habitat that will be removed for the proposal includes mature eucalypts (as between fairway vegetation) which provide foraging resources. While some trees will be removed, and others of the same species will be retained on the BGC land, ensuring foraging resources for the species are still present on the BGC land throughout the year.

The proposed action is not likely to have an adverse effect on these species such that the local populations are likely 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

This species are not endangered populations, but threatened species.

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

The species are not ecological communities, but threatened species.

(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

(i) An area of 0.43 ha of highly modified 'between fairway vegetation' will be removed for the development. Due to the degraded nature of the 'between fairway vegetation', it is not considered to be important habitat for the Large-eared Pied Bat and the Eastern Bentwing-bat.

(ii) Currently, the habitat on the BGC land is fragmented and isolated from the surrounding bushland creating a blockage for fauna movement through the landscape (Burcher 1995).

(iii) The long term survival of the Large-eared Pied Bat and the Eastern Bentwing-bat will not be affected by the proposed removal of habitat on BGC land. The patch of degraded vegetation identified for removal is not considered high habitat value, due to lack of structure and soil modifications. Additionally, there is an abundance of intact bushland in the locality of the BGC land.

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

No declared areas of critical habitat will be impacted (either directly or indirectly). The BGC land and its immediate surrounds are not known to include any area declared or mapped as being of 'critical habitat'.

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

There is a National Recovery Plan for Large-eared Pied Bat *Chalinolobus dwyeri* (DERM 2011, http://www.environment.gov.au/system/files/resources/9e59696a-f72f-4332-8eda-25eeb4460349/files/large-eared-pied-bat.pdf, accessed 24 July 2018). Most of the Objectives and Recovery Actions in DERM 2011 related to national and regional Actions and not to site specific projects.

National Recovery Plan Objectives (DERM 2011)	Proposal compliance
1. Identify priority roost and maternity sites for protection.	Yes. The species has been identified on site and ongoing presence can be established through monitoring associated with the VMP.
2. Implement conservation and management strategies for priority sites.	Yes. Identified important areas of habitat on site will be protected and enhance as per the VMP..
3. Educate the community and industry to understand and participate in the conservation of the large-eared pied bat.	Yes. New residents will be made aware of local threatened flora and fauna as per the Objective 1 of the VMP.
4. Research the large-eared pied bat to augment biological and ecological data to enable conservation management.	N/A, however monitoring data will published in per reviewed journals and can be used towards conservation.
5. Determine the meta-population dynamics throughout the distribution of the large-eared pied bat.	N/A, but see above.

Under the SoS program, the Large-eared Pied Bat (www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10157, accessed

24 July 2018) and Eastern Bentwing-bat (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10534, accessed 24 July 2018) has been assigned to the Landscape species management stream as disturbances occur at landscape scale (e.g. habitat loss or degradation) rather than processes that affect distinct, definable locations.

For SoS Large-eared Pied Bat, it is stated that:

> *Insufficient information is available on the species' distribution and ecology to guide effective management*

For SoS Eastern Bentwing-bat most of the Action Descriptions are not site specific, except one. The proposal is consistent with this site specific Action Description.

In the Action Toolbox, six Action Descriptions have been identified in SoS "Help save the Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*)*"* including:

Action Description	Scale	Applicable to the project
Remove vegetation encroaching on cave entrances, with a minimum of disturbance.	Site	N/A. There are no caves on the BGC land.
Initiate a caver education program promoting awareness of the threat of pathogens to microbats, and providing information on appropriate hygiene, and where appropriate decontamination, protocols. Program should particularly target people likely to come into contact with pathogens overseas and who may introduce them to Australia.	State	N/A. There are no caves on the BGC land.
Protect and maintain high quality foraging habitat in the vicinity of maternity caves. Target high productivity habitats, primarily riparian areas, wetlands, and other areas of native vegetation associated with high moisture status and fertility. Where possible negotiate conservation agreements with landholders; agreements should preferably be funded and in perpetuity.	Site, Area	N/A. There are no caves on the BGC land.
Undertake revegetation, using a diverse mix of locally appropriate native species. Revegetation should focus on areas of good moisture and fertility, particularly riparian areas and wetlands. Priority should be given to expanding existing small habitat patches.	Site, Area	Yes. Local native plant species are in the revised landscape species selection (Table B in Clements *et al.* 2018). For the conservation areas of the golf course, especially in riparian areas and wetlands, appropriate local native species are used to enhance and restore conservation corridors from the highly fragmented patches of degraded vegetation. This is consistent with Objectives 8, 9 of the VMP. This includes the restoration of more than 15 ha of local native vegetation.
Restrict physical cave entrance closures to situations where there is a real hazard to public health and safety, and where the risk cannot be dealt with by other means (for example removing access tracks). Where closures are required, closures should be undertaken in a	State	N/A. There are no caves on the BGC land.

Action Description	Scale	Applicable to the project
manner that continues to allow safe access for bats, and that does not influence the cave's microclimate.		
Prevent human access to roost and maternity caves and the areas immediately around cave entrances during winter and the breeding season, through the erection of signage, or the removal of access tracks and paths.	Site	N/A. There are no caves on the BGC land.

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

The key threatening processes potentially relevant to Large-eared Pied Bat and the Eastern Bentwing-bat likely to result from this development are listed below. The proposal is not likely to significantly increase the impact of these processes as only a small amount of native vegetation (largely modified) will be removed.

The proposed development or activity is not likely to significantly increase the impact of key threatening processes relevant to Large-eared Pied Bat and the Eastern Bentwing-bat, as:

Existing key threatening processes	Existing threat	Increased threat from the proposal
Clearing of native vegetation	Yes. Ongoing golf course management.	Yes. Clearing of approximately 0.43 ha of between-fairway vegetation, consisting of native and exotic trees with a golf course managed understorey (mainly mown existing grasses and frequently with soil topdressing).

In conclusion, the proposal is not likely to significantly impact the Large-eared Pied Bat and the Eastern Bentwing-bat. No species impact statement is required.

Recommendations to minimise risk of impacts to the Large-eared Pied Bat (*Chalinolobus dwyeri*) and the Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*):

- the site specific Vegetation Management Plan (Conservation/Biodiversity Management Plan) for the proposed development presented in Part B of Clements *et al.* (2017) with the associated Implementation and Compliance Table in Table 4 of Clements *et al.* (2017) should be applied,
- artificial lighting on the exterior of the complex should be subdued and directed so that it lights only areas such as pathways where it is required.

3.2.3 Little Bentwing-bat (*Miniopterus australis*) and the Southern Myotis (*Myotis macropus)*

These bats have roost requirements of caves and tree hollows (plus man-made structures).

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

Little Bentwing-bats are small insectivorous bats with a body length of about 45 mm. They are found on the East coast and ranges of Australia from Cape York in Queensland to Wollongong in NSW. They are generally found in well-timbered areas including moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. They roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.

Southern Myotis (*Myotis macropus*) has previously been called the Large-footed Myotis (*M. adversus*). It has disproportionately large feet; more than 8 mm long, with widely-spaced toes which are distinctly hairy and with long, curved claws. It weighs up to 15 grams.

The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Generally it roosts in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. It forages over streams and pools catching insects and small fish by raking their feet across the water surface. In NSW females have one young each year usually in November or December (OEH species profile).

Both species were detected on the golf course, however they are likely to primarily utilise the site for foraging. Foraging and roosting are most likely to occur in densely vegetated areas, such as the vegetation in the north-west. As this habitat is not being modified for the proposal there is not expected to be a negative impact on these species. Roosting and breeding may occur (evidence of breeding detected), however the species are mostly dependent on caves (which are not present) although buildings, bridges and hollows may be used.

Only a small amount of potential roosting habitat will be removed, an insignificant amount of the potential roosting habitat both on the BGC land and in the locality. The species are highly mobile and considering the local available foraging habitat, the proposal is not expected to adversely impact the species. The habitat that will be removed for the proposal includes mature eucalypts (as between fairway vegetation) which may provide roosting resources (the Southern Myotis primarily feeds over water). Only a small number of trees will be removed, and others of the same species will be retained on the BGC land, ensuring roosting resources for the species are still present on BGC land throughout the year. The proposed action is not likely to have an adverse effect on these species such that a local population is likely 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

The species are not endangered populations, but threatened species.

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

The species are not ecological communities, but threatened species.

(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

(i) An area of 0.43 ha of highly modified 'between fairway vegetation' will be removed for the development. Due to the degraded nature of the 'between fairway vegetation', it is not considered important habitat for the Little Bentwing-bat and the Southern Myotis.

(ii) Currently, the habitat on the BGC land is fragmented from the surrounding bushland creating a blockage for fauna movement through the landscape (Burcher 1995). The proposal will increase connectivity within the site and restore the wildlife corridor across the golf course into the surrounding bushland.

(iii) The long term survival of the Little Bentwing-bat and the Southern Myotis will not be affected by the proposed removal of habitat on BGC land. The patch of degraded vegetation identified for removal is not considered high habitat value, due to lack of structure and soil modifications. Additionally, there is an abundance of intact bushland in the locality of the BGC land.

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

No declared areas of critical habitat will be impacted (either directly or indirectly). The BGC land and its immediate surrounds are not known to include any area declared or mapped as being of 'critical habitat'.

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

Under the Save our Species (SoS) program, Little Bentwing-bat (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10533, accessed 24 July 2018) and the Southern Myotis (http://environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10549, accessed 24 July 2018) have been assigned to the Landscape species management stream as its disturbances occur at landscape managed scale (e.g. habitat loss or degradation) rather than processes that affect distinct, definable locations.

In the Action Toolbox, 12 Action Descriptions have been identified in "Help save the Little Bentwing-bat (*Miniopterus australis*)*"* including:

Action Description	Scale	Applicable to the project
Check that cave entrances are not blocked in a way that prevents easy continual access by bats. Monitor the density of vegetation (native or exotic) at the entrance to any active or potential maternity or hibernation roost cave and manually remove (do not use chemicals) as necessary to ensure bats have ready	Site	N/A. There are no caves on the BGC land.

Action Description	Scale	Applicable to the project
access year round.		
Identify important maternity or hibernation roost sites (e.g. caves, tunnels, bridges, drains, culverts) and negotiate with relevant landholders or land managers to enter into an agreement that protects these sites from disturbance or degradation. This should include provision to check and seek expert advice if the bats are present prior to undertaking maintenance works.	Site	N/A. There are no caves on the BGC land.
Discourage recreational users from roosting areas such as caves, culverts, and stormwater drains by erecting signs or blocking preventing human access whilst still allowing access to bats. In caves where public access is permitted, restrict access during breeding season (November-March) and winter to approved scientific research only and provide information in the form of brochures and signage about appropriate care and behaviour whilst at the site. Provide this information to caving, climbing, abseiling and bushwalking groups.	Area	N/A. There are no caves on the BGC land.
Liaise with relevant authorities and/or land managers to ensure that the location and sensitivity of roosting and key foraging areas are known and encourage that existing lighting impacting on these areas be modified and that any future lighting avoid spilling onto these areas where possible.	Site, Area	Artificial lighting on the exterior of the development complex should be subdued, and directed so that it lights only areas such as pathways where it is required to minimise impact on the foraging of insectivorous bats.
Liaise with relevant authorities or land managers to ensure that the location and sensitivity of key foraging areas are known prior to any hazard reduction burns. Also ensure that areas immediately surrounding maternity/nursery caves are identified as an important biodiversity asset in any relevant fire planning and have a 100m buffer zone applied. Planned fires near maternity or roosting site should not be undertaken during the breeding season (August to early April), during winter when bats are in residence, or when the wind direction is likely to blow heavy smoke or flames into the cave. Undertake research into the effects of fire on the species.	Area	N/A to the project
Investigate wintering roosts including whether the species use banana trees and tree hollows in order to understand species habitat.	State	Monitoring of nest boxes associated with the VMP will detect if this species is using hollows during winter.
Monitor the species at a number of sites, including the single known breeding colony in NSW, to keep watch on the potential introduction of pathogens such as white-nosed fungus. Restrict use of known important maternity or hibernation roost caves	Site, Area	N/A to the project

Action Description	Scale	Applicable to the project
during the breeding and overwintering period to those undertaking approved management or scientific research. Disseminate brochures and liaise with recreational caving, bushwalking, abseiling and climbing groups to highlight the risks of disease spread and also describe appropriate hygiene protocols for use on site.		
Raise awareness amongst landholders in close proximity (approximately 15km radius) to maternity or hibernation roost caves, of the potential impacts of using harmful pesticides and other chemicals and discourage their use in or adjacent to habitat areas.	Area	N/A. There are no caves on the BGC land.
Encourage land managers to enter into land management agreements that protect and restore key areas particularly swamps and habitat adjacent to caves and other roost sites.	Site	N/A to the project
Undertake restoration and augmentation planting and/or direct seeding , including species from the ground layer and understorey in areas of degraded and/or potentially suitable habitat where weeds can be effectively managed. Revegetation should focus on expanding existing smaller areas of suitable habitat and connecting areas of suitable habitat to create corridors for movement. A diversity of local native species should be planted.	Site	Yes. No environmental weed species are included in the revised landscape species selection. The conservation areas of the golf course are exclusively local native species. The diverse mix of appropriate native species will thicken existing fragmented patches of vegetation on site.
Liaise with relevant authorities and/or land managers to discourage the destruction of caves. If mine sites are to be closed or previously abandoned mines reopened, they should first be checked for the presence of bats (during summer) and access should still be provided for the bats to safely enter and leave. Closure technique should be discussed with relevant microbat experts to ensure that possible habitat for bats is maintained. If gates are used, they should be bat friendly with horizontal bars at last 15cm apart and preferably with a larger gap across the top. Bats should be excluded prior to closure (and this should not occur during the breeding season from August to early April or winter). The impact of closure on bat usage should be monitored for several seasons.	Site, Area	N/A. There are no caves on the BGC land.
Undertake research to understand the effects of fragmentation on the species.	State	It is recommended for the proposal that the effects of the habitat rehabilitation, enhancement and re-construction works be presented in peer review journals, especially of the restored habitat of insectivorous bats.

In the Action Toolbox, 13 Action Descriptions have been identified in “Help save the Southern Myotis (*Myotis macropus)”* including:

Action Description	Scale	Applicable to the project
Retain and protect live and standing dead trees likely to contain suitably sized hollows, or that have the potential to develop these in the future (e.g. through the loss of limbs) particularly in riparian zones. Ensure the largest hollow-bearing trees, including dead trees, are given highest priority for retention in property vegetation plan assessments. Offsets should include remnants in high productivity and riparian zones. Raise public awareness of the importance of hollow-bearing trees and promote strategies for retaining these in the landscape.	Area	Yes. Retention of dead trees is applicable only where there is limited public access on the BGC land. Retention of hollow-bearing trees is part of the VMP for the BGC land. Increasing environmental awareness is consistent with Objective 1 of the VMP.
Identify sites, particularly in riparian zones, where hollows are limiting due to exotic species inhibiting recruitment and changing the vegetation structure. Ensure the future replacement of large old trees by facilitating regeneration or undertaking replanting at sites where they presently occur. Protect recruit trees that will be able to provide hollows in the future.	Site	Yes. Consistent with the VMP and additional information in Clements *et al.* (2018).
Liaise with the Roads and Maritime Authority and other relevant authorities and land managers regarding wooden bridges, wharves, tunnels, aqueducts and other structures acting as bat habitat. When undertaking any major works, replacing wooden bridges with concrete bridges or upgrading wharves, this be done at a time outside of the breeding (October-February) and overwintering period. A wooden structure should be placed under new bridges or wharves where bats are known to provide a roost.	State	Yes. Appropriate and should be considered for the bridge across the existing drainage canals on the BGC land.
Encourage land managers to enter into land management agreements that protect and restore key areas such as riparian habitat and including the retention of suitable hollow-bearing trees and recruitment trees in these areas.	Site	Yes. Consistent with the VMP and additional information in Clements *et al.* (2018).
Check that in caves utilised by bats, entrances are not blocked in a way that prevents easy continual access by bats. Monitor the density of vegetation (native or exotic) at the entrance to any active or potential maternity or hibernation roost cave and manually remove (do not use chemicals) as necessary to ensure bats have ready access year-round.	Site	N/A. There are no caves on the BGC land.
Discourage recreational users from roosting areas by erecting signs or blocking preventing human access whilst still allowing access to bats. In caves where public access is permitted, restrict access during breeding season (November-March) and winter to approved management and scientific research only. Provide information to users in the form	State	Yes. Golf activities are during daylight hours and unlikely to involve activities near roosting area such as caves, culverts, and storm water drains.

Action Description	Scale	Applicable to the project
of brochures and signage about appropriate care and behaviour whilst at the site. Provide this information to caving, climbing, abseiling and bushwalking groups.		
Promote roosting habitat in new artificial structures within the species' range and monitor their use.	Site	Yes. Forms part of the proposal.
Control or remove exotic weeds, particularly in riparian zones, that degrade habitat and alter the structure of the vegetation community in areas of the species' distribution. Ensure that such weed control work be undertaken in a staged manner and minimises disturbance to the habitat of the species. Develop and implement a bush regeneration strategy (which includes monitoring and reporting requirements) targeting the removal of weeds significantly compromising habitat values such as the repression of future hollow-bearing trees. Care should be taken to avoid widespread removal of vegetation without replacement. Manual weed removal is preferable and the use of herbicides should avoid non-target impacts. Leave dead trees standing. Encourage land managers and bushcare groups to undertake weed control.	Site	Yes. Consistent with Objectives 3, 4, 7, 9, 10 of the VMP.
Undertake restoration and augmentation planting and/or direct seeding, including species from the ground layer and understorey in areas of degraded and/or potentially suitable habitat particularly in riparian zones. Revegetation should focus on expanding existing smaller areas of suitable habitat and connecting areas of suitable habitat to create corridors for movement. A diversity of local native species should be planted. Dead trees should not be removed.	Site	Yes. Forms part of the proposal.
Liaise with relevant authorities and/or land managers to discourage the destruction of caves. If mine sites are to be closed or previously abandoned mines reopened, they should first be checked for the presence of bats (during summer) and access should still be provided for the bats to safely enter and leave. Closure technique should be discussed with relevant microbat experts to ensure that possible habitat for bats is maintained. If gates are used, they should be bat friendly with horizontal bars at least 15cm apart and preferably with a larger gap across the top. Bats should be excluded prior to closure (and this should not occur during the breeding season from October to February or in winter). The impact of closure on bat usage should be monitored for several seasons.	Site, Area	N/A. There are no caves on the BGC land.
Raise awareness amongst landholders in close proximity (approximately 15km radius) to maternity or roost sites, of the potential	Site, Area	Yes. Increasing environmental awareness of native flora and fauna is Objective 1 of the VMP (Clements *et al.* 2017).

Action Description	Scale	Applicable to the project
impacts of using harmful pesticides and other chemicals and discourage their use in or adjacent to foraging habitat, particularly in riparian zones around waterways such as rivers, creeks, lakes and dams.		
Liaise with agricultural landholders to promote land management that minimises disturbance to waterways likely to be foraging habitat (e.g. restore riparian vegetation and carefully manage stormwater and polluted run-off). Monitor and maintain adequate water quality in water systems known to be used for foraging. Liaise with relevant authorities with respect to limiting the impacts of waste disposal and runoff in these systems.	Site, Area	N/A. BGC land is not on or near agricultural landholdings. The watercourses on the BGC land, based on the *E. coli* counts in the watercourses, is being adversely impacted by waste disposal and runoff in these systems.
Manually remove and appropriately dispose of invasive aquatic weeds in waterways in foraging areas (weeds inhibit the species' ability to forage over water).	Site	Yes. Forms part of the proposed VMP.

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

The key threatening processes potentially relevant to the Little Bentwing-bat and the Southern Myotis likely to result from this development are listed below. The proposal is not likely to significantly increase the impact of these processes as only a small amount, 0.43 ha, of largely modified, 'between fairway vegetation' will be removed.

The proposed development or activity is not likely to significantly increase the impact of key threatening processes relevant to Little Bentwing-bat and the Southern Myotis, as:

Existing key threatening processes	Existing threat	Increased threat from the proposal
Clearing of native vegetation	Yes. Ongoing golf course management.	Yes. Clearing of approximately 0.43 ha of between-fairway vegetation, consisting of native and exotic trees with a golf course managed understorey (mainly mown existing grasses and frequently with soil topdressing).
Loss of Hollow-bearing trees	Yes. Ongoing as part the golf course management.	Yes. A loss of 13 of 84 identified hollow-bearing trees north of Cabbage Tree Road (none of 15 trees with large hollows, 5 of 30 with medium hollows, 7 of 31 with small hollows and 1 of 8 with indeterminate hollows)
Removal of dead wood and dead trees	Yes. Ongoing as part the golf course management.	No. Proposal is not likely to increase the threat.

In conclusion, the proposal is not likely to significantly impact the Little Bentwing-bat and the Southern Myotis. No species impact statement is required.

Recommendations to minimise risk of impacts to the Little Bentwing-bat (*Miniopterus australis*) and the Southern Myotis *(Myotis macropus*):

- the site specific Vegetation Management Plan (Conservation/Biodiversity Management Plan) for the proposed development presented in Part B of Clements *et al.* (2017) with the associated Implementation and Compliance Table in Table 4 of Clements *et al.* (2017) should be applied;
- water quality improvements need to be discussed with Council and the Water Authority, especially in drains adjoining the property boundaries receiving storm water runoff;
- artificial lighting on the exterior of the complex should be subdued, and directed so that it lights only areas such as pathways where it is required: and
- installation of nest boxes and artificial hollows with ongoing maintenance and monitoring.

3.2.4 Eastern False Pipistrelle *(Falsistrellus tasmaniensis),* Eastern Freetail-bat *(Mormopterus norfolkensis),* Greater Broad-nosed Bat *(Scoteanax rueppellii)* and the Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris)*

These bats have roost requirements of tree hollows and some under bark (plus man-made structures).

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

The Eastern False Pipistrelle prefers moist habitats, with trees taller than 20 m. It generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. It hunts beetles, moths, weevils and other flying insects above or just below the tree canopy (OEH species profile).

The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW. They weigh up to 10 grams, usually solitary but also recorded roosting communally, probably insectivorous. They occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. They roost mainly in tree hollows but will also roost under bark or in man-made structures.

The Greater Broad-nosed Bat is a large powerful bat, up to 95 mm long, It is found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast over much of its range. This species usually roosts in tree hollows. Little is known of its reproductive cycle, however a single young is born in January; prior to birth, females congregate at maternity sites located in suitable trees. It utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. It forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects (OEH species profile).

The Yellow-bellied Sheathtail-bat is a very distinctive, large, insectivorous bat up to 87 mm long. It is a wide-ranging species found across northern and eastern Australia. It roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. Breeding has been recorded from December to mid-March, when a single young is born. When foraging for insects, it flies high and fast over the forest canopy, but lower in more open country. It forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory (OEH species profile).

The Eastern False Pipistrelle and the Eastern Freetail-bat were detected on the golf course, however they were likely to primarily utilise the site for foraging. The other two species were not detected on the BGC land.

Roosting of all four species is likely to occur in densely vegetated areas, such as the vegetation in the north-west, and breeding may also occur in these areas. As this habitat is not being modified for the proposal there is not expected to be a negative impact on these species. Only a small amount of available foraging habitat will be removed, an insignificant amount of the potential foraging habitat both on the BGC land and in the locality. The species is highly mobile and considering the local available foraging and roosting habitat, the proposal is not expected to adversely impact the species. The habitat that will be removed for the proposal includes mature eucalypts (as between fairway vegetation) which provide foraging resources and potential roosting habitat. While some trees will be removed, and others of the same species will be retained on the BGC land, ensuring foraging resources for the species are still present on BGC land throughout the year. The proposed action is not likely to have an adverse effect on the species such that a local population is likely 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

The species are not an endangered populations, but threatened species.

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

The species are not ecological communities, but threatened species.

(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

(i) An area of 0.43 ha of highly modified ‘between fairway vegetation’ will be removed for the development. Due to the degraded nature of the ‘between fairway vegetation’, it is not considered important habitat for the Eastern False Pipistrelle, the Eastern Freetail-bat, the Greater Broad-nosed Bat and the Yellow-bellied Sheathtail-bat.

(ii) Currently, the habitat on the BGC land is fragmented from the surrounding bushland creating a blockage for fauna movement through the landscape (Burcher 1995). The proposal will increase connectivity within the site and restore the wildlife corridor across the golf course into the surrounding bushland.

(iii) The long term survival of the Eastern False Pipistrelle, the Eastern Freetail-bat, the Greater Broad-nosed Bat and the Yellow-bellied Sheathtail-bat will not be affected by the proposed

removal of habitat on BGC land. The patch of degraded vegetation identified for removal is not considered high habitat value, due to lack of structure and soil modifications. Additionally, there is an abundance of intact bushland in the locality of the BGC land.

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

No declared areas of critical habitat will be impacted (either directly or indirectly). The BGC land and its immediate surrounds are not known to include any area declared or mapped as being of 'critical habitat'.

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

Under the Save our Species (SoS) program, Eastern False Pipistrelle (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10331, accessed 24 July 2018), Eastern Freetail-bat (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10544, accessed 24 July 2018), Greater Broad-nosed Bat (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10748, accessed 24 July 2018) and the Yellow-bellied Sheathtail-bat (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10741, accessed 24 July 2018*)* has been assigned to the Landscape species management stream as its disturbances occur at landscape managed scale (e.g. habitat loss or degradation) rather than processes that affect distinct, definable locations.

In the Action Toolbox, four Action Descriptions have been identified in "Help save the Eastern False Pipistrelle *(Falsistrellus tasmaniensis)"* including:

Action Description	**Scale**	**Applicable to the project**
Ensure roosting bats are not present before removing or disturbing hollow-bearing trees in winter.	State	Yes. Consistent with Objective 1 of the VMP All onsite personnel are to be inducted and fully informed of the conservation significance. In the regular tool box talks, the personnel are to be reminded of the conservation importance of the site to maintaining health of the catchment.
Protect and maintain areas of high quality habitat, particularly areas of extensive tall forest (dominated by trees more than 20m in height), which include areas of high productivity foraging habitat around creeks, rivers and wetlands. Where possible negotiate conservation agreements with landholders, agreements should preferably be funded and in-perpetuity.	Site, Area	Yes. The area of degraded vegetation to be cleared consists of cleared fairway vegetation and is not located around creeks rivers and wetlands. High quality habitat present on site will be protected in-perpetuity. The proposal aims to increase the habitat of Eastern False Pipistrelle with the creation a creek and retention ponds creating high productive foraging habitat
Encourage landholders to retain and protect hollow-bearing trees in suitable habitat. Ensure long-term hollow availability by protecting recruit trees, that is, trees that will be able to provide hollows when current hollow-bearing trees have died and fallen.	Site, Area	Yes. Proposal is to retain and protect hollow-bearing trees in suitable habitat, with loss of only 13 of the 84 hollow-bearing trees by the proposal. It should be noted that no large hollows are to be removed. Installation of nest boxes and artificial hollows with ongoing maintenance and monitoring is

Action Description	Scale	Applicable to the project
		recommended as part of Clements *et al.* (2018), as well as Objective 9 of the VMP
Undertake revegetation, using a locally appropriate mix of native species, in areas that will develop into tall forest. Revegetation should focus on expanding existing smaller areas of suitable habitat, and areas of high productivity such as riparian areas and wetlands.	Site, Area	Yes. For the conservation areas of the golf course, especially in the riparian areas and wetlands, appropriate local native species are used to enhance and restore conservation corridors from the highly fragmented patches of degraded vegetation This is consistent with Objectives 8, 9 of the VMP. This includes the restoration of more than 15 ha of local native vegetation.

In the Action Toolbox, seven Action Descriptions and on Monitoring Action have been identified in “Help save the Eastern Freetail-bat *(Mormopterus norfolkensis)”* including:

Action Description	Scale	Applicable to the project
Raise public awareness of the importance of hollow-bearing trees and promote strategies for retaining these in the landscape. Facilitate regeneration or undertaking replanting at sites where they presently occur. Protect recruit trees that will be able to provide hollows in the future.	State	Yes. Consistent with Objectives 1, 2, 5, 6, 7, 8, 9, 10 of the VMP.
Negotiate agreements with relevant landholders, particularly in-perpetuity covenants or stewardship agreements, that promote the retention and connectivity of suitable habitat, including forested areas with hollow-bearing trees, as well as vegetation buffers around wetlands, estuaries, alluvial flats along creeklines and coastal lagoons.	Site, Area	N/A. A covenant is not appropriate as the current vegetation is highly degraded and fragmented. The proposed habitat improvements are part of the increased environmental sustainability of the existing 18 hole golf course. Objectives 8 and 9 of the VMP aim to promote suitable habitat and connectivity.
Raise public awareness of the damage caused to habitat by thinning, slashing, underscrubbing and inappropriate grazing. Encourage land managers to retain tree density and a floristically and structurally diverse and spatially variable mid and understorey.	State	Yes. Consistent with Objectives 1, 2, 8, 9, 10 of the VMP.
Identify sites where hollows are limiting due to exotic species inhibiting recruitment and changing the vegetation structure. Implement a bush regeneration strategy targeting the removal of weeds significantly compromising habitat values and restore native vegetation. Care should be taken to avoid widespread removal of beneficial exotic woody vegetation without replacement and avoid non-target impacts of herbicides.	Site	Yes. Consistent with Objectives 4, 6, 7 of the VMP. Targeting the removal of weeds within degraded areas.
Raise awareness amongst landholders in close proximity (approximately 15km radius) to maternity or roost sites, of the potential impacts of using harmful pesticides and other chemicals and discourage their use in or adjacent to foraging habitat particularly in	Area	Yes. Consistent with Objective 1 of the VMP.

Action Description	Scale	Applicable to the project
riparian zones around waterways such as wetlands, swamps, esturaries, rivers, creeks, lakes and dams. Monitor and maintain adequate water quality in water systems known to be used for foraging.		
Liaise with relevant landholders or land managers responsible for artificial light sources close to key roosting or foraging areas, to encourage reduction or modification of light impacting on known habitat to reduce levels of disturbance.	Site	Yes. Artificial lighting on the exterior of the complex should be subdued and directed so that it lights only areas such as pathways where it is required as recommended by the VMP.
Liaise with relevant authorities or land managers to ensure that the location and sensitivity of key foraging areas are known prior to any hazard reduction burns. Ensure that areas within a 100m buffer of maternity caves are excluded from burning, and burning in these areas should not take place during breeding (November to January). Fire in broader foraging habitat should be managed to promote a mosaic of vegetation structures and high intensity fires that remove hollow-bearing trees should be avoided where possible.	Area	N/A. Hazard reduction burning is unlikely to occur onsite.
Monitoring Actions		
Regular monitoring of the effectiveness of management and the trajectory of local populations is an important component of landscape-managed species. The toolbox and any site-based management plans for landscape-managed species will be adapted, added or removed over time in response to monitoring results	-	Yes. Consistent with Objective 10 of the VMP.

In the Action Toolbox, ten Action Descriptions have been identified in “Help save the Greater Broad-nosed Bat *(Scoteanax rueppellii)”* including:

Action Description	Scale	Applicable to the project
Liaise with relevant authorities or land managers to ensure that the location and sensitivity of roost sites (such as trees bearing small hollows) and key foraging areas are known prior to any hazard reduction burns. Ensure that areas immediately surrounding maternity and roost sites are identified as an important biodiversity asset in any relevant fire planning and have a 100m buffer zone applied. Planned fires near maternity or roosting sites should not be undertaken during the breeding season, i.e. December to January, or overwintering period if bats are in residence. Hazard reduction burns should be of low intensity and in dry open forest and woodland habitat should not occur more than once every 7-30 years, in swamp forest not more than once every 7-35 years. Fires should be conducted in a mosaic manner to	Area	N/A. Hazard reduction burning is unlikely to occur onsite.

Action Description	Scale	Applicable to the project
allow areas of refuge to remain undamaged. Liaise with the Rural Fire Service, National Parks and Wildlife Service, or relevant land manager, to ensure that prescribed burns that may affect riparian or other habitat are cool burns and/or do not kill hollow-bearing trees, or remove cohorts of smaller hollow-bearing species over large areas.		
Raise awareness among landholders about the importance of retaining large live and standing dead hollow-bearing trees in the landscape as habitat for the species.	Area	Yes. Consistent with Objectives 1, 9 of the VMP.
Identify sites, particularly in riparian zones, where hollows are limiting due to exotic species inhibiting recruitment and changing the vegetation structure. Ensure the future replacement of large old trees by facilitating regeneration or undertaking replanting at sites where they presently occur. Protect recruit trees that will be able to provide hollows in the future.	State	Yes. Consistent with Objectives 1, 9 of the VMP.
Liaise with agricultural landholders to promote land management that minimises disturbance to waterways likely to be foraging habitat (e.g. restore riparian vegetation and carefully manage stormwater and polluted run-off).	Area, Site	Yes. The watercourses on the BGC land, based on the *E. coli* counts in the watercourses, is being adversely impacted of waste disposal and runoff in these system. Liaising with the appropriate authorities is required.
Control or remove exotic weeds, particularly in riparian zones, that degrade habitat and alter the structure of the vegetation community in areas of the species distribution. Ensure that such weed control work be undertaken in a staged manner and minimises disturbance to the habitat of the species. Develop and implement a bush regeneration strategy (which includes monitoring and reporting requirements) targeting the removal of weeds significantly compromising habitat values such as the repression of future hollow-bearing trees. Care should be taken to avoid widespread removal of vegetation without replacement. Manual weed removal is preferable and the use of herbicides should avoid non-target impacts. Leave dead trees standing. Encourage land managers and bushcare groups to undertake weed control.	Site	Yes. Consistent with Objectives 3, 4, 7, 9, 10 of the VMP.
Undertake restoration and augmentation planting and/or direct seeding , including species from the ground layer and understorey in areas of degraded and/or potentially suitable habitat particularly in riparian zones. Revegetation should focus on expanding existing smaller areas of suitable habitat and connecting areas of suitable habitat to create corridors for movement. A diversity of local native species should be	Site	Yes. Consistent with Objectives 7, 8, 9 of the VMP.

Action Description	Scale	Applicable to the project
planted. Dead trees should not be removed.		
Manually remove and appropriately dispose of invasive aquatic weeds from waterways in foraging areas.	Site	Yes. Consistent with Objective 7 of the VMP.
Encourage land managers to enter into land management agreements that protect and restore key areas such as riparian habitat and including the retention of suitable hollow bearing trees and recruitment trees in these areas.	State	N/A for the BGC land. The implementation of the VMP forms part of the Actions proposed to increase environmental sustainability of the BGC land.
Raise awareness amongst landholders in close proximity (approximately 15km radius) to maternity or roost sites, of the potential impacts of using harmful pesticides and other chemicals and discourage their use in or adjacent to foraging habitat particularly in riparian zones around waterways such as rivers, creeks, lakes and dams.	Site	Yes. Consistent with Objectives 1, 5, 9 of the VMP.
Undertake research into habitat use and roost ecology and regional movements in order to better understand and protect habitat for the species.	State	Yes. It is expected for works undertaken on the BGC land, especially those related to enhancement of flora and fauna habitat.

In the Action Toolbox, Seven Action Descriptions have been identified in “Help save the Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris)”* including:

Action Description	Scale	Applicable to the project
Encourage land managers to enter into land management agreements that protect and restore key areas including the retention of suitable hollow-bearing trees and recruitment trees.	Site	N/A for the BGC land. The implementation of the VMP forms part of the Actions proposed to increase environmental sustainability of the BGC land.
Raise awareness among landholders about the importance of retaining large live and standing dead hollow-bearing trees in the landscape as habitat for the species.	Site, Area	Yes. Consistent with Objectives 1, 5, 9 of the VMP.
Raise awareness amongst landholders in close proximity (approximately 15km radius) to maternity or roost sites, of the potential impacts of using harmful pesticides and other chemicals and discourage their use in or adjacent to foraging habitat particularly in riparian zones around waterways such as rivers, creeks, lakes and dams.	Area	Yes. Consistent with Objectives 1, 5, 9 of the VMP.
Raise public awareness of the damage caused to habitat by thinning, slashing, underscrubbing and inappropriate grazing, and encourage land managers to retain tree density and a floristically and structurally diverse and spatially variable mid and understorey.	State	Yes. Applicable to a golf course management and consistent with Objectives 1, 2, 8, 9, 10 of the VMP.
Undertake restoration and augmentation planting and/or direct seeding, including species from the ground layer and	Site	Yes. No environmental weed species are included in the revised landscape species selection (Table B in Clements *et al.* 2018).

Action Description	Scale	Applicable to the project
understorey in areas of degraded and/or potentially suitable habitat where weeds can be effectively managed. Revegetation should focus on expanding existing smaller areas of suitable habitat and connecting areas of suitable habitat to create corridors for movement. Maintain and improve travelling stock reserves used by the species. A diversity of local native species should be planted.		The conservation areas of the golf course are exclusively local native species. The diverse mix of appropriate native species will thicken existing fragmented patches of vegetation on site and re-establish a wildlife corridor to the surrounding bushland. This is consistent with Objective 8 of the VMP.
Control or remove exotic weeds, particularly in riparian zones, that degrade habitat and alter the structure of the vegetation community in areas of the species' distribution. Ensure that such weed control work be undertaken in a staged manner and minimises disturbance to the habitat of the species and prey species (insects). Develop and implement a bush regeneration strategy (which includes monitoring and reporting requirements) targeting the removal of weeds significantly compromising habitat values such as the repression of future hollow-bearing trees. Care should be taken to avoid widespread removal of vegetation without replacement. Manual weed removal is preferable and the use of herbicides should avoid non-target impacts. Leave dead trees standing. Encourage land managers and bushcare groups to undertake weed control.	Site	Yes. Consistent with Objectives 3, 4, 7, 9, 10 of the VMP.
Undertake research into habitat use and roost ecology in order to better understand and protect habitat for the species.	State	Yes. It is recommended for the proposal that the effects of the habitat rehabilitation, enhancement and re-construction works be presented in peer review journals, especially of the restored habitat of insectivorous bats.

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

The key threatening processes potentially relevant to the Eastern False Pipistrelle, the Eastern Freetail-bat, the Greater Broad-nosed Bat and the Yellow-bellied Sheathtail-bat likely to result from this development are listed below. The proposal is not likely to significantly increase the impact of these processes as only a small amount, 0.43 ha, of largely modified, ‘between fairway vegetation’ will be removed.

The proposed development or activity is not likely to significantly increase the impact of key threatening processes relevant to the Eastern False Pipistrelle, the Eastern Freetail-bat, the Greater Broad-nosed Bat and the Yellow-bellied Sheathtail-bat, as:

Existing key threatening processes	Existing threat	Increased threat from the proposal
Clearing of native vegetation	Yes. Ongoing golf course management.	Yes. Clearing of approximately 0.43 ha of between-fairway vegetation, consisting of native and exotic trees with a golf course

Existing key threatening processes	Existing threat	Increased threat from the proposal
		managed understorey (mainly mown existing grasses and frequently with soil topdressing).
Loss of Hollow-bearing trees	Yes. Ongoing as part the golf course management.	Yes. A loss of 13 of 84 identified hollow-bearing trees north of Cabbage Tree Road (none of 15 trees with large hollows, 5 of 30 with medium hollows, 7 of 31 with small hollows and 1 of 8 with indeterminate hollows)
Removal of dead wood and dead trees	Yes. Ongoing as part the golf course management.	No. Proposal is not likely to increase the threat.

In conclusion, the proposal is not likely to significantly impact the Eastern False Pipistrelle, the Eastern Freetail-bat, the Greater Broad-nosed Bat and the Yellow-bellied Sheathtail-bat. No species impact statement is required.

Recommendations to minimise risk of impacts to the Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), Eastern Freetail-bat (*Mormopterus norfolkensis*), Greater Broad-nosed Bat *(Scoteanax rueppellii)* and the Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*):

- the site specific Vegetation Management Plan (Conservation/Biodiversity Management Plan) for the proposed development presented in Part B of Clements *et al.* (2017) with the associated Implementation and Compliance Table in Table 4 of Clements *et al.* (2017) should be applied;
- artificial lighting on the exterior of the complex should be subdued; and directed so that it lights only areas such as pathways where it is required; and
- installation of nest boxes and artificial hollows with ongoing maintenance and monitoring.

3.3 Birds

3.3.1 Glossy-black Cockatoo (*Calyptorhynchus lathami*)

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

The Glossy Black-Cockatoo is a small brown-black cockatoo with a massive, bulbous bill and a short crest. Males have a prominent red tail panel, while that of females is yellow to orange-red. They are usually seen in pairs or small groups feeding in sheoaks. Feeds almost exclusively on the seeds of several species of she-oak (*Casuarina* and *Allocasuarina* species), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites (OEH species profile).

The Glossy Black-Cockatoo's nest is a hollow in a eucalypt, live or dead, commonly in a dead spout in a living tree, about 26 cm wide and up to 1.4 m deep (NSW final determination).

The species was not detected on the BGC land, however it may utilise the site for foraging. Only a small amount of available foraging habitat will be removed, an insignificant amount of the potential foraging habitat both on the BGC land and in the locality. The species is highly mobile and considering the local available foraging habitat there is not expected to be a negative impact on this species. The habitat that will be removed for the proposal includes

some of the existing *Casuarina glauca* and *Allocasuarina torulosa* (which are used as food resources). Only a small number of trees will be removed, and others of the same species will be retained on the BGC land, ensuring foraging resources for the species are still present on BGC land throughout the year. Large hollows are required for nesting, no large hollows were recorded in the area associated with the proposed seniors housing.

The proposed action is not likely to have an adverse effect on the species such that a local population is likely 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

The species is not an population, but a threatened species.

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

The species is not an ecological community, but a threatened species.

(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

(i) An area of 0.43 ha of highly modified 'between fairway vegetation' will be removed for the development. Due to the degraded nature of the 'between fairway vegetation', it is not considered important habitat for the Glossy-black Cockatoo.

(ii) Currently, the habitat on the BGC land is fragmented and isolated from the surrounding bushland creating a blockage for fauna movement through the landscape (Burcher 1995).

(iii) Currently, the vegetation on the Golf Course is highly modified and isolated. The long term survival of the Glossy-black Cockatoo will not be affected by the proposed removal of some of the existing *Casuarina glauca* and *Allocasuarina torulosa*. The patch of degraded vegetation identified for removal is not considered high habitat value, due to lack of structure and soil modifications. Additionally, there is an abundance of intact bushland in the locality of the BGC land.

The habitat proposed to be removed, modified, fragmented or isolated to the long-term survival of the species in the locality is of low importance.

e) whether the action proposed is likely to have an adverse effect on critical

habitat (either directly or indirectly)

No declared areas of critical habitat will be impacted (either directly or indirectly). The BGC land and its immediate surrounds are not known to include any area declared or mapped as being of 'critical habitat'.

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

There is a Recovery Plan for the South Australian Subspecies of the Glossy-black Cockatoo prepared by South Australian Department of Environment and Heritage dated August 2005 (Mooney and Pedler 2005). This recovery plan is not relevant to species in New South Wales.

The Glossy-black Cockatoo is included in the *Saving our Species (SoS)* threatened species Recovery strategies and Actions (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10741, accessed 24 July 2018). The Glossy-black Cockatoo has been assigned to the Landscape species management stream under the SoS program as disturbances occur at landscape scale (e.g. habitat loss or degradation) rather than processes that affect distinct, definable locations.

In the Action Toolbox, Seven Action Descriptions have been identified in "Help save the Glossy-black Cockatoo *(Calyptorhynchus lathami)"* including:

Action Description	Scale	Applicable to the project
Raise public awareness of the importance of large old trees (living and dead), which provide roosting habitat and important hollow resources. Protect large old trees and smaller trees that contain large hollows, including from the effects of fire. Ensure the recruitment of large old trees by retaining medium-sized trees, facilitating regeneration, and undertaking replanting.	Site	Yes. Increasing environmental awareness is consistent with Objective 1 of the VMP.
Increase the quality and extent of foraging habitat within a region. Prevent frequent fire that will result in the elimination of sheoak stands. Manage fire regimes to ensure a mosaic of age classes of important feed species, with a bias toward older age classes (which provide abundant food resources). Encourage the retention of sheoak food species in the understorey, and raise public awareness of the damage caused to food resources by slashing/underscrubbing, fuel reduction burns, and over-grazing. Control feral animals, including pigs and goats, that may degrade the understorey and limit regeneration of sheoak food species.	Site, Area	Yes. Fire frequency is not expected to increase as a result of the proposal. Both *Allocasuarina torulosa* and *Casuarina glauca* are present thoroughout the BGC land. These species are expected to be retained and planted as per Objective 8 of the VMP. Increasing environmental awareness is consistent with Objective 1 of the VMP.
Ensure the year round availability of surface water in close proximity to foraging and nesting habitat. Where necessary, install or maintain artificial water resources to ensure continued access to food and nest sites during periods when natural surface water is absent. Maintain vegetation in proximity to water points, including the presence of a smaller trees immediately	Site	Yes. The area of degraded vegetation to be cleared consists of cleared fairway vegetation and is not located around creeks, rivers and wetlands. The proposal aims to increase the area of vegetated riparian zones with the creation a creek and retention

Action Description	Scale	Applicable to the project
adjacent to the water's edge, to provide cover and a resting place for drinking birds.		ponds creating high productive foraging habitat in close proximity to water.
Raise awareness among landholders in a local area known to have important habitat for the species, to engage them in proactive management and monitoring of the species' population on their land.	Area, State	Yes. Increasing environmental awareness is consistent with Objective 1 of the VMP.
Identify sites where hollows are limiting and develop and implement strategies to increase hollow availability that have clear objectives and include monitoring, maintenance, and reporting requirements. Actions include nest box installation, the humane control of introduced species, and the protection of trees having the potential to develop hollows.	Site	Yes. Installation of both artificial hollows and nest boxes are proposed, with ongoing monitoring and management.
Maintain connectivity within and between regions. At a local scale, ensure that glossy black-cockatoos can move safely between food, water and roosting resources via corridors that provide cover in the form of woodland or forest vegetation. Identify regional corridors that connect inland populations with those along the Great Divide and coast. Enhance or restore these regional corridors through strategic revegetation and other works that ensure the availability of food, shelter, and water resources.	Area, State	Yes. No environmental weed species are included in the revised landscape species selection (Table B in Clements *et al.* 2018). The conservation areas of the golf course are exclusively local native species. The diverse mix of appropriate native species will thicken existing fragmented patches of vegetation on site and re-establish a wildlife corridor to the surrounding bushland. This is consistent with Objective 8 of the VMP.
To assist in the management of the species and its habitat, model the impacts of climate change projections on the distribution of habitat and abundance of key resources.	State	N/A to the project

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

The key threatening processes potentially relevant to the Glossy-black Cockatoo likely to result from this development are listed below. The proposal is not likely to significantly increase the impact of these processes as only a small amount, 0.43 ha, of largely modified, 'between fairway vegetation' will be removed.

The proposed development or activity is not likely to significantly increase the impact of key threatening processes relevant to Glossy-black Cockatoo, as:

Existing key threatening processes	Existing threat	Increased threat from the proposal
Clearing of native vegetation	Yes. Ongoing golf course management.	Yes. Clearing of approximately 0.43 ha of between-fairway vegetation, consisting of native and exotic trees with a golf course managed understorey (mainly mown existing grasses and frequently with soil topdressing).

Existing key threatening processes	Existing threat	Increased threat from the proposal
Loss of Hollow-bearing trees	Yes. Ongoing as part the golf course management.	No. Large hollows are required for nesting, no large hollows were recorded in the area associated with the proposed seniors housing.
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	No. Fire frequency low.	No. No increase in fire frequency proposed.
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	Yes. BGC land bounded by urban land.	No. Proposal is not likely to increase the threat.
Removal of dead wood and dead trees	Yes. Ongoing as part the golf course management.	No. Proposal is not likely to increase the threat.

In conclusion, the proposal is not likely to significantly impact the Glossy-black Cockatoo. No species impact statement is required.

Recommendations to minimise risk of impacts to the Glossy-black Cockatoo (*Calyptorhynchus lathami*):

- the site specific Vegetation Management Plan (Conservation/Biodiversity Management Plan) for the proposed development presented in Part B of Clements *et al.* (2017) with the associated Implementation and Compliance Table in Table 4 of Clements *et al.* (2017) should be applied; and
- retain and plant additional feed trees such as *Allocasuarina torulosa.*

3.3.2 Barking Owl (*Ninox connivens*)

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

The Barking Owl is a medium-sized owl (42 cm, 650 g), smaller than the similar Powerful Owl and larger than the Southern Boobook. It inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. It is 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 riparian soils. It preferentially hunts small arboreal mammals such as Squirrel Gliders and Common Ringtail Possums, but when loss of tree hollows decreases these prey populations, the owl becomes more reliant on birds, invertebrates and terrestrial mammals such as rodents and rabbits. It can catch bats and moths on the wing, but typically hunts by sallying from a tall perch. The Barking Owl sometimes extend their home range into urban areas, hunting birds in garden trees and insects attracted to streetlights. (OEH species profile).

The species was not detected on the site (the golf course), however it may utilise the site for foraging and occasional roosting (breeding unlikely especially in areas proposed to be modified). Only a small amount of available foraging habitat will be removed, an insignificant amount of the potential foraging habitat both on the BGC land and in the locality. The species is highly mobile and considering the local available foraging habitat there is not expected to be a negative impact on this species.

The proposed action is not likely to have an adverse effect on the species such that a local population is likely 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

The species is not an endangered population, but a threatened species.

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

The species is not an ecological community, but a threatened species.

(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

(i) An area of 0.43 ha of highly modified 'between fairway vegetation' will be removed for the development. Due to the degraded nature of the 'between fairway vegetation', it is not considered important habitat for the Barking Owl.

(ii) Currently, the habitat on the BGC land is fragmented and isolated from the surrounding bushland creating a blockage for fauna movement through the landscape (Burcher 1995).

(iii) The long term survival of the Barking Owl will not be affected by the proposed removal of habitat on BGC land. The patch of degraded vegetation identified for removal is not considered high habitat value, due to lack of structure and soil modifications.

The habitat proposed to be removed, modified, fragmented or isolated to the long-term survival of the species in the locality is of low importance.

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

No declared areas of critical habitat will be impacted (either directly or indirectly). The BGC land and its immediate surrounds are not known to include any area declared or mapped as being of 'critical habitat'.

(f) whether the action proposed is consistent with the objectives or actions of a

recovery plan or threat abatement plan

The Barking Owl is included in the *Saving our Species (SoS)* threatened species Recovery strategies and Actions (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10561, accessed 24 July 2018). The Barking Owl has been assigned to the Landscape species management stream under the SoS program as disturbances occur at landscape scale (e.g. habitat loss or degradation) rather than processes that affect distinct, definable locations.

In the Action Toolbox, Seven Action Descriptions have been identified in "Help save the Barking Owl (*Ninox connivens*)*"* including:

Action Description	Scale	Applicable to the project
Negotiate with relevant landholders to enter into agreements, particularly in-perpetuity covenants or stewardship agreements, that promote the retention of large old trees, riparian habitat, owl roost sites and other high value habitat (as developed in the best practice guidelines).	Site	N/A. However high quality habitat present on the site will be protected in-perpetuity.
Test metal collars around trunks for exclusion of goannas and brush-tailed possums from nest hollows. Use remote cameras to monitor effectiveness (and also human disturbance due to the marking of these nest trees). If proven effective, implement on known nest trees where feasible.	Site, Area	N/A.
In regions where high priority barking owl populations can be increased and stabilised, improve habitat quality and reconstruct connectivity. Focus initially on restoration of arboreal habitat that will foster populations of habitat-specific mammalian prey. Create wide corridors, especially in riparian habitat where prey are potentially more abundant due to better resources and soil fertility.	Site, Area	N/A. However habitat restoration of the BGC land is part of the project proposal. This includes increasing connectivity and restoring the habitat corridor across the golf course.
At sites where tree hollows are few or declining within high priority barking owl populations, research the cost-efficiency of installing nest boxes to increase medium-sized arboreal mammals that serve as important prey for barking owls (e.g. squirrel gliders). Collate data on prey population trends where long-term nest box projects have been conducted in order to develop guidelines. Expand the program as feasible if proven effective for owls and a valuable technique to educate the public about the impact of hollow loss.	Site	Yes. Installation of both artificial hollows and nest boxes are proposed, especially for prey species for Owls as well as planting of food trees for prey species are consistent with the listed SoS Action.
In regions identified as supporting high priority barking owl populations, establish baseline occupancy from which to determine long-term population response to habitat modification (e.g. timber harvesting and residential development) so as to test and adaptively adjust mitigation protocols.	Site	N/A. However monitoring is Objective 10 of the VMP.

Action Description	Scale	Applicable to the project
Opportunistically use regions where fox control coincides with barking owl populations to examine whether increasing prey enhances owl densities.	Site	Yes. Monitoring is Objective 10 of the VMP. Council Fox and wild dog baiting are likely to be occurring in the LGA and if necessary additional monitoring may be required. It should be noted that the Barking Owl has not been sited on the BGC land.
Consolidate all available information, knowledge and assessment protocols to create a consensus of best practice guidelines, providing a single point source to advise land managers about barking owl conservation. Update regularly. Seek novel educational frameworks that increase public interest in applying these guidelines.	State	N/A.
Test metal collars around trunks for exclusion of goannas and brush-tailed possums from nest hollows. Use remote cameras to monitor effectiveness (and also human disturbance due to the marking of these nest trees). If proven effective, implement on known nest trees where feasible.	Site	N/A.

In the Recovery Plan for the Barking Owl *Ninox connivens* (NPWS 2003*)*, the objectives are:

In the Draft Recovery Plan (NPWS 2003), the objectives are:	Proposal compliance
1. Increase understanding of the biology, ecology and management of the Barking Owl	Monitoring reports will note the species if it is recorded during monitoring associated with the VMP.
2. Increase education and awareness of and involvement in the conservation of the Barking Owl and its habitat in NSW	New residents will be made aware of local threatened flora and fauna.
3. Undertake threat abatement and mitigation	It is expected that the more suitable habitat will be created through the implementation of the VMP, including installation of nest boxes.
4. Gain efficiencies through links with other conservation plans and conservation groups	N/A
5. Provide organisational support	There will be funding and assistance available from the proposal applicant for ongoing monitoring via the VMP.

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

The key threatening processes potentially relevant to the Barking Owl likely to result from this development are listed below. The proposal is not likely to significantly increase the impact of these processes as only a small amount, 0.43 ha, of largely modified, ‘between fairway vegetation’ will be removed.

The proposed development or activity is not likely to significantly increase the impact of key threatening processes relevant to Barking Owl, as:

Existing key threatening processes	Existing threat	Increased threat from the proposal
Clearing of native vegetation	Yes. Ongoing golf course management.	Yes. Clearing of approximately 0.43 ha of between-fairway vegetation, consisting of native and exotic trees with a golf course managed understorey (mainly mown existing grasses and frequently with soil topdressing).
Loss of Hollow-bearing trees	Yes. Ongoing as part the golf course management.	Yes. A loss of 13 of 84 identified hollow-bearing trees north of Cabbage Tree Road (none of 15 trees with large hollows, 5 of 30 with medium hollows, 7 of 31 with small hollows and 1 of 8 with indeterminate hollows)
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	No. Fire frequency low.	No. No increase in fire frequency proposed.
Removal of dead wood and dead trees	Yes. Ongoing as part the golf course management.	No. Proposal is not likely to increase the threat.

In conclusion, the proposal is not likely to significantly impact the Barking Owl. No species impact statement is required.

Recommendations to minimise risk of impacts to the Barking Owl (*Ninox connivens*):

- the site specific Vegetation Management Plan (Conservation/Biodiversity Management Plan) for the proposed development presented in Part B of Clements *et al.* (2017) with the associated Implementation and Compliance Table in Table 4 of Clements *et al.* (2017) should be applied. The VMP is directed to establishment of the fauna corridors to assist in the movement of arboreal fauna through the landscape;
- existing fauna habitats of the remnants in conservation areas are to be protected, especially as Barking Owl has been observed to nest and raise young in the relative intact forest in the north-west of the BGC land;
- installation of both artificial hollows and nest boxes; and
- planting of food trees for prey species will ensure that larger populations of prey species can be supported.

3.3.3 Powerful Owl (*Ninox strenua*)

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

The Powerful Owl is the largest owl in Australasia. It is a typical hawk-owl, with large yellow eyes and no facial-disc. Adults reach 60 cm in length, have a wingspan of up to 140 cm and weigh up to 1.45 kilograms. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine *Syncarpia glomulifera*, Black She-oak *Allocasuarina littoralis*, Blackwood *Acacia melanoxylon*, Rough-barked Apple *Angophora floribunda*, Cherry Ballart *Exocarpus cupressiformis* and a number of eucalypt species. The main prey items are medium-sized arboreal marsupials, particularly the Greater

Glider, Common Ringtail Possum and Sugar Glider. There may be marked regional differences in the prey taken by Powerful Owls (OEH species profile).

The species was detected on the BGC land and a breeding site was identified in the dense vegetation in the north-west. However it is likely to utilise the entire site for foraging. The local population may be dependent on the vegetation in the north-west for breeding. As this habitat is not being modified for the proposal there is not expected to be a negative impact on this species. Only a small amount of available foraging habitat will be removed, an insignificant amount of the potential foraging habitat both on the BGC land and in the locality. The species is highly mobile and considering the local available foraging habitat there is not expected to be any negative impacts on this species.

The proposed action is not likely to have an adverse effect on the species such that a local population is likely 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

The species is not an endangered population, but threatened species.

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

The species is not an ecological community, but threatened species.

(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

(i) An area of 0.43 ha of highly modified ‘between fairway vegetation’ will be removed for the development. Due to the degraded nature of the ‘between fairway vegetation, it is not considered important habitat for the Powerful Owl.

(ii) Currently, the habitat on the BGC land is fragmented from the surrounding bushland creating a blockage for fauna movement through the landscape (Burcher 1995).

(iii) The long term survival of the Powerful Owl will not be affected by the proposed removal of habitat on BGC land. The patch of degraded vegetation identified for removal is not considered high habitat value, due to lack of structure and soil modifications.

The habitat proposed to be removed, modified, fragmented or isolated to the long-term survival of the species in the locality is of low importance.

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

No declared areas of critical habitat will be impacted (either directly or indirectly). The BGC land and its immediate surrounds are not known to include any area declared or mapped as being of 'critical habitat'.

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

Powerful Owl is included in the Recovery Plan for Large Forest Owls (DECC 2006) and *Saving our Species (SoS)* threatened species Recovery strategies and Actions (www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10562, accessed 24 July 2018). The Powerful Owl (*Ninox strenua)* has been assigned to the Landscape species management stream under the SoS program as disturbances occur at landscape scale (e.g. habitat loss or degradation) rather than processes that affect distinct, definable locations.

In the Recovery Plan for the Large Forest Owls the objectives are:

In the State Recovery Plan (DECC 2006), the objectives are:	**Proposal compliance**
1. Assess the distribution and amount of high quality habitat for each owl species across public and private lands to get an estimate of the number and proportion of occupied territories of each species that are, and are not, protected.	All high quality habitat on site utilised by the Powerful Owl will be protected as per the VMP. Ongoing monitoring associated with the VMP will produce temporal occupation data and establish long-term site usage and breeding success.
2. To monitor trends in population parameters (numbers, distribution, territory fidelity and breeding success) across the range of the three species and across different land tenures and disturbance histories.	As above.
3. To assess the implementation and effectiveness of forest management prescriptions designed to mitigate the impact of timber-harvesting operations on the three owl species and, (if necessary), to use this information to refine the prescriptions so that forestry activities on state forests are not resulting in adverse changes in species abundance and breeding success.	N/A.
4. Ensure the impacts on large forest owls and their habitats are adequately assessed during planning and environmental assessment processes.	The occurrence of Powerful Owl on the site has been considered appropriately in this proposal. The identification of it and its habitat onsite allows it to be protected through the VMP and will ensure appropriate consideration on future local development proposal.
5. Minimise further loss and fragmentation of habitat by protection and more informed management of significant owl habitat (including protection of individual nest sites).	All significant owl habitat on the site will be protected as per the VMP. Additional areas will be restored and planting in new areas will also take place. This will help appropriately manage the habitat in the long term.
6. To improve the recovery and management of the three large forest owls based on an improved understanding of key areas of their biology and ecology.	N/A.

In the State Recovery Plan (DECC 2006), the objectives are:	Proposal compliance
7. To raise awareness of the conservation requirements of the three large forest owls amongst the broader community, to involve the community in owl conservation efforts and in so doing increase the information base about owl habitats and biology.	New residents will be made aware of local threatened flora and fauna.
8. To coordinate the implementation of the recovery plan and continually seek to integrate actions in this plan with actions in other recovery plans or conservation initiatives.	The VMP for the proposed development is in line with recovery plan actions and seeks to promote the conservation of large forest owls.

In the Action Toolbox, six Action Descriptions and one Monitoring Action has been identified in "Help save the Powerful Owl (*Ninox strenua*)*"* including:

Action Description	Scale	Applicable to the project
Consolidate all available information, knowledge and assessment protocols to create a consensus of best practice guidelines, providing a single point source to advise land managers about powerful owl conservation. Update regularly. Seek novel educational frameworks that increase public interest in applying these guidelines.	State	Yes. It is recommended for the proposal that the effects of the habitat rehabilitation, enhancement and re-construction works be communicated with SoS team and presented in peer review journals, especially of the restored habitat of the prey species of the Powerful Owl.
Negotiate with relevant landholders to enter into agreements, particularly in-perpetuity covenants or stewardship agreements, that promote the retention of large old trees, riparian habitat, owl roost sites and other high value habitat (as developed in the best practice guidelines).	Site	This needs to be discussed with the Council. It should be noted that none of the 13 hollow bearing trees proposed to be removed contain large hollows.
In regions where high priority powerful owl populations can be increased and stabilised, improve habitat quality and reconstruct connectivity. Focus initially on restoration of arboreal habitat that will foster populations of habitat-specific mammalian prey. Create wide corridors, especially in riparian habitat where prey are potentially more abundant due to better resources and soil fertility	Area	Yes. The re-establishment of the fauna corridors on the BGC land will assist in the movement of arboreal fauna through the landscape is consistent with the listed SoS Action.
At sites where tree hollows are few or declining within high priority powerful owl populations, trial the installation of nest boxes to increase mammalian prey densities. Expand the program if demonstrated to be effective for owls and use as a tool to educate the public about the impact of hollow loss.	Site, Area	Yes. Installation of both artificial hollows and nest boxes are proposed, especially for prey species for Powerful Owls as well as planting of food trees for prey species are consistent with the listed SoS Action.
Encourage development of citizen science programs in urban areas where an increase in community engagement is likely to create broader conservation awareness of powerful owls.	Area	This need to be discussed with Council and Beth Mott, as disturbance to habitat of Powerful Owl is not considered appropriate.
Document and protect known nests. Ensure that no habitat degradation occurs within 100m (e.g. hazard reduction burns or tree felling).	Site	Yes. Powerful Owl is know to nest and raise young in the relative intact forest in the north-west of the BGC land. The proposal is

Action Description	Scale	Applicable to the project
Facilitate the location of new nest sites through observer training and encouragement		to protect and enhance existing fauna habitats as part of the golf course upgrade.
Monitoring Actions		
Regular monitoring of the effectiveness of management and the trajectory of local populations is an important component of landscape-managed species. The toolbox and any site-based management plans for landscape-managed species will be adapted, added or removed over time in response to monitoring results.	-	Yes. It is recommended for the onsite proposal that the effectiveness on the local population of the habitat rehabilitation, enhancement and re-construction works be carefully monitored and the results presented in peer review journals, especially of habitat of the prey species of the Powerful Owl.

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

The key threatening processes potentially relevant to the Powerful Owl likely to result from this development are listed below. The proposal is not likely to significantly increase the impact of these processes as only a small amount, 0.43 ha, of largely modified, 'between fairway vegetation' will be removed.

The proposed development or activity is not likely to significantly increase the impact of key threatening processes relevant to Powerful Owl, as:

Existing key threatening processes	Existing threat	Increased threat from the proposal
Clearing of native vegetation	Yes. Ongoing golf course management.	Yes. Clearing of approximately 0.43 ha of between-fairway vegetation, consisting of native and exotic trees with a golf course managed understorey (mainly mown existing grasses and frequently with soil topdressing).
Loss of Hollow-bearing trees	Yes. Ongoing as part the golf course management.	Yes. A loss of 13 of 84 identified hollow-bearing trees north of Cabbage Tree Road (none of 15 trees with large hollows, 5 of 30 with medium hollows, 7 of 31 with small hollows and 1 of 8 with indeterminate hollows).
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	No. Fire frequency low.	No. No increase in fire frequency proposed.

In conclusion, the proposal is not likely to significantly impact the Powerful Owl. No species impact statement is required.

Recommendations to minimise risk of impacts to the Powerful Owl *(Ninox strenua):*

- the site specific Vegetation Management Plan (Conservation/Biodiversity Management Plan) for the proposed development presented in Part B of Clements *et al.* (2017) with the associated Implementation and Compliance Table in Table 4 of Clements *et al.*

(2017) should be applied. The VMP is directed to establishment of the fauna corridors to assist in the movement of arboreal fauna through the landscape;
- existing fauna habitats of the remnants in conservation areas are to be protected, especially as Powerful Owl has been observed to nest and raise young in the relative intact forest in the north-west of the BGC land;
- installation of both artificial hollows and nest boxes to provide additional habitat for the prey species; and
- planting of food trees for prey species will ensure that a larger population of the Powerful Owl's food source (prey species) can be supported.

3.3.4 Dusky Woodswallow (*Artamus cyanopterus cyanopterus*), Little Lorikeet (*Glossopsitta pusilla*) and the Swift Parrot (*Lathamus discolor*)

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

The Dusky Woodswallow is a medium-sized bird (16-19.5 cm, 35 g), with a longish tail. It is mostly dark grey-brown, merging to blackish on the tail, with a small black-brown mask. Dusky Woodswallows are widespread in eastern, southern and south western Australia. The species occurs throughout most of New South Wales, but is sparsely scattered in, or largely absent from, much of the upper western region. Most breeding activity occurs on the western slopes of the Great Dividing Range. It primarily eats invertebrates, mainly insects, which are captured whilst hovering or sailying above the canopy or over water. It also frequently hovers, sallies and pounces under the canopy, primarily over leaf litter and dead timber and also occasionally take nectar, fruit and seed (OEH species profile).

The Little Lorikeet is a small (16-19 cm; 40 g) bright green parrot, with a red face surrounding its black bill and extending to the eye. Nomadic movements are common, influenced by season and food availability, although some areas retain residents for much of the year and 'locally nomadic' movements are suspected of breeding pairs. It feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards (OEH species profile).

The Swift Parrot is a small parrot about 25 cm long. It is bright green with red around the bill, throat and forehead. It breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW it mostly occurs on the coast and south west slopes. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens* (OEH species profile).

None of these species were detected on the BGC land, however they may utilise the land for foraging or occasional roosting (species are nomadic). Only a small amount of available foraging habitat will be removed, an insignificant amount of the potential foraging habitat both on the BGC land and in the locality. The species are highly mobile and considering the local available foraging habitat there is not expected to be a negative impact on these species. The habitat that will be removed for the proposal includes mature eucalypts (as between fairway vegetation) which provide foraging resources. Only a small number of trees will be removed, and others of the same species will be retained on the BGC land, ensuring foraging resources for the species are still present on BGC land throughout the year.

The proposed action is not likely to have an adverse effect on the species such that a local population is likely 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

The species are not endangered populations, but threatened species.

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

The species are not ecological communities, but threatened species.

(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

(i) An area of 0.43 ha of highly modified 'between fairway vegetation' will be removed for the development. Due to the degraded nature of the 'between fairway vegetation', it is not considered important habitat for the Dusky Woodswallow, Little Lorikeet and the Swift Parrot.

(ii) Currently, the habitat on the BGC land is fragmented and isolated from the surrounding bushland creating a blockage for fauna movement through the landscape (Burcher 1995).

(iii) The long term survival of the Dusky Woodswallow, Little Lorikeet and the Swift Parrot will not be affected by the proposed removal of habitat on BGC land. The patch of degraded vegetation identified for removal is not considered high habitat value, due to lack of structure and soil modifications.

The habitat proposed to be removed, modified, fragmented or isolated to the long-term survival of the species in the locality is of low importance.

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

No declared areas of critical habitat will be impacted (either directly or indirectly). The BGC land and its immediate surrounds are not known to include any area declared or mapped as being of 'critical habitat'.

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

Under the Save our Species (SoS) program, Dusky Woodswallow (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=20303,

accessed 24 July 2018), Little Lorikeet 9http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=20111, accessed 24 July 2018) and the Swift Parrot (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10455, accessed 24 July 2018) has been assigned to the Landscape species management stream as its disturbances occur at landscape managed scale (e.g. habitat loss or degradation) rather than processes that affect distinct, definable locations.

In the toolbox, no Actions have been identified in the Action Descriptions in “Help save the Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)”.

In the Action Toolbox, seven Action Descriptions have been identified in “Help save the Little Lorikeet (*Glossopsitta pusilla*)” including:

Action Description	Scale	Applicable to the project
Raise public awareness of the importance of large old trees (particularly isolated paddock trees and hollow-bearing trees, live and dead) and undertaking restoration and revegetation to replace cohorts of trees where they have been removed from the landscape, particularly in areas adjacent to and connecting woodland remnants.	State	Yes. The aim of the proposal is to increase the width, condition and security of landscape links. The proposal is to re-establish the wildlife corridor across the extensively cleared 18 hole golf course on the BGC land by thickening of the between fairway vegetation and re-establish native vegetation.
Encourage landholders to protect ground layer and midstorey vegetation by implementing sensitive grazing practices and avoiding slashing or underscrubbing, and to promote the retention of a floristically and structurally diverse and spatially variable understorey in patches of woodland. Target in-perpetuity covenants or stewardship agreements to landholders with high quality remnant woodland habitat.	Site	N/A. However restoration works are planned as part of the project proposal. This will improve vegetation structure throughout currently degraded parts of the BGC land.
Target removal of weeds significantly compromising habitat values (e.g. invasive perennial grasses) and restore native vegetation. Care should be taken to avoid widespread removal of beneficial exotic woody vegetation without replacement and avoid non-target impacts of herbicides.	Site	Yes. Restoration works are proposed to remove weeds and replace with native vegetation.
Measure the abundance and impact of noisy miners on species populations and habitat, and implement appropriate management actions with demonstrated effectiveness (e.g. direct control, habitat restoration) to reduce the impacts of noisy miners, if/where required.	Site, Area	N/A. However monitoring associated with the VMP will record the presence/ abundance of Noisy Miners.
Conduct targeted research into identifying different practical methods for restoring the structure and function of the ground layer in degraded habitat, including soil biota and its functionality.	Site	Yes. It is recommended for the proposal that the effects of the habitat rehabilitation, enhancement and re-construction works be communicated with SoS team and presented in peer reviewed journals.
Identify sites where tree hollows are limiting and develop and implement a nest box strategy that has clear objectives and includes monitoring, maintenance, and evaluation of success.	Site	Yes. Installation of both artificial hollows and nest boxes are proposed. Monitoring of nest boxes will also be conducted.
Undertake revegetation, using a diverse mix of	Area,	Yes. For the conservation areas of the

Action Description	Scale	Applicable to the project
locally appropriate native species, focussing on expanding areas of existing habitat, connecting isolated habitat patches (either through corridor or stepping stone plantings) or establishing additional habitat patches in landscapes with already existing, although insufficient, patches of suitable habitat. Areas with access to water, especially riparian areas, are particularly important, although care should be taken to ensure that riparian revegetation programs are sufficiently wide (minimum 50m wide).	State	golf course, especially in the riparian areas and wetlands, appropriate local native species are used to enhance and restore conservation corridors from the highly fragmented patches of degraded vegetation This is consistent with Objectives 8, 9 of the VMP. This includes the restoration of more than 15 ha of local native vegetation.

In the Action Toolbox, seven Action Descriptions have been identified in “Help save the Swift Parrot (Lathamus discolor)” including:

Action Description	Scale	Applicable to the project
Raise public awareness of the importance of large old trees of species that provide important food resources. Protect large old trees, including from the effects of fire. Ensure the recruitment of large old trees by retaining medium-sized trees, facilitating regeneration, and undertaking replanting.	Site	Yes. Increasing environmental awareness is consistent with Objective 1 of the VMP.
Within a region, increase the extent and quality of habitat to increase food supply and improve foraging efficiency. Focus on sites that may better function as drought refuges. Include locally occurring species that provide important food resources in revegetation programs where appropriate. Ensure that fuel reduction burns do not result in canopy scorch, which can reduce flowering in subsequent years. Manage aggressive honeyeater impacts through habitat modification (e.g. reduce the amount of edge and establish a structurally complex understorey).	Site, Area	Yes, there is a proposed increase to more than 15 ha of vegetation. Much of this will be in the form of Coastal Floodplain Communities, and include plantings of the preferred food tree, *Eucalyptus robusta*. Other planted species will include *Eucalyptus paniculata* (winter flowering), as well as significant understorey restoration which will provide structural complexity to currently degraded areas.
Engage the community in the identification and enhanced management of priority sites. Priority sites are those that (1) have been used by a large proportion of the population, or (2) have been used in multiple seasons, or (3) have been used for an extended period of time within a season. Engage stakeholders in the identification and development of site-based management projects for priority areas, being areas containing a high proportion of priority sites, or areas that contribute to the overall diversity and distribution of resources available to swift parrots under a range of environmental conditions.	Area, State	N/A.

Action Description	Scale	Applicable to the project
With the assistance of the community, monitor swift parrot distribution, abundance, and habitat use. Investigate knowledge gaps to improve the effectiveness of management actions, including understanding the phenology of key food species, determining movement strategies, patterns and pathways between regions, and modelling the impacts of climate change projections on the distribution and abundance of foraging habitat and resources.	Area, State	N/A. However monitoring associated with the VMP will record the presence/abundance of Swift Parrots.
Establish the Beak and Feather Disease Virus (BFDV) status of rehabilitated parrots proposed to be released using appropriate tests and quarantine procedures. Parrots carrying BFDV should not be released into the wild.	State	N/A.
Raise public awareness on collision risks and how these can be minimised. At priority sites and movement pathways assessed as having a high risk of collision, develop and implement mitigation strategies.	State, Site, Area	Yes. Increasing environmental awareness is consistent with Objective 1 of the VMP.

There is a National Recovery Plan for the Swift Parrot *Lathamus discolor* (Saunders & Tzaros 2011, http://www.environment.gov.au/system/files/resources/c3e20a20-8122-4a9c-bd06-455ea7620380/files/lathamus-discolor-swift-parrot.pdf, accessed 24 July 2018).

Overall objectives are"

To prevent further decline of the Swift Parrot population.

To achieve a demonstrable sustained improvement in the quality and quantity of Swift Parrot habitat to increase carrying capacity.

Specific Recovery Actions include:

In the National Recovery Plan (Saunders & Tzaros 2011), the Recovery Actions are:	Proposal compliance
1. Identify the extent and quality of habitat.	Ongoing restoration works associated with the VMP will increase the extent and quality of habitat for the species.
2. Manage and protect Swift Parrot habitat at the landscape scale.	All areas of identified high value habitat on site will be protected through the VMP.
3. Monitor and manage the impact of collisions, competition and disease.	Monitoring associated with the VMP will note these if observed.
4. Monitor population and habitat.	The presence of the species (and condition of habitat) will be noted during monitoring associated with the VMP.
5. Increase community involvement in, and awareness of, the recovery program.	New residents will be made aware of local threatened flora and fauna.
6. Coordinate, review and report on recovery process.	Monitoring reports will be produced as per the VMP.

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

The key threatening processes potentially relevant to the Dusky Woodswallow, Little Lorikeet and the Swift Parrot likely to result from this development are listed below. The proposal is not likely to significantly increase the impact of these processes as only a small amount, 0.43 ha, of largely modified, 'between fairway vegetation' will be removed.

The proposed development or activity is not likely to significantly increase the impact of key threatening processes relevant to Dusky Woodswallow, Little Lorikeet and the Swift Parrot, as:

Existing key threatening processes	Existing threat	Increased threat from the proposal
Clearing of native vegetation	Yes. Ongoing golf course management.	Yes. Clearing of approximately 0.43 ha of between-fairway vegetation, consisting of native and exotic trees with a golf course managed understorey (mainly mown existing grasses and frequently with soil topdressing).
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	No. Fire frequency low.	No. No increase in fire frequency proposed.
Invasion and establishment of exotic vines and scramblers	Yes. Widespread due to nutrient runoff.	No. Proposal is not likely to increase the threat.
Invasion, establishment and spread of Lantana (*Lantana camara* L. *sens. lat.*)	Yes. Lantana widespread, including recorded in the remnant in the north-west.	No. Proposal is not likely to increase the threat.
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	Yes. BGC land bounded by urban land.	No. Proposal is not likely to increase the threat.

In conclusion, the proposal is not likely to significantly impact the Dusky Woodswallow, Little Lorikeet and the Swift Parrot. No species impact statement is required.

Recommendations to minimise risk of impacts to the Dusky Woodswallow (*Artamus cyanopterus cyanopterus*), Little Lorikeet (*Glossopsitta pusilla*) and the Swift Parrot (*Lathamus discolor*):

- the site specific Vegetation Management Plan (Conservation/Biodiversity Management Plan) for the proposed development presented in Part B of Clements *et al.* (2017) with the associated Implementation and Compliance Table in Table 4 of Clements *et al.* (2017) should be applied;
- installation of nest boxes/artificial hollows; and
- retain and plant additional feed trees such as winter flowering eucalypts, including *Eucalyptus robusta.*

3.3.5 Australasian Bittern (*Botaurus poiciloptilus*), Black Bittern (*Ixobrychus flavicollis*) and Australian Painted Snipe (*Rostratula australis*)

(a) in the case of a threatened species, whether the action proposed is likely to have an

adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

The Australasian Bittern is a large, stocky bird, reaching up to 75 cm in length. It has a long, thick neck and a straight, brownish-yellow bill. Australasian Bitterns are widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. It favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spikerushes (*Eleocharis* spp.). It hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely-vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch (OEH species profile)

The Black Bittern is a heron, dark grey to black in colour, with buff streaks on the throat and a characteristic yellow streak on the sides of the head and down the neck. In NSW, records of the species are scattered along the east coast, with individuals rarely being recorded south of Sydney or inland. It inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves. It feeds on frogs, reptiles, fish and invertebrates, including snails, dragonflies, shrimps and crayfish, with most feeding done at dusk and at night. During the day, it roosts in trees or on the ground amongst dense reeds. Nests, built in spring are located on a branch overhanging water and consist of a bed of sticks and reeds on a base of larger sticks (OEH species profile).

The Australian Painted Snipe is a small freshwater wader, with a long bill that droops slightly at the tip. In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. It prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. It nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. Breeding is often in response to local conditions; generally occurs from September to December. Incubation and care of young is all undertaken by the male only. It forages nocturnally on mud-flats and in shallow water and feeds on worms, molluscs, insects and some plant-matter (OEH species profile).

None of these species were detected on the BGC land, however they may utilise the site for foraging. None of the potential habitat will be removed from the BGC land. The species inhabit swamps and wetlands. The species are highly mobile and considering the local available foraging habitat there is not expected to be a negative impact on these species.

The proposed action is not likely to have an adverse effect on the species such that a local population is likely 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

The species are not an endangered population.

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

The species are not an ecological community.

(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

(I) The proposal aims to conserve, enhance and re-establish coastal floodplain habitat. Proposal re-establishes watercourses across the golf course.

An area of 0.43 ha of highly modified 'between fairway vegetation' will be removed for the development. Due to the degraded nature of the 'between fairway vegetation', it is not considered important habitat for the Australasian Bittern, the Black Bittern and the Australian Painted Snipe.

(ii) Currently, the habitat on the BGC land is fragmented and isolated from the surrounding bushland creating a blockage for fauna movement through the landscape (Burcher 1995).

(iii) The long term survival of the Australasian Bittern, the Black Bittern and the Australian Painted Snipe will not be affected by the proposed removal of habitat on BGC land. The patch of degraded vegetation identified for removal is not considered high habitat value, due to lack of structure and soil modifications.

The habitat proposed to be removed, modified, fragmented or isolated to the long-term survival of the species in the locality is of low importance.

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

No declared areas of critical habitat will be impacted (either directly or indirectly). The BGC land and its immediate surrounds are not known to include any area declared or mapped as being of 'critical habitat'.

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

There is a Recovery Plan for the Western Australian population the Australasian Bittern prepared by Birdlife Australia dated July 2015 (Birdlife Australia 2015). This recovery plan is not relevant to species in New South Wales.

Under the Save our Species (SoS) program, Australasian Bittern (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10105, accessed 24 July 2018), the Black Bittern

(http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10441, accessed 24 July 2018) and the Australian Painted Snipe (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10734, accessed 24 July 2018) has been assigned to the Landscape species management stream as its disturbances occur at landscape managed scale (e.g. habitat loss or degradation) rather than processes that affect distinct, definable locations.

In the Action Toolbox, six Action Descriptions have been identified in "Help save the *Australasian Bittern (Botaurus poiciloptilus*)*"* including:

Action Description	Scale	Applicable to the project
Input specific environmental water requirements (timing, depth, duration, frequency) in long-term environmental water plans (Murrumbidgee, Murray, Lachlan, Macquarie, Gwydir) to maintain and restore habitat. Advise NSW and Commonwealth water trading strategies on an as-needs basis for priority sites for bittern habitat.	State	N/A.
Develop or upgrade infrastructure (e.g. regulators, pumps) to support environmental water delivery to priority bittern habitat areas.	Site	N/A.
Develop targeted facts sheets for landholders to improve wetland management and awareness of bitterns, and report sightings. Target landholders in Hunter, north and south coast, northern basin and Riverina/Murray areas.	State	Yes. Increasing environmental awareness is consistent with Objective 1 of the VMP.
Undertake targeted control of vertebrate predators at selected priority sites during breeding (summer) using standard techniques (e.g. trapping and/or baiting as appropriate).	Site	Yes. Monitoring is Objective 10 of the VMP. Council Fox and wild dog baiting are likely to be occurring in the LGA and if necessary additional baiting may be required.
Manage runoff and drainage into wetlands in peri-urban habitat to maintain high water quality for the persistence of prey species (e.g. bell frogs). Incorporate this communication into education and awareness raising for local government and landholders.	Site	Yes. Increasing environmental awareness is consistent with Objective 1 of the VMP.
Liaise with irrigation corporations in rice-growing areas to increase awareness about the use of canals as bittern breeding habitat. Encourage sensitive management of canals (i.e. discouraging use of toxic pesticides and inappropriate slashing).	Area	Yes. Increasing environmental awareness is consistent with Objective 1 of the VMP. It should be noted that the BGC land is not a rice-growing area.
Work with rice growers to develop a "bittern friendly" rice label that advertises and promotes best practice rice growing for maintaining bittern habitat.	State	N/A to the proposal.
Conduct targeted research into habitat use in the non-breeding season and the	State	N/A to the proposal.

Action Description	Scale	Applicable to the project
location/importance of potential drought refugia in the landscape (e.g. in coastal areas or northern Australia).		

In the Action Toolbox, six Action Descriptions have been identified in "Help save the Black Bittern (*Ixobrychus flavicollis*)*"* including:

Action Description	Scale	Applicable to the project
Survey suitable habitat such as vegetated wetlands during the breeding season (December-March) to enhance understanding of habitat use and breeding activity in key locations (e.g. Swamp Oak Forest).	Site	N/A. However monitoring associated with the VMP will record the presence/abundance of Black Bitterns.
Encourage landholders to enter land management agreements that promote the maintenance of riparian vegetation and habitat.	Site	N/A. However the proposal aims to increase the area of vegetated riparian zones with the creation a creek and retention ponds creating high productive foraging habitat in close proximity to water.
Implement riparian restoration activities in areas where the species is known to occur and in habitat where it is likely to breed.	Site	Yes. The proposal aims to increase the area of vegetated riparian zones with the creation a creek and retention ponds creating high productive foraging habitat in close proximity to water.
Encourage landholders and land managers to implement sensitive grazing practices that minimise impacts on riparian vegetation.	Site	N/A.

In the Action Toolbox, six Action Descriptions have been identified in "Help save the Australian Painted Snipe (*Rostratula australis*)*"* including:

Action Description	Scale	Applicable to the project
Input specific environmental water requirements (timing, depth, duration, frequency) in long-term environmental water plans (Murrumbidgee, Murray, Lachlan, Macquarie, Gwydir) to maintain and restore habitat. Consult on and inform NSW and Commonwealth watering strategies on an as-needs basis for priority sites for snipe habitat.	State	N/A
Manage grazing and/or burning in wetlands to create a mosaic of different vegetation structures and to control invasive weeds where necessary (e.g. Fivebough Swamp), with the aim of maintaining high quality wetland habitat for snipe.	Area	N/A.
Liaise with landholders managing wetlands and adjacent land about the potential impacts of pesticides on wetland habitat and water quality. Encourage the use of non-toxic chemicals (safe on invertebrate prey) and appropriate drainage	Area	Yes. The proposal includes changing from Kikuyu Grass to a less nutrient requiring grass Couch. This will reduce the need for use of fertilisers and pesticides.

Action Description	Scale	Applicable to the project
management to avoid run-off into wetlands.		
Undertake control of exotic weeds and invasive native plants via appropriate techniques (e.g. burning, grazing, mechanical methods).	Site	Yes. Weed control and replacement with native species is proposed through the VMP.
Liaise with landholders managing stock and fire regimes in and near wetlands to educate about inappropriate grazing and burning during drought periods and during times of inundation.	Area	N/A. However fire regimes are not expected to change as a result of the proposal.
Conduct targeted research into the species' breeding ecology, breeding habitat requirements and movement during breeding and non-breeding periods.	State	N/A.
In agricultural landscapes, encourage the restoration of natural wetland habitat to maintain local populations.	Area	N/A.
Where possible, manage environmental water to maintain appropriate water draw-down and filling to promote availability of shallow muddy edge habitat during spring and summer.	Site	N/A.

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

The key threatening processes potentially relevant to the Australasian Bittern, the Black Bittern and the Australian Painted Snipe likely to result from this development are listed below. The proposal is not likely to significantly increase the impact of these processes as only a small amount, 0.43 ha, of largely modified, 'between fairway vegetation' will be removed.

The proposed development or activity is not likely to significantly increase the impact of key threatening processes relevant to the Australasian Bittern, the Black Bittern and the Australian Painted Snipe, as:

Existing key threatening processes	Existing threat	Increased threat from the proposal
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	Yes. Watercourses have been highly modified and water quality is low in parts of the drains.	No. Proposal is not likely to increase the threat.
Clearing of native vegetation	Yes. Ongoing golf course management.	Yes. Clearing of approximately 0.43 ha of between-fairway vegetation, consisting of native and exotic trees with a golf course managed understorey (mainly mown existing grasses and frequently with soil topdressing).
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	Yes. BGC land bounded by urban land.	No. Proposal is not likely to increase the threat.

In conclusion, the proposal is not likely to significantly impact the Australasian Bittern, the Black Bittern and the Australian Painted Snipe. No species impact statement is required.

Recommendations to minimise risk of impacts to the Australasian Bittern (*Botaurus poiciloptilus*), Black Bittern (*Ixobrychus flavicollis*) and Australian Painted Snipe (*Rostratula australis*):

- the site specific Vegetation Management Plan (Conservation/Biodiversity Management Plan) for the proposed development presented in Part B of Clements *et al.* (2017) with the associated Implementation and Compliance Table in Table 4 of Clements *et al.* (2017) should be applied;
- improvements to the watercourses; and
- improvements to the water quality entering the site, especially sewer overflows and stromwater runoff from the adjoining residential developments.

3.3.6 White-bellied Sea-Eagle (*Haliaeetus leucogaster*), Little Eagle (*Hieraatus morphnoides*), Eastern Osprey (*Pandion cristatus)* and the Square-tailed Kite (*Lophoictinia isura*)

These birds are all raptors.

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

The White-bellied Sea-Eagle is a large eagle that has long broad wings and a short, wedge-shaped tail. It measures 75–85 cm in length, and has a wingspan of 180–220 cm. In New South Wales it is widespread along the east coast, and along all major inland rivers and waterways. It occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass (OEH species profile).

The Little Eagle is a medium-sized bird of prey. The Little Eagle is found throughout the Australian mainland except in the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW. It occupies open eucalypt forest, woodland or open woodland. Sheoak or *Acacia* woodlands and riparian woodlands of interior NSW are also used. It nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. It lays two or three eggs during spring, and young fledge in early summer and preys on birds, reptiles and mammals, occasionally adding large insects and carrion (OEH species profile).

The Eastern Osprey is a large, water-dependent bird of prey, distinctive in flight and when perched. Despite its wing-span of up to 1.7 m, it is noticeably smaller than the White-bellied Sea-eagle. The species is uncommon to rare or absent from closely settled parts of south-eastern Australia. It favour coastal areas, especially the mouths of large rivers, lagoons and lakes. It feeds on fish over clear, open water. It breeds from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea (OEH species profile).

The Square-tailed Kite is a reddish, medium-sized, long-winged raptor, about the size of a Little Eagle or harrier. In NSW, scattered records of the species throughout the state indicate

that the species is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. It is found in a variety of timbered habitats including dry woodlands and open forests. It shows a particular preference for timbered watercourses. It is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage (OEH species profile).

Of these four species, the Square-tailed Kite was observed flying over the BGC land. The other three species were not detected on the BGC land, however they may utilise the site for foraging and occasional roosting. None of the potential foraging habitat for the Eastern Osprey and the White-belllied Sea Eagle will be removed from the BGC land, as the species forages over oceans, rivers and wetlands. The Square tailed Kite and the Little Eagle are specialised hunters of birds, reptiles, mammals and insects as well as carrion. These species are highly mobile and considering the local available foraging habitat there is not expected to be a negative impact on any of these four species.

The proposed action is not likely to have an adverse effect on the species such that a local population is likely 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

The species is not a population.

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

The species is not an ecological community.

(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

i) An area of 0.43 ha of highly modified ‘between fairway vegetation’ will be removed for the development. Due to the degraded nature of the ‘between fairway vegetation’, it is not considered important habitat for the White-bellied Sea-Eagle, Little Eagle, Eastern Osprey and the Square-tailed Kite.

(ii) Currently, the habitat on the BGC land is fragmented and isolated from the surrounding bushland creating a blockage for fauna movement through the landscape (Burcher 1995).

(iii) The long term survival of the White-bellied Sea-Eagle, Little Eagle, Eastern Osprey and the Square-tailed Kite will not be affected by the proposed removal of habitat on BGC land. The patch of degraded vegetation identified for removal is not considered high habitat value, due to lack of structure and soil modifications.

The habitat proposed to be removed, modified, fragmented or isolated to the long-term survival of the species in the locality is of low importance.

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

No declared areas of critical habitat will be impacted (either directly or indirectly). The BGC land and its immediate surrounds are not known to include any area declared or mapped as being of 'critical habitat'.

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

The save our species program is currently being developed for the White-bellied Sea-Eagle *(Haliaeetus leucogaster*) and there are not applicable Action Description.

Under the Save our Species (SoS) program, Little Eagle (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=20131, accessed 24 July 2018), Eastern Osprey (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10585, accessed 24 July 2018) and the Square-tailed Kite (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10495, accessed 24 July 2018) have been assigned to the Landscape species management stream as their disturbances occur at landscape managed scale (e.g. habitat loss or degradation) rather than processes that affect distinct, definable locations.

In the Action Toolbox, five Action Descriptions have been identified in "Help save the Little Eagle (*Hieraaetus morphnoides*)*"* including:

Action Description	Scale	Applicable to the project
Raise awareness amongst land managers in areas where little eagles are known to occur of the risks of secondary poisoning as a result of the use of Pindone or second generation rodenticides. Encourage the use of alternative poisons (such as 1080 or coumatetralyl) and control techniques such as warren ripping.	State	Yes. Increasing environmental awareness is consistent with Objective 1 of the VMP.
Protect and maintain high quality habitat, which consists of open forest and woodland with a mosaic of open and timbered areas, including wooded farmland, gallery forests and wooded floodplains along water courses and around wetlands. Riparian areas are particularly important. Where possible negotiate conservation agreements with	Site, Area	Yes. The area of degraded vegetation to be cleared consists of cleared fairway vegetation and is not located around creeks rivers and wetlands. The proposal aims to increase foraging habitat on Site with the creation a creek and retention ponds creating highly productive foraging habitat.

Action Description	Scale	Applicable to the project
landholders, agreements should preferably be funded and in perpetuity.		
Improve prey availability through restoration of degraded remnants, particularly riparian areas. Increase structural complexity and species diversity in the understorey through the control of invasive exotic plants, the removal of thick swards of exotic pasture grasses, management of grazing pressure and potentially augmentation planting with locally appropriate native species.	Site, Area	Yes. Restoration of degraded remnants is consistent with Objective 8 and Objective 9 of the VMP (Clements et al 2017). This involves increasing structural diversity and prey availability by increasing habitat availability.
Undertake revegetation, using a diverse mix of locally appropriate native species, and ensuring the creation of a mosaic of open and wooded areas. Revegetation should focus on expanding areas of existing small (less than 10ha) habitat patches, particularly riparian habitat, and creating wooded habitat patches around tall isolated trees.	Site, Area	Yes. For the conservation areas of the golf course, especially in the riparian areas and wetlands, appropriate local native species are used to enhance and restore conservation corridors from the highly fragmented patches of degraded vegetation This is consistent with Objectives 8, 9 of the VMP. This includes the restoration of more than 15 ha of local native vegetation.
Increase the abundance of paddock trees, particularly large ones, by protecting existing trees, and supplementary planting or protection of natural regrowth.	Area, Site	N/A. However tree planting will occur as part of the VMP resulting in long term increased availability of trees.

In the Action Toolbox, seven Action Descriptions have been identified in “Help save the Eastern Osprey (*Pandion cristatus*)’” including:

Action Description	Scale	Applicable to the project
Identify active or inactive nest sites (including old nests built by corvids), ensure that active nests are not disturbed during the breeding season; July-September (e.g. by restricting access within a 100m buffer to nests on public land and reducing activity within 100m of nests on private land), and ensure that nests and surrounding vegetation are protected from damage or removal when inactive.	Site	N/A.
Monitor water quality in waterways close to nests and known to be used for foraging. Liaise with relevant authorities with respect to managing any adverse impacts of waste disposal in these systems.	Area	Yes. The watercourses on the BGC land, based on the *E. coli* counts in the watercourses, is being adversely impacted by waste disposal and runoff in these systems.
Raise awareness among the recreational fishing community via liaison with peak groups and other initiatives (e.g. media campaigns, brochures and interpretive signs in key fishing locations) that promote responsible fishing practices and warn about the impacts of discarding fishing tackle improperly. Place fishing tackle disposal bins at key recreational fishing locations.	State	Yes. Increasing environmental awareness is consistent with Objective 1 of the VMP.
Work with relevant energy suppliers and	Area	Yes. Increasing environmental awareness is

Action Description	Scale	Applicable to the project
relevant contractors to raise awareness about the importance of using sensitive pole designs for power lines in areas where the species is known to occur and nest, as well as insulating power lines in close proximity to known active nest sites.		consistent with Objective 1 of the VMP.
Encourage private landholders to enter into agreements, particularly in-perpetuity covenants or stewardship agreements, that promote the retention of large living or standing dead trees within 1-2km of watercourses in known habitat and management of riparian areas to restore native vegetation and limit water pollution via stormwater and run-off.	Area	N/A. However vegetation on the BGC land will be protected in-perpetuity as per the VMP. Dead trees near watercourses will be retained where appropriate.
In areas where potential nesting habitat (i.e. large trees close to waterways) has been removed, erect artificial pole and platform nest sites. Ensure that these sites are monitored, maintained and evaluated in terms of their use.	Site	N/A.
Liaise with telecommunications companies to raise awareness among their staff and contractors of the importance of retaining existing nests on or near telecommunications infrastructure throughout the non-breeding period (December-April). Also ensure that all active nests are reported to Office of Environment and Heritage so they can be monitored to minimise disturbance.	State	Yes. Increasing environmental awareness is consistent with Objective 1 of the VMP.

In the Action Toolbox, five Action Descriptions have been identified in “Help save the Square-tailed Kite (*Lophoictinia isura*)*”* including:

Action Description	Scale	Applicable to the project
Throughout western areas of the species' range, encourage landholders to enter agreements, particularly in-perpetuity covenants or stewardship agreements, that promote the retention of large trees in riparian areas and connectivity of remnant woodland patches (priority should be to create or protect patches larger than 200ha with multi-layered vegetation structure).	Site	N/A.
Identify active nest sites and ensure that these sites are not disturbed during the breeding season; August - November (e.g. by restricting access within a 20m buffer to nests on public land and reducing activity within 20m of nests on private land).	State	Nesting sites, if identified during monitoring associated with the Objective 10 of the VMP (Clements et al 2017), will be protected from public access and disturbance.
Conduct targeted surveys for breeding pairs and liaise with local field ornithologist groups to locate nest trees in order to track reproductive success (e.g. number of eggs, successfully fledged offspring etc.) across the breeding season (August - November) and evaluate	Site	N/A. However if the species/breeding pairs are detected during monitoring associated with Objective 10 of the VMP (Clements *et al* 2017), this data can be used to help evaluate population viability.

Action Description	Scale	Applicable to the project
population viability.		
Undertake restoration and revegetation of remnant woodland (prey habitat) patches within 20km of known active nest sites, focusing on patches that are or could be larger than 200ha once connected, to maximise area of structurally diverse woodland for foraging.	Site	Yes. The aim of the proposal is to increase the width, condition and security of landscape links. The proposal is to re-establish wildlife corridor across the extensively cleared 18 hole golf course on the BGC land by thickening of the between fairway vegetation and re-establish native vegetation.
Promote awareness among local communities of the impacts of illegally removing birds or nestlings from the wild or shooting individuals, as well as the threatened status of the species. Encourage the reporting of suspected nest-robbing, trapping or shooting to Environment Line (131 555).	State	Yes. Increasing environmental awareness is consistent with Objective 1 of the VMP.

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

The key threatening processes potentially relevant to the White-bellied Sea-Eagle, Little Eagle, Eastern Osprey and the Square-tailed Kite likely to result from this development are listed below.

The proposed development or activity is not likely to significantly increase the impact of key threatening processes relevant to White-bellied Sea-Eagle, Little Eagle, Eastern Osprey and the Square-tailed Kite, as:

Existing key threatening processes	Existing threat	Increased threat from the proposal
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	Yes. Watercourses have been highly modified and water quality is low in parts of the drains.	No. Proposal is not likely to increase the threat.
Clearing of native vegetation	Yes. Ongoing golf course management.	Yes. Clearing of approximately 0.43 ha of between-fairway vegetation, consisting of native and exotic trees with a golf course managed understorey (mainly mown existing grasses and frequently with soil topdressing).
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	Yes. BGC land bounded by urban land.	No. Proposal is not likely to increase the threat.

In conclusion, the proposal is not likely to significantly impact the White-bellied Sea-Eagle, Little Eagle, Eastern Osprey and the Square-tailed Kite. No species impact statement is required.

Recommendations to minimise risk of impacts to the White-bellied Sea-Eagle (*Haliaeetus leucogaster*), Little Eagle (*Hieraatus morphnoides*), Eastern Osprey (*Pandion cristatus)* and the Square-tailed Kite (*Lophoictinia isura*):

- the site specific Vegetation Management Plan (Conservation/Biodiversity Management Plan) for the proposed development presented in Part B of Clements *et al.* (2017) with

the associated Implementation and Compliance Table in Table 4 of Clements *et al.* (2017) should be applied;
- improvements to the watercourses; and
- improvements to the water quality entering the site, especially sewer overflows and stormwater runnoff from the adjoining residential developments.

3.3.7 Superb Fruit-Dove (*Ptilinopus superbus)*

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

The Superb Fruit-dove is a small pigeon, approximately 24 cm in length. The Superb Fruit-dove occurs principally from north-eastern in Queensland to north-eastern NSW. It is much less common further south, where it is largely confined to pockets of suitable habitat as far south as Moruya. It inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees. Part of the population is migratory or nomadic. There are records of single birds flying into lighted windows and lighthouses, indicating that birds travel at night. At least some of the population, particularly young birds, moves south through Sydney, especially in autumn (OEH species profile).

The species was not detected on the BGC land, and if present is likely to be confined to the good condition habitat in the north-west. As this habitat is not being modified for the proposal there is not expected to be a negative impact on this species. The habitat that will be modified for the proposal is already highly degraded and unstructured (between fairway trees with little understorey vegetation) and is not expected to be utilised by the species.

The proposed action is not likely to have an adverse effect on the species such that a local population is likely 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

The species is not a population.

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

The species is not an ecological community.

(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

(i) An area of 0.43 ha of highly modified 'between fairway vegetation' will be removed for the development. Due to the degraded nature of the 'between fairway vegetation', it is not considered important habitat for the Superb Fruit-Dove.

(ii) Currently, the habitat on the BGC land is fragmented from the surrounding bushland creating a blockage for fauna movement through the landscape (Burcher 1995).

(iii) The long term survival of the Superb Fruit-Dove will not be affected by the proposed removal of habitat on BGC land. The patch of degraded vegetation identified for removal is not considered high habitat value, due to lack of structure and soil modifications.

The habitat proposed to be removed, modified, fragmented or isolated to the long-term survival of the species in the locality is of low importance.

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

No declared areas of critical habitat will be impacted (either directly or indirectly). The BGC land and its immediate surrounds are not known to include any area declared or mapped as being of 'critical habitat'.

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

This species has been assigned to the Partnership (range-restricted) management stream under the *Saving our Species (SoS)* program (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10709, accessed 24 July 2018), as less than 10% of the species' total population occurs within NSW.

No Actions or Objectives are avaliable in the SoS profile.

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

The key threatening processes potentially relevant to the Superb Fruit-Dove likely to result from this development are listed below. The proposal is not likely to significantly increase the impact of these processes as only a small amount, 0.43 ha, of largely modified, 'between fairway vegetation' will be removed.

The proposed development or activity is not likely to significantly increase the impact of key threatening processes relevant to Superb Fruit-Dove, as:

Existing key threatening processes	Existing threat	Increased threat from the proposal
Clearing of native vegetation	Yes. Ongoing golf course management.	Yes. Clearing of approximately 0.43 ha of between-fairway vegetation, consisting of native and exotic trees with a golf course managed understorey (mainly

Existing key threatening processes	Existing threat	Increased threat from the proposal
		mown existing grasses and frequently with soil topdressing).

In conclusion, the proposal is not likely to significantly impact the Superb Fruit-Dove. No species impact statement is required.

Recommendations to minimise risk of impacts to the Superb Fruit-Dove (*Ptilinopus superbus*):

- the site specific Vegetation Management Plan (Conservation/Biodiversity Management Plan) for the proposed development presented in Part B of Clements *et al.* (2017) with the associated Implementation and Compliance Table in Table 4 of Clements *et al.* (2017) should be applied; and
- protect and enhance the existing areas with rainforest/mesic understorey in the north-west, adjoining Cabbage Tree Road and other areas on the higher areas of the BGC land. The listed threat in the species profile for the species is 'Clearing and degradation of rainforest remnants'.

3.4 Amphibians

3.4.1 Green and Golden Bell Frog (*Ranoidea aurea,* formerly *Litoria aurea)*

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

A relatively large, stout frog, ranging in size from approximately 45 mm to approximately 100 mm snout to vent length. Diagnostic features are a gold or creamish white stripe running along the side, extending from the upper eyelids almost to the groin, with a narrow dark brown stripe beneath it, from nostril to eye. It inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas (OEH species profile).

The species was not detected on the BGC land, and if present would only utilise the golf course dams and ponds, such as ponds south of Cabbage Tree Road. As this habitat is not being modified for the proposal there is not expected to be a negative impact on this species.

The proposed action is not likely to have an adverse effect on the species such that a local population is likely 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

The species is not a population

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

The species is not an ecological community.

(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

(i) The proposal aims to conserve, enhance and re-establish coastal floodplain habitat. Proposal re-establishes watercourses across the golf course.

An area of 0.43 ha of highly modified 'between fairway vegetation' will be removed for the development. Due to the degraded nature of the 'between fairway vegetation, it is not considered important habitat for the Green and Golden Bell Frog.

(ii) Currently, the habitat on the BGC land is fragmented from the surrounding bushland creating a blockage for fauna movement through the landscape (Burcher 1995).

(iii) The long term survival of the Green and Golden Bell Frog will not be affected by the proposed removal of habitat on BGC land. The patch of degraded vegetation identified for removal is not considered high habitat value, due to lack of structure and soil modifications.

The habitat proposed to be removed, modified, fragmented or isolated to the long-term survival of the species in the locality is of low importance.

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

No declared areas of critical habitat will be impacted (either directly or indirectly). The BGC land and its immediate surrounds are not known to include any area declared or mapped as being of 'critical habitat'.

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

The Draft Recovery Plan for the Green and Golden Bell Frog (*Litoria aurea*) (DEC 2005) identifies the following Recovery Plan Objectives:

Draft Recovery Plan Objective (DEC 2005)	Proposal compliance
1. increase the security of key GGBF populations by way of preventing the further loss of GGBF habitat at key populations across the species range and where possible secure opportunities for increasing protection of habitat areas (reservation / conservation status, Section 10)	N/A. There are no key GGBF populations on the site, however habitat that could be utilised by the species will be improved through the VMP.
2. ensure extant GGBF populations are managed	N/A.

Draft Recovery Plan Objective (DEC 2005)	Proposal compliance
to eliminate or attenuate the operation of factors that are known or discovered to be detrimentally affecting the species (threat and habitat management, Section 11)	
3. implement habitat management initiatives that are informed by data obtained through investigations into the general biology and ecology of the GGBF through a systematic and coordinated monitoring program (research and monitoring, Section 12)	Yes. Extensive revegetation and restoration works are proposed through the VMP. This will aim to improve habitat suitability for the GGBF.
4. establish, within more than one institution, self sustaining and representative captive populations (particularly 'at risk' populations) of the Green and Golden Bell Frog for the primary purpose of maintaining 'insurance' colonies for re-establishment and supplementation of populations of the species (captive breeding and translocation, Section 13; with research and educational purposes a secondary objective.)	N/A.
5. increase the level of regional and local awareness of the conservation status of the Green and Golden Bell Frog and provide greater opportunity for community involvement in the implementation of this recovery plan (community education, awareness and involvement, Section 14)	Yes. Increasing environmental awareness is consistent with Objective 1 of the VMP.

The Green and Golden Bell Frog has been assigned to the Site-managed species management stream under the *Saving our Species (SoS)* program (http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10483, accessed 24 July 2018). Available data on locations and threats enable the development of a site-based conservation project for this species. The species is highly regarded by the community.

A there are no known extant populations in the Northern Beaches LGA, no management sites exist for the Green and Golden Bell Frog (OEH 2018).

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

The key threatening processes potentially relevant to the Green and Golden Bell Frog likely to result from this development are listed below.

The proposed development or activity is not likely to significantly increase the impact of key threatening processes relevant to Green and Golden Bell Frog, as:

Existing key threatening processes	Existing threat	Increased threat from the proposal
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	Yes. Watercourses have been highly modified and water quality is low in parts of the drains.	No. Proposal is not likely to increase the threat.
Clearing of native vegetation	Yes. Ongoing golf course management.	Yes. Clearing of approximately 0.43 ha of between-fairway

Existing key threatening processes	Existing threat	Increased threat from the proposal
		vegetation, consisting of native and exotic trees with a golf course managed understorey (mainly mown existing grasses and frequently with soil topdressing).
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	Yes. BGC land bounded by urban land.	No. Proposal is not likely to increase the threat.

In conclusion, the proposal is not likely to significantly impact the Green and Golden Bell Frog. No species impact statement is required.

Recommendations to minimise risk of impacts to the Green and Golden Bell Frog (*Ranoidea aurea,* formerly *Litoria aurea*):

- the site specific Vegetation Management Plan (Conservation/Biodiversity Management Plan) for the proposed development presented in Part B of Clements *et al.* (2017) with the associated Implementation and Compliance Table in Table 4 of Clements *et al.* (2017) should be applied;
- improvements to the watercourses; and
- improvements to the water quality entering the site, especially sewer overflows and stormwater runoff from the adjoining residential developments.

4.0 Applying the 7 part test for Endangered Ecological Communities

Endangered Ecological Community	Recorded on BGC land	Direct or indirect adverse impacts
The Coastal Floodplain community	Yes	Unlikely to be impacted.
Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	Possibly, no naturally occurring *Corymbia maculata* recorded or observed onsite	Unlikely to be impacted.

4.1 Coastal Floodplain communities

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

Coastal Floodplain Communities are not a threatened species, but threatened ecological communities.

(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

This is an ecological community is not a population.

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

i) The Coastal Floodplain community present on the BGC land is restricted to the original soil on low lying land (not on fill). None of these occurrences will be directly impacted by the proposed re-establishment of watercourses and associated riparian zones across the golf course.

The proposed action is not likely to have an adverse effect on the ecological communities such that a local occurrence is likely to be placed at risk of extinction.

ii) The proposed action is to retain the existing approximately 4.44 ha of degraded patches of the Coastal Floodplain community insitu. (The 4.44 ha area count is likely to be an over-estimate as it includes the fragmented strips of historically planted *Casuarina glauca)*.

On the low-lying land, there is a proposed increase in area from approximately 4.44 ha to 11.9 ha of connected, restored and re-established fresh and brackish ecosystems of the listed Coastal Floodplain communities.

The proposal is not 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.

(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

i) The proposal aims to conserve, enhance and re-establish coastal floodplain habitat. Proposal re-establishes watercourses across the golf course.

No habitat of the Coastal Floodplain community is likely to be removed or modified as a result of the proposed development or activity.

ii) The areas of habitat of the Coastal Floodplain community on the BGC land is restricted to areas unsuitable to play golf. The habitat exists as a narrow band of degraded vegetation close to the south-western, southern and northern boundaries. These narrow strips are fragmented by cut drains as well as by golf course filling. The proposal aims to increase habitat corridor widths of the existing Coastal Floodplain community.

The area of habitat is not likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity.

Iii) No existing habitat of the Coastal Floodplain community is proposed to be removed. The proposal is not likely to affect the long-term survival of the ecological community in the locality.

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

No declared areas of critical habitat will be impacted (either directly or indirectly). The BGC land and its immediate surrounds are not known to include any area declared or mapped as being of 'critical habitat'.

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

There are no recovery plans for the Communities and their intergrades.

There are communities profiles for endangered ecological Coastal Floodplain communities. In the Recovery Strategy section in the Community profiles, it is stated that "A Saving Our Species conservation project is currently being developed for this species and will be available soon" for three of the four Coastal Floodplain communities that are likely to occur on BGC land. For *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*, a targeted strategy has been developed.

Community Profile	Under Recovery Strategy
Coastal Floodplain Communities	
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	A Saving Our Species conservation project is currently being developed for this species and will be available soon.
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	A targeted strategy for managing this species has been developed under the Saving Our Species program
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	A Saving Our Species conservation project is currently being developed for this species and will be available soon.
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	

In the Recovery Strategy (http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10787, accessed 24 July 2018) from the community profile for *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions,* it is stated that:

> *The key threats to the viability of landscape-managed ecological communities are loss, fragmentation and degradation of habitat, and widespread pervasive factors such as impacts of climate change. Many of these threats are addressed by NSW planning, native vegetation, and biodiversity legislation, policy and programs including the offsets program (BioBanking, NSW Biodiversity Offsets Policy for Major Projects), Biodiversity Certification, management of environmental water and reservation under the National Parks and Wildlife Act 1974. ...*
>
> *The actions listed in the action toolbox are supplementary to NSW legislation, policy and programs and can be used by stakeholders, where applicable to guide management at a site, regional or state scale.*

Action toolbox

Action description	Scale	Applicable to the proposal
Encourage off-creek watering for stock such as having dams upstream of the creek and TEC	Site, Area	N/A. The BGC land is a golf course and has offstream irrigation dams.
Undertake educational/promotional activities to raise awareness and appreciation such as distribution of relevant publications, erecting interpretive signs at strategic locations, school programs, establishing a demonstration site for the TEC. Include information about fauna that depend on the TEC as well as threats to the community such as altered hydrology, human disturbance and weeds	Area	Yes. Consistent with Objective 1 of the VMP.
Councils to publicise their rubbish collection particularly for green waste and to let residents know that green waste such as clippings is actually not beneficial to the TEC	Area	Yes. Northern Beaches Council has a greenwaste program.
Liaise with Council to discourage mowing within and close to the TEC. Undertake training for Council operational staff about mowing and other activities that may be detrimental to the TEC.	Area, Site	Yes. Northern Beaches Council employs professional ecologists. The VMP for the BGC land is to be implemented by professional restoration ecologists. Both sets of ecologists are likely to liaise to discourage mowing within and close to the TEC.
Work with land managers to prevent damage and disturbance by visitors by managing access through the installation of bollards, gates, and/or fencing at strategic locations and/or the use of deterrent signage. Encourage natural revegetation or revegetate following any track closure.	Site	Yes. Consistent with the VMP and the orderly operation of the golf course.
Undertake appropriate weed control using the most appropriate methods to suit differing conditions and schedule regular follow up work. Removal of African Olive privet lantana to encourage groundcover regeneration	Site	Yes. Consistent with Objective 7 of the VMP.
Develop a holistic catchment or creek line approach to weed management to prevent re-seeding from upstream so that there are not individual weed management plans operating in isolation	Area	Yes. Consistent with environmentally sustainable development and the VMP, especially Objectives 3, 4, 7, 10.
Follow recommendations in "An independent review of bell miner associated dieback – Final Report June 2017" by Knowledge Ecology commissioned by OEH. http://www.environment.nsw.gov.au/resources/vegetation/bell-miner-associated-dieback-independent-review.pdf	Site	N/A. Bell miner are not likely to occur on the BGC land.
Encourage land managers to participate in conservation agreements (preferably long-term in perpetuity) to protect the TEC	Site	Yes. The implementation of the VMP relies on the golf course management to participate in onsite conservation management, consistent with Objective 1 of the VMP
Support and encourage the continuation of volunteer bush regeneration programs.	Site, Area	N/A. The BGC land is managed by a professional team.

Action description	Scale	Applicable to the proposal
Encourage natural regeneration in the first instance. If natural revegetation is not enough undertake habitat restoration including species from all strata. Install nest boxes where appropriate	Site	Yes. Consistent with the VMP, especially Objectives 7, 8, 9, 10.
Encourage nurseries, including Council nurseries, to stock species from this TEC and to use them in Council plant give away's	Area	Yes. The specialists local native nursery and the Council are being consulted as part of planning for the proposal.
Liaise with Councils to develop a TEC species list for habitat restoration appropriate for different geologies	Area, Site	Yes. The Council are being consulted as part of the planning for the proposal. Based on survey data from the BGC and nearby, lists of local native species for the different geologies have been developed.
Work with land managers to revegetate cleared areas following Australian Native Plant Conservation guidelines. Promote the OEH Enviro Line to report any unauthorised clearing or damage to the TEC	Area, Site	Yes. The implementation of the VMP will use the current "best practices". Objective 10 includes monitoring and reporting requirements
Liaise with water authorities to ensure that there are mechanisms in place to prevent stormwater and sewage overflowing into the TEC. Work with these agencies to include riparian health as well as human health when considering risks	Site, Area	Yes. Based on the recorded *E. coli* counts in the watercourse liaising water authorities to ensure that there are mechanisms in place to prevent stormwater and sewage overflowing into the TEC will form part of the implementation of the VMP, especially Objective 4.
Liaise with land managers water authorities to reduce the amount of nutrients entering the waterway. This may include the construction of better tailwater dams.	Site	Yes. Consistent with Objective 4 of the VMP
Encourage water sensitive design that benefits the TEC such as planting of buffer zones to trap nutrients and the design and installation of detention basins that have an ecological value so that hydrology is improved. Encourage Councils and other land managers to plan holistically when installing detention basins. Use Western Sydney Parklands Eastern Creek as a demonstration site	Site, Area	Yes. Consistent with Objectives 3, 4, 8, 9, 10.
Develop guidelines for infrastructure that cuts corridors such as culverts to protect ecological processes including appropriate sizing of culverts and other infrastructure to take into account impacts on the TEC so that function is improved as well as corridors for wildlife	Area	Yes. Forms part of the stormwater management of the BGC land.
Increase floodplain width by restoring unimpeded one in 100 flood line	Site, Area	N/A. The low lying land of the BGC land is below the 1:100 year floodline.
Undertake ground water monitoring to better understand the water system and how it impacts on the TEC and to be able to address the threat of altered hydrology	Site, Area	Yes. Being undertaken as part of proposal.

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

process

The proposed development or activity is not likely to significantly increase the impact of any of key threatening process on the *Coastal Floodplain community* on the BGC land, as:

Existing key threatening processes ▲	Existing threat	Increased threat from the proposal
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	Yes. Natural watercourses historically relocated as excavated drains close to boundary, with filling of original watercourses.	No. Proposal re-establishes watercourses across the golf course.
Bushrock removal	No.	No. Proposal is not likely to increase the threat.
Clearing of native vegetation	Yes. Ongoing golf course management with mowing and fertilising.	Yes. Clearing of approximately 0.43 ha of between-fairway vegetation, consisting of native and exotic trees with a golf course managed understorey (mainly mown existing grasses and frequently with soil topdressing).
Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus* (L.)	No. Rabbit not observed on the golf course, though expected.	No. Proposal is not likely to increase the threat. The proposal includes changing from Kikuyu Grass to a less nutrient requiring grass Couch.
Competition and habitat degradation by Feral Goats, *Capra hircus* Linnaeus 1758	No. No goats recorded nor observed on the BGC land.	No. Goats not proposed to be introduced by the proposal.
Competition from feral honey bees, *Apis mellifera* L.	No. None of the species hives of honey bees recorded nor observed on the BGC land.	No. No hives of honey bees on the BGC land proposed.
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	No. Fire frequency low.	No. No increase in fire frequency proposed.
Infection of native plants by *Phytophthora cinnamomi*	No. *Phytophthora cinnamomi* not recorded on the BGC land.	No. Proposal is not likely to increase the threat.
Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae	Yes. Recorded in the north-west on the highly susceptible *Rhodamnia rubescens.* Recorded tree of *Syzygium paniculatum* possibly infected but species has low susceptibility (Pegg *et al.* 2012, page 7).	No. Proposal is not likely to increase the threat.
Invasion and establishment of exotic vines and scramblers	Yes. Widespread due to nutrient runoff.	No. Proposal is not likely to increase the threat.
Invasion of native plant communities by African Olive Olea europaea subsp. cuspidata (Wall. ex G. Don) Cif.	No. Not recorded on the BGC land.	No. Proposal is not likely to increase the threat.
Invasion of native plant communities by Chrysanthemoides monilifera	No. Not recorded on the BGC land.	No. Proposal is not likely to increase the threat.
Invasion of native plant communities by exotic perennial	Yes. The golf course supports fertilised and mown exotic grass	No. Proposal is not likely to increase the threat.

Existing key threatening processes ▲	Existing threat	Increased threat from the proposal
grasses		
Invasion, establishment and spread of Lantana (Lantana camara L. sens. Lat)	Yes. Lantana widespread, including in the remnant in the north-west.	No. Proposal is not likely to increase the threat.
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	Yes. BGC land bounded by urban land.	No. Proposal is not likely to increase the threat.
Removal of dead wood and dead trees	Yes. Ongoing as part the golf course management.	No. Proposal is not likely to increase the threat.

In conclusion, the proposal is not likely to significantly impact the Coastal Floodplain community. No species impact statement is required.

Recommendations to minimise risk of impacts to the Coastal Floodplain community:

- the site specific Vegetation Management Plan (Conservation/Biodiversity Management Plan) for the proposed development presented in Part B of Clements *et al.* (2017) with the associated Implementation and Compliance Table in Table 4 of Clements *et al.* (2017) should be applied. The proposal is to increase the connectivity and size of the existing native vegetation from 6.86 ha to more than 15 ha of potential habitat. Of the more than 15 ha, 11.9 ha are of Coastal Floodplain communities.

4.2 Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion

This test has been undertaken despite the mapped area of "Candidate-Pittwater Spotted Gum Forest" on the BGC land by Bell and Stables (2012) lacking the presence of *Corymbia maculata* (Spotted Gum), the characteristic species and dominant canopy species of the community.

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

Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion is not a threatened species, but threatened ecological community.

(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

This is an ecological community not a population.

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

i) The areas of more intact vegetation on soils derived from the Narrabeen geological group are restricted to the north-west (sampled in Transects 1, 18, 19) and close to Cabbage Tree

Road (sampled in the lower half of Transect 4, Transects 5, 8). These two patches meet the description of Group B of Bell and Stables (2012) and mesic forms of the *Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion*. These areas are not in the areas being affected by the proposal and are not in areas being actively managed for playing golf.

The proposal is not likely 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.

ii) Neither of the two patches of *Pittwater and Wagstaffe Spotted Gum Forest* are in the areas being affected by the proposal nor in areas being actively managed for playing golf.

The proposed action is not likely to substantially or adversely modify the composition of the two mapped patches of *Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion* such that its local occurrence is likely to be placed at risk of extinction.

(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

i) None of the existing habitat of *Pittwater and Wagstaffe Spotted Gum Forest* are likely to be removed or modified as a result of the proposed Seniors Housing nor golf course management, nor the existing golf management.

ii) The patch of habitat of *Pittwater and Wagstaffe Spotted Gum Forest* in the north-west is connected to the native vegetation offsite and is not fragmented.

In contrast the patch of habitat of *Pittwater and Wagstaffe Spotted Gum Forest* close to Cabbage Tree Road is reduced to a narrow band of vegetation on steep sloping land with existing Cabbage Tree Road cut into the slope, being the part of the vegetation pruned for powerlines in the south. This patch is truncated in the eastern end to a golf road and by fill on the upper northern end. The patch in the west is fragmented with the existing buggy way and former south to north path. The proposal is to relocate the buggy way onto the golf area and continue to allow regeneration of the current south to north path. The existing fill upslope is to be removed as a part of the proposal to reduce the ongoing risk from sediment and nutrient movement downslope.

iii) As no area of habitat of the community is to be removed, modified, fragmented or isolated, and the existing potential threats from sediment and nutrient downwash from the unconsolidated fill is to be reduced, the proposal is not likely to affect the habitat of the community or the long-term survival of the species or ecological community in the locality.

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

No declared areas of critical habitat will be impacted (either directly or indirectly). The BGC land and its immediate surrounds are not known to include any area declared or mapped as being of ‘critical habitat’.

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

There is no Recovery plan for *Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion (http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10634,* accessed 24 July 2018) There is a community profile with a link to Recovery Strategies. There is a targeted strategy for managing this species, it has been developed under the Saving Our Species program.

It is stated that:

> *The key threats to the viability of landscape-managed ecological communities are loss, fragmentation and degradation of habitat, and widespread pervasive factors such as impacts of climate change. Many of these threats are addressed by NSW planning, native vegetation, and biodiversity legislation, policy and programs including the offsets program (BioBanking, NSW Biodiversity Offsets Policy for Major Projects), Biodiversity Certification, management of environmental water and reservation under the National Parks and Wildlife Act 1974. ...*
>
> *The actions listed in the action toolbox are supplementary to NSW legislation, policy and programs and can be used by stakeholders, where applicable to guide management at a site, regional or state scale.*

Action toolbox

Action Description	Scale	Applicable to the proposal
Land manager to liaise with relevant fire authority (NPWS, Rural Fire Service) to develop and implement fire plans as per the TEC thresholds (Fire no more than once every 10 years).	Area	N/A. However fire frequency is not expected to change due to the proposal.
Liaise with relevant stakeholders (Local Land Services, NPWS, land owners, community groups, local council) to educate on the importance of the TEC and how threats including habitat loss, clearing, illegal tree and understorey removal, weeds, fire, erosion, encroachment and disease impact it. Methods of engagement can include workshops, letter-box drops, media campaigns, field days etc.	Area	Yes. Consistent with Objective 1 of the VMP.
Undertake active weed control for invasive species that compete with native species, including aerial spraying. Primary weed control to be undertaken in year 1, followed by secondary weed control annually (where required).	Site	Yes. Consistent with Objective 7 of the VMP.
Continue to support any bush regeneration groups and volunteers working in the area.	Area	Yes. This is consistent with the VMP, as it seeks to restore native vegetation on the BGC land.
Close illegal tracks at strategic sites to restrict access by recreational users. Develop and implement a rehabilitation plan to re-vegetate closed tracks. Locally sourced seed from species listed on the Scientific Determination will be used for re-vegetation and should represent all stratum of the TEC.	Site	N/A.
Install fencing at strategic sites to restrict access by recreational users.	Site	N/A.
Install signage in National Parks and Council reserves to	Site	Yes. Consistent with Objective 1

Action Description	Scale	Applicable to the proposal
educate the community about the TEC and threats to it, including disease.		of the VMP.

(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

Of the 38 listed key threatening processes, the following are considered relevant to *Pittwater and Wagstaffe Spotted Gum Forest* on the BGC land.

Existing key threatening processes ▲	Existing threat	Increased threat from the proposal
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	Yes. Natural watercourses historically relocated as excavated drains close to boundary, with filling of original watercourses.	No. Proposal re-establishes watercourses across the golf course.
Bushrock removal	No.	No. Proposal is not likely to increase the threat.
Clearing of native vegetation	Yes. Ongoing golf course management with mowing and fertilising of golf course and between-fairway vegetation.	Yes. Clearing of approximately 0.43 ha of between-fairway vegetation, consisting of native and exotic trees with a golf course managed understorey (mainly mown existing grasses and frequently with soil topdressing).
Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus* (L.)	No. Rabbit not observed on the golf course, though expected.	No. Proposal is not likely to increase the threat. The proposal includes changing from Kikuyu Grass to a less nutrient requiring grass Couch.
Competition and habitat degradation by Feral Goats, *Capra hircus* Linnaeus 1758	No. No goats recorded nor observed on the BGC land.	No. Goats not proposed to be introduced by the proposal.
Competition from feral honey bees, *Apis mellifera* L.	No. No evidence of competition from honey bees recorded nor observed on the BGC land.	No. Proposal is not likely to increase the threat.
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	No. Fire frequency low.	No. No increase in fire frequency proposed.
Infection of native plants by *Phytophthora cinnamomi*	No. *Phytophthora cinnamomi* not recorded on the BGC land.	No. Proposal is not likely to increase the threat.
Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae	Yes. Recorded in the north-west on the highly susceptible *Rhodamnia rubescens.* Recorded tree of *Syzygium paniculatum* possibly infected but species has low susceptibility (Pegg *et al.* 2012, page 7).	No. Proposal is not likely to increase the threat.
Invasion and establishment of exotic vines and scramblers	Yes. Widespread due to nutrient runoff.	No. Proposal is not likely to increase the threat.
Invasion of native plant communities by African Olive	No. Not recorded on the BGC land.	No. Proposal is not likely to increase the threat.

Existing key threatening processes ▲	Existing threat	Increased threat from the proposal
Olea europaea subsp. cuspidata (Wall. ex G. Don) Cif.		
Invasion of native plant communities by Chrysanthemoides monilifera	No. Not recorded on the BGC land.	No. Proposal is not likely to increase the threat.
Invasion of native plant communities by exotic perennial grasses	Yes. The golf course supports fertilised and mown exotic grass.	No. Proposal is not likely to increase the threat.
Invasion, establishment and spread of Lantana (Lantana camara L. sens. Lat)	Yes. Lantana widespread, including in the remnant in the north-west.	No. Proposal is not likely to increase the threat.
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	Yes. BGC land bounded by urban land.	No. Proposal is not likely to increase the threat.
Removal of dead wood and dead trees	Yes. Ongoing as part the golf course management.	No. Proposal is not likely to increase the threat.

In conclusion, the proposal is not likely to significantly impact on the *Pittwater and Wagstaffe Spotted Gum Forest* on the BGC land. No species impact statement is required for *Pittwater and Wagstaffe Spotted Gum Forest* on the BGC land.

Recommendations to minimise existing risk to the *Pittwater and Wagstaffe Spotted Gum Forest*

- the site specific Vegetation Management Plan (Conservation/Biodiversity Management Plan) for the proposed development presented in Part B of Clements *et al.* (2017) with the associated Implementation and Compliance Table in Table 4 of Clements *et al.* (2017) should be applied. The term Vegetation Management Plan in Clements *et al.* (2017) is used because the conservation areas include the waterfront land.

In particular:

- the existing threats from *Lantana camara* to the more intact areas be reduced, especially control of *Lantana camara*;
- the existing extensive fill upslope of the narrow strip of more intact vegetation adjoining Cabbage Tree Road be carefully removed; and
- the existing powerlines through the lower slope of the more intact vegetation adjoining Cabbage Tree Road be removed from the northern side of Cabbage Tree Road to avoid the ongoing pruning of this vegetation.

Appendix 3: Photographic record of search for *Rhodamnia rubescens* on 24 July 2018

Appendix 3
Photographic record of search for *Rhodamnia rubescens* on 24 July 2018

Southern end of 20 m x 20 m quadrat looking north.

Extensive dumping at the east end of Quadrat looking west.

Extensive dumping east of Quadrat looking west.

South of 20 m x 20 m looking west with tree lopping in distant background.

Existing ground cover disturbance near centre of quadrat looking north east.

Cut drains and altered soil levels west of maintenance shed looking east.

Remnant rainforest understorey near maintenance shed.

Trunk of *Rhodamnia rubescens* tree in front of Security fence.

Rhodamnia rubescens coppice growth.

Rhodamnia rubescens foliage without any sign of Myrtle Rust